5.11 NOISE

This section of the Draft Environmental Impact Report (DEIR) discusses the fundamentals of sound; examines federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing noise-sensitive receptor locations; and evaluates potential noise and vibration impacts associated with the Ontario Ranch Business Park Specific Plan project (proposed project); and provides mitigation to reduce noise impacts at sensitive receptor locations. This evaluation uses procedures and methodologies as specified by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) and evaluates the potential for the proposed project to result in noise and vibration impacts at nearby sensitive receptors. Appendix J of this DEIR provides supplementary, project-specific background information, construction noise calculation worksheets, and project-generated traffic noise modeling results.

5.11.1 Environmental Setting

5.11.1.1 SOUND FUNDAMENTALS

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A 3 dBA change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dBA is readily discernable to most people in an exterior environment whereas a 10 dBA change is perceived as a doubling (or halving) of the sound.

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by weighting frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects of noise, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain human activities.

Technical Terminology

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." The following are brief definitions of terminology used in this section:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 pm to 10:00 pm and 10 dB from 10:00 pm to 7:00 am. For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive, that is, higher than the L_{dn} value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Peak Particle Velocity (PPV).** The peak signal value of an oscillating vibration velocity waveform, usually expressed in inches per second (in/sec).
- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second ($1x10^{-6}$ in/sec).

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.
- **RCNM.** Federal Highway Administration Roadway Construction Noise Model

Sound Measurement

Sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, while 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single point source, sound levels decrease by approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dBA for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases by 4.5 dBA for each doubling of distance.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time, or 1, 5, and 15 minutes per hour. These "Ln" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and the County require that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. to 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. to 7:00 a.m. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 p.m. and 10:00 p.m. Both descriptors give roughly the same 24-hour level with the CNEL being only slightly more restrictive (i.e., higher).

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. Table 5.11-1 shows typical noise levels from familiar noise sources.

Table 5.11-1 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans 2013.

5.11.1.2 VIBRATION FUNDAMENTALS

Vibration is an oscillating motion in the earth. Like noise, vibration is transmitted in waves, but in this case through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard.

Vibration can be either natural as in the form of earthquakes, volcanic eruptions, landslides, or man-made as from explosions, heavy machinery or trains. Both natural and man-made vibration may be continuous such as from operating machinery, or impulsive as from an explosion.

As with noise, vibration can be described by both its amplitude and frequency. Amplitude may be characterized in three ways including displacement, velocity, and acceleration. Particle displacement is a measure of the distance that a vibrated particle travels from its original position and for the purposes of soil displacement is typically measured in inches or millimeters. Particle velocity is the rate of speed at which soil particles move in inches per second or millimeters per second. Particle acceleration is the rate of change in velocity with respect to time and is measured in inches per second or millimeters per second. Typically, particle velocity (measured in inches per second) and/or acceleration (measured in gravities) are used to describe vibration. Table 5.11-2 presents the human reaction to various levels of peak particle velocity (PPV).

Table 5.11-2 Human Reaction to Typical Vibration Levels

Vibration Level Peak Particle Velocity (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings
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 2013.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

5. Environmental Analysis
NOISE

5.11.1.3 REGULATORY BACKGROUND

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

Federal

While there are no federal regulations directly applicable to implementation of the project under CEQA, the federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the EPA. Such limitations would apply to the operation of construction equipment and would also apply to any proposed industrial warehouse land uses. Noise exposure of this type is dependent on work conditions and is addressed through a facility's Health and Safety Plan, as required under OSHA, and is, therefore, not addressed further in this analysis.

State

General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. Local municipalities adopt these compatibility standards as part of their General Plan and modify them as appropriate for their local environmental setting.

California Building Code

The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, *Allowable Interior Noise Levels*, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

The State of California's noise insulation standards for nonresidential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA

CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

Local Noise Standards

City of Ontario – The Ontario Plan Safety Element

The Safety and Land Use Elements of The Ontario Plan (TOP) set forth goals, policies, and land use guidelines to protect residential neighborhoods and noise-sensitive receptors from excessive noise levels. The City uses the Noise Level Exposure and Land Use Compatibly Guidelines (shown in Table 5.11-3 below) when siting new development and making land use decisions.

Table 5.11-3 Noise Level Exposure and Land Use Compatibility Guidelines

Land Use Categories		Community Noise Equivalent Level (CNEL)			
Category	Uses	Clearly Acceptable[1]	Normally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential/Lodging	Single Family/Duplex	<60	60-65	65-70	70-85
	Multi-Family	<60	60-65	65-75	75-85
	Mobile Homes	<60	60-65	-	65-85
	Hotel/Motel	<65	65-70	70-80	80-85
Public/Institutional	Schools/Hospitals	<60	60-65	65-70	70-85
	Churches/Libraries	<60	60-65	65-70	70-85
	Auditoriums/Concert Halls	<55	55-60	60-70	70-85
Commercial	Offices	<65	65-75	75-80	80-85
	Retail	<70	70-75	75-80	80-85
Industrial	Manufacturing	<70	70-75	75-85	-
	Warehousing	<70	70-80	80-85	-
Recreational/Open Space	Parks/Playgrounds	<65	65-70	70-75	75-85
	Golf Course/Riding Stables	<65	65-70	70-75	75-85
	Outdoor Spectator Sports	<60	60-65	65-70	
	Outdoor Music Shells/Amphitheaters	-	<60	60-65	65-85
	Livestock/Wildlife Preserves	<70	-	70-75	75-85
	Crop Agriculture	<55-85	-	-	-

Source: The Ontario Plan
1 No special noise insulation required, assuming buildings of normal conventional construction.
2 Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditions will normally suffice
3 New construction should be discouraged. Noise/aviation easements required for all new construction. If new construction does proceed, a detailed analysis of noise reduction requirements must be made, and necessary noise insulation features included.
4 No new construction should be permitted.

The following goals and policies from TOP Safety Element are directly relevant to the proposed project:

- **Goal S4:** An environment where noise does not adversely affect the public's health, safety, and welfare.

5. Environmental Analysis
NOISE

- **S4-1** Noise Mitigation. Utilize the City's Noise Ordinance, building codes and subdivision and development codes to mitigate noise impacts.
- **S4-2** Coordination with Transportation Authorities. Collaborate with airport owners, FAA, Caltrans, SANBAG, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, and updates to transportation related plans to minimize noise impacts and provide appropriate mitigation measures.
- **S4-4** Truck Traffic. Manage truck traffic to minimize noise impacts on sensitive land uses.
- **S4-5** Roadway Design. Design streets and highways to minimize noise impacts.

Municipal Code Standards

The City of Ontario enforces noise limits through the Municipal Code Chapter 29, *Noise*. Table 5.11-4 summarizes the City of Ontario's noise limits.

Table 5.11-4 Exterior Noise Standards – City of Ontario

	Allowed Equivalent Noise Level, Leq	
Land Use	7:00 AM to 10:00 PM	10:00 PM to 7:00 AM
Single-Family Residential	65 dBA	45 dBA
Multi-Family Residential, Mobile Home Parks	65 dBA	50 dBA
Commercial Property	65 dBA	60 dBA
Residential Portion of Mixed Use	70 dBA	70 dBA
Manufacturing and Industrial, Other Uses	70 dBA	70 dBA

Source: City of Ontario Municipal Code, Chapter 29 *Noise – Section 5-29.04 Exterior* Noise *Standards*

The noise limits summarized in Table 5.11-4 are subject to the following:

- The noise standard for the applicable zone for any fifteen-minute (15) period; and
- A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).
- In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.
- The Noise Zone IV (residential portion of mixed use) standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.
- If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

- Per Section, 5-29.11, the noise standards assigned to Noise Zone I (single-family residential) also apply to the outdoor use area of any school, day care center, hospital or similar health care institution, library or museum while it is in use.

Per Section 5-29.06(e), noise sources associated with construction, repair, remodeling, demolition or grading of a public right-of-way is exempt from the provisions of the Municipal Code.

Section 5-29.09 addresses construction noise and states that no person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 AM and 6:00 PM or on Saturday or Sunday between the hours of 9:00 AM and 6:00 PM.

City of Chino

The City of Chino enforces noise limits through the Municipal Code Chapter 9.40, *Noise*. Table 5.11-5 summarizes the City of Chino's noise limits for residential, school, and hospital (or similar health care institution) properties.

Table 5.11-5 Exterior Noise Standards – City of Chino

Time Period	Noise Level (dBA)				
	L_{50}[1]	L_{25}[2]	L_{8}[3]	L_{2}[4]	L_{max}[5]
7:00 a.m.–10:00 p.m.	55	60	65	70	75
10:00 p.m.–7:00 a.m.	50	55	60	65	70

Source: City of Chino Municipal Code, Chapter 9.40 *Noise – Section 9.40.040 Exterior Noise Standards, Section 9.40.070 Schools, Churches, Libraries, Health Care Institutions – Special Provisions.*
Note: A 5 dBA penalty shall be applied in the event of an alleged offensive noise such as impact noise, simple tones, speech, music, or any combination of thereof.
The noise standards shall not exceed
1 The noise standard for a cumulative period of more than 30 minutes in any hour; or
2 The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
3 The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
4 The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
5 The noise standard plus 20 dBA for any period of time.

The noise limits summarized in Table 5.11-5 are subject to the following:

- Each of the noise limits specified in Table 5.11-5 shall be reduced by 5 dBA for impulse or simple tone noises, or for noises consisting of speech or music; provided, however, that if the ambient noise level exceeds the resulting standard, the ambient shall be the standard.
- In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

- If the measurement location is on a boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

Construction activity is exempt from the provisions of the Municipal Code between the hours of 7:00 AM and 8:00 PM Monday through Saturday, with no construction allowed on Sundays and federal holidays per sections 9.40.060 and 15.44.030 of the Chino Municipal Code. The construction noise standard is 65 dBA at the affected residential property line.

Section 9.40.110 of the Chino Municipal Code sets the threshold of vibration perception at no more than 0.05 inches/second RMS vertical velocity (equivalent to 94 VdB).

5.11.1.4 EXISTING CONDITIONS

Sensitive Receptors

The Ontario Ranch Specific Plan proposes industrial and business park uses. The site is an existing dairy farm bounded by Euclid Avenue to the west, Merrill Avenue to the south, and Eucalyptus to the north. The nearest sensitive receptors from the project site are residences to the west across Euclid Avenue in City of Chino and residences to the north across Eucalyptus Avenue in the City of Ontario. The Egan Lyle High School and Youth Correctional Facility are located southwest of the project site.

Ambient Noise Measurements

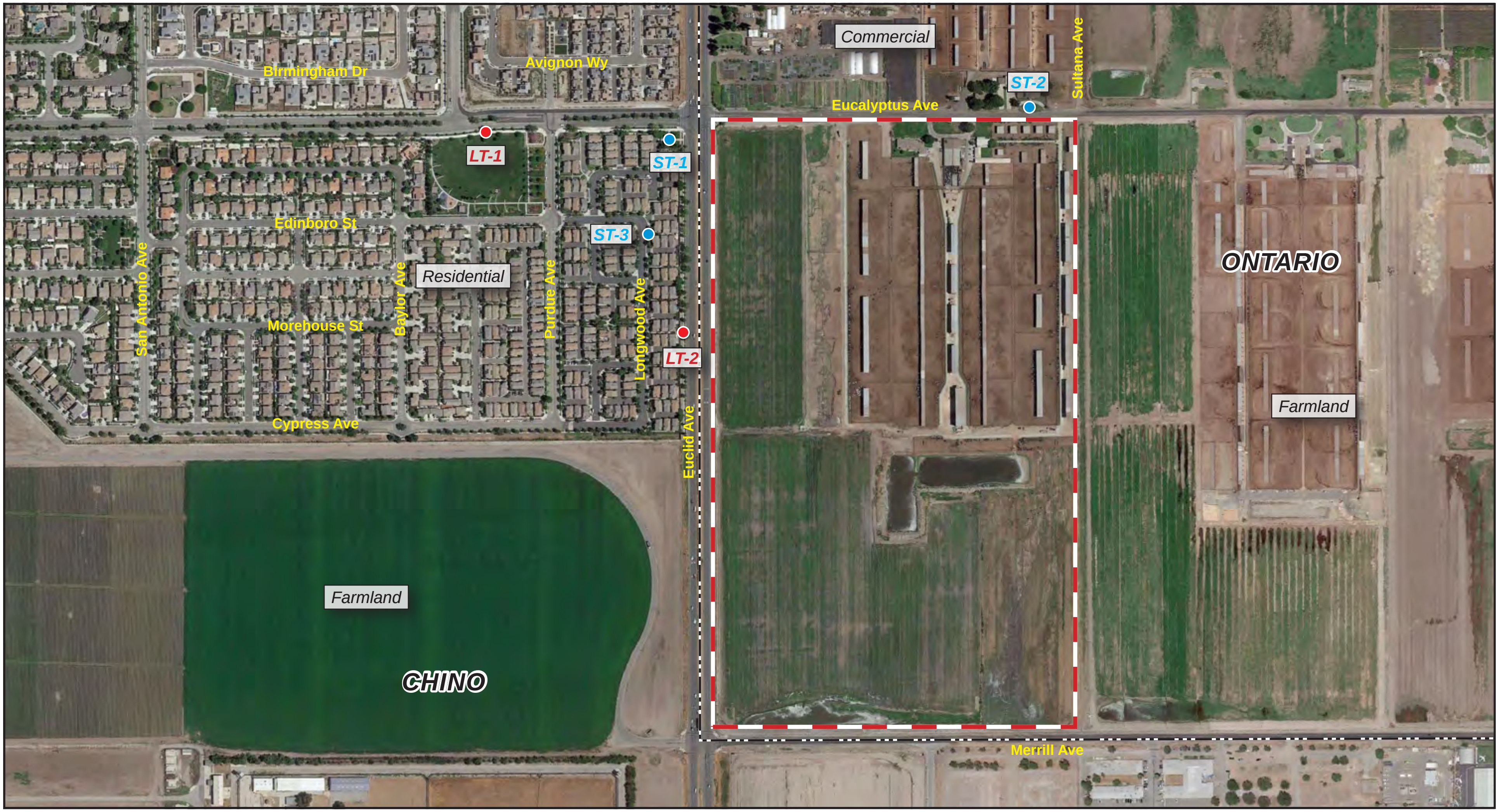
To determine baseline noise levels within the project vicinity, ambient noise monitoring was conducted by PlaceWorks in the month of May 2019. Measurements were made on a weekday at three short-term (15-minute) measurement locations. Two long-term (48-hour) measurements and conducted between Tuesday, May 28 through Thursday, May 30 of 2019.

The primary noise sources during measurements were roadway traffic and aircraft overflights. Secondary noises such as pedestrian foot traffic, dogs barking and birds chirping also contributed to the overall noise environment. Meteorological conditions during the measurement period were favorable for outdoor sound measurements and were noted to be representative of the typical conditions for the season. Generally, conditions included mostly clear skies with daytime temperatures ranging from 60 to 66 degrees Fahrenheit (°F), and average wind speeds between 1 to 2 miles per hour (mph). All sound level meters were equipped with a windscreen during measurements.

All sound level meters used for noise monitoring satisfy the American National Standards Institute (ANSI) standard for Type 1 instrumentation.[1] The sound level meters were set to "slow" response and "A" weighting (dBA). The meters were calibrated prior to and after the monitoring period. All measurements were at least 5 feet above the ground and away from reflective surfaces. Noise measurement locations are described below and shown in Figure 5.11-1, *Approximate Noise Monitoring Locations*.

[1] Monitoring of ambient noise was performed using Larson-Davis model LxT and 820 sound level meters.

Figure 5.11-1 - Approximate Noise Monitoring Locations



Project Boundary
City Boundary
ST-# Short-Term Noise Measurement Locations (3)
LT-# Long-Term Noise Measurement Locations (2)

0 650
Scale (Feet)

Source: Google Earth Pro, 2019

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The following describes the noise monitoring locations:

- **Long-Term Location 1 (LT-1)** was located near Constellation Park off Eucalyptus Avenue, approximately 20 feet south of the closest eastbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at the 9:00 AM hour Tuesday, May 28, 2019. The noise environment of this site is characterized primarily by traffic from Eucalyptus Avenue and foot traffic from park goers and pedestrians. Two heavy-duty trucks, two medium duty trucks, and 35 auto pass-bys were observed in a 5-minute period.
- **Long-Term Location 2 (LT-2)** was located off Euclid Avenue, approximately 0.15 miles south of Eucalyptus Avenue. The meter was approximately 25 feet west of the closest southbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at the 9:00 AM hour Tuesday, May 28, 2019. The noise environment of this site is characterized primarily by traffic on Euclid Street. A total of 22 heavy-duty trucks, 18 medium-duty trucks, and 99 auto pass-bys were observed in a 5-minute period.
- **Short-Term Location 1 (ST-1)** was located near the southwest corner of Eucalyptus Avenue and Euclid Avenue in College Park. A 15-minute noise measurement was conducted, beginning at 9:32 AM on Tuesday, May 28, 2019. The noise environment of this site is characterized primarily by traffic from Euclid Avenue and Eucalyptus Avenue. Traffic noise levels generally ranged from 62 dBA to 70 dBA. Heavy-duty trucks ranged from 70 dBA to 79 dBA. The background noise level was observed to be as low as 50 dBA.
- **Short-Term Location 2 (ST-2)** was located in front 7280 Eucalyptus Avenue, east of Euclid Avenue, approximately 15 feet north of the westbound centerline. A 15-minute noise measurement was conducted, beginning at 10:06 AM on Tuesday, May 28, 2019. The noise environment of this site is characterized primarily by roadway traffic and aircraft overflights. Aircraft overflight noise levels ranged from 53 dBA to 55 dBA. Traffic noise levels typically ranged from 71 dBA to 78 dBA. Heavy-duty trucks ranged from 75 dBA to 87 dBA. The background noise level was observed to be low as 47 dBA. During a 15-minute period, 12 autos, 3 medium-duty trucks, and 6 heavy-duty trucks were observed.
- **Short-Term Location 3 (ST-3)** was located in front of 14535 Longwood Avenue. A 15-minute noise measurement was conducted, beginning at 10:35 AM on Tuesday, May 28, 2019. The noise environment of this site is characterized primarily by aircraft overflights. Secondary noise sources were birds and heavy-duty trucks on Euclid Avenue. Aircraft overflight noise levels ranged from 48 to 60 dBA and traffic noise levels were observed to be up to 60 dBA on occasion. The background noise level was observed to be low as 39 dBA.

Ambient Noise Monitoring Results

Long-term and short-term noise measurements were conducted in the vicinity of the project site to assess the existing noise levels, determine the dominate sources of noise, and verify traffic noise modeling volumes. During the ambient noise survey, the CNEL noise levels at monitoring locations ranged from 70 to 81 dBA

5. Environmental Analysis
NOISE

CNEL. The long-term noise measurement results are summarized in Tables 5.11-6 and 5.11-7. A summary of the daily trend during long-term noise measurements are provided in Appendix J.

Table 5.11-6 Long-Term Noise Measurements Summary in A-weighted Sound Levels

Monitoring Location	Description	CNEL	Lowest Leq, 1-hr	Highest Leq, 1-hr
LT-1	Constellation Park – Eucalyptus Avenue 20 feet south of the closest eastbound travel lane centerline	70	53.3	71.0
LT-2	Euclid Avenue – South of Eucalyptus Avenue 25 feet west of the closest southbound travel lane centerline	81	69.3	77.8

Table 5.11-7 Short-Term Noise Measurements Summary in A-weighted Sound Levels

Monitoring Location	Description	15-minute Noise Level, dBA						
		Leq	Lmax	Lmin	L2	L8	L25	L50
ST-1	Constellation Park, Eucalyptus Avenue, west of Euclid Avenue, 9:32 AM, 5/28/2019	67.7	79.0	50.4	74.4	71.6	68.9	65.1
ST-2	7080 Eucalyptus Avenue, 10:06 AM, 5/28/2019	68.7	86.9	46.5	80.1	71.3	58.1	53.0
ST-3	14353 Longwood Avenue 10:35 AM, 5/28/2019	49.3	61.3	39.0	55.1	52.7	50.1	47.7

5.11.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would result in:

N-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

N-2 Generation of excessive ground borne vibration or ground borne noise levels.

N-3 For a project located within the vicinity of a private airstrip or 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, if the project would expose people residing or working in the project area to excessive noise levels.

Construction Noise

City of Chino

The City of Chino has set a noise limit to construction noise at 65 dBA at the affected residential property line.

City of Ontario

The City of Ontario has not established noise limits for temporary construction activities. Therefore, for the purposes of this analysis, the City of Chino threshold of 65 dBA at the affected residential property is also used to analyze construction noise impacts to affected residences in the City of Ontario.

Transportation Noise

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an exterior environment. Based on this, the following thresholds of significance are used to assess traffic noise impacts at sensitive receptor locations:

- Up to 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher;
- Up to 3 dBA increase for ambient noise environments of 60–64 CNEL; and
- Up to 5 dBA increase for ambient noise environments of less than 60 dBA CNEL.

Stationary Noise

City of Ontario

As discussed above in Section 5.11.1.3 *Regulatory Background*, the City's noise ordinance (Chapter 29, *Noise,* of the Municipal Code) establishes noise level standards at receiving residential, school, daycare, hospital, library and museum land uses (see Table 5.11-4). These noise limits are used as significance thresholds for stationary noise sources.

City of Chino

As discussed above in Section 5.11.1.3 *Regulatory Background*, the City's noise ordinance (Chapter 9.40, *Noise*, of the Municipal Code) establishes noise level standards at receiving residential, school and hospital land uses (see Table 5.11-5). These noise limits are used as significance thresholds for stationary noise sources.

Vibration

Architectural Damage

The cities of Ontario and Chino do not have established vibration damage criteria, therefore the United States Department of Transportation Federal Transit Administration (FTA) criteria for acceptable levels of ground-borne vibration for various types of buildings is used for this analysis. Structures amplify ground borne vibration and wood-frame buildings, such as typical residential structures, are more affected by ground vibration than heavier buildings. The level at which ground borne vibration is strong enough to cause architectural damage has not been determined conclusively. The most conservative estimates are reflected in the FTA standards shown in Table 5.11-8

Table 5.11-8 Ground borne Vibration Criteria: Architectural Damage

Building Category		PPV (in/sec)
I.	Reinforced concrete, steel, or timber (no plaster)	0.5
II.	Engineered concrete and masonry (no plaster)	0.3
III.	Non-engineered timber and masonry buildings	0.2
IV.	Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018.

Vibration Annoyance

Section 9.40.110 of the Chino Municipal Code sets the threshold of vibration perception at no more than 0.05 inches per second root mean squared (RMS) vertical velocity (equivalent to 94 VdB[2]). Therefore, the potential for vibration annoyance is assessed using 94 VdB as a threshold in this analysis.

5.11.3 Plans, Programs, and Policies

PPP N-1 The proposed project shall comply with City of Ontario Municipal Code Chapter 29, Exterior Noise Standards and Section 5-29.09, which limits construction activities to weekdays between the hours of 7:00 AM and 6:00 PM or on Saturday or Sunday between the hours of 9:00 AM and 6:00 PM.

PPP N-2 The proposed project shall comply with City of Chino Municipal Code Chapter 9.40, Exterior Noise Standards, and Section 15.44.040, which limits construction activities between the hours of 7:00 AM and 8:00 PM Monday through Saturday, with no construction allowed on Sundays and federal holidays.

[2] $Lv = 20\mathrm{Log}_{10}(V/Vref)$
Lv = velocity level, VdB

5.11.3.1 METHODOLOGY

This noise evaluation was prepared in accordance with the requirements of CEQA to determine if the proposed project would result in significant construction and operational impacts at nearby sensitive receptors. For purposes of CEQA noise impacts do not address noise compatibility of onsite sensitive receptors, however, the City requires projects to be designed to achieve the interior noise standards of Title 24, including the non-residential noise insulation requirements of the California Green Building Standards Code, which require exterior-interior noise insulation sufficient to achieve acceptable interior noise levels for the on-site office uses. Construction noise modeling was conducting using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). Traffic noise increases were calculated using a version of the Federal Highway Administration's (FHWA) Traffic Noise Prediction Model based on existing and future traffic volumes and vehicle mix provided by Urban Crossroads (Appendix L1 of this DEIR) for roadway segments in the plan area.

5.11.3.2 IMPACT ANALYSIS

Impact 5.11-1: Construction activities would result in substantial temporary noise increases in the vicinity of the proposed project. [Threshold N-1]

Two types of short-term noise impacts could occur during construction: (1) mobile-source noise from transport of workers, material deliveries, and debris and soil haul and (2) stationary-source noise from use of construction equipment.

Construction Noise

Project construction is anticipated to have off-site and on-site improvements and occur over the course of approximately 26 months. Off-site improvements involve infrastructure development of new sewer and water lines. On-site improvements involve the overall construction of the industrial and business park in two developmental phases. Each development phase is anticipated to have the similar construction phase activities (e.g. demolition, grading, building construction, and paving) with similar associated equipment mix.

Off-Site Improvements

The proposed project would include various off-site improvements that would take place along roadways and near residential uses. Off-site improvements such as expanding water and sewage lines would be temporary and such construction activity would not remain in one place for an extended period of time. Unlike on-site improvements and construction activity that is bounded by the project site, offsite improvements would progress a linear fashion. As discussed above, Section 5-29.06(e) of the Ontario Municipal Code exempts noise sources associated with construction, repair, remodeling, demolition or grading of a public right-of-way and construction noise associated with off-site improvements would be less than significant.

On-Site Improvements

Noise generated by on-site construction equipment is based on the type of equipment used, its location relative to sensitive receptors, and the timing and duration of noise-generating activities. Each phase of construction involves different types of equipment and has distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest several pieces of equipment. The dominant equipment noise source is typically the engine, although work-piece noise (such as dropping of materials) can also be noticeable.

The noise produced at each construction phase is determined by combining the L_{eq} contributions from each piece of equipment used at a given time, while accounting for the ongoing time-variations of noise emissions (commonly referred to as the usage factor). Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of up to 85 dBA at 50 feet. However, overall noise emissions vary considerably, depending on what specific activity is being performed at any given moment.

Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground effects, and shielding effects), the average noise levels at noise-sensitive receptors could vary considerably, because mobile construction equipment would move around the site with different loads and power requirements.

Noise levels from project-related construction activities were calculated from the simultaneous use of all applicable construction equipment at spatially averaged distances (i.e., from the acoustical center of the general construction site) to the property line of the nearest receptors. Although construction may occur across the entire project area, the center of construction activities best represents the potential average construction-related noise levels at the various sensitive receptors. To provide for a conservative assessment of project impacts, the center of the proposed building closest to off-site sensitive receptors (e.g., Building 8 being closest to residences in Ontario across Eucalyptus Avenue) was used to estimate construction noise levels occurring during that period of construction.

Using information provided by the applicant, the expected construction equipment mix was estimated and categorized by construction activity using the FHWA Roadway Construction Noise Model (RCNM). The associated, aggregate sound levels—grouped by construction activity—are summarized in Table 5.11-9, *Project Related Construction Noise*. RCNM modeling input and output worksheets are included in Appendix J.

Table 5.11-9 Project-Related Construction Noise, dBA L_{eq}

Construction Activity Phase	City of Ontario Residences 300 feet north of Building 8 area	City of Chino Residences 400 feet west of Building 6 area	City of Chino Egan Lyle High School and Youth Correctional Facility 1,000 southwest of Building 3 area
Asphalt/Building Demolition	64	62	54
Rough Grading	69	67	59
Fine Grading	68	65	57
Utility Trenching	65	63	55
Building Construction	62	59	51
Paving	67	65	57
Finish & Landscaping	65	62	54

Notes: Calculations performed with the FHWA's RCNM software are included in Appendix J.
Values in **bold** would exceed the 65 dBA significance threshold.

As shown in Table 5.11-9, noise levels could at times exceed the 65 dBA significance threshold at the nearest noise-sensitive receptors. In addition, since construction of the project is anticipated to last over two years, impacts from construction noise are considered significant.

Construction Vehicles

The transport of workers and materials to and from the construction site would incrementally increase noise levels along site access roadways. Individual construction vehicle pass-bys and haul trucks may create momentary noise levels of up to approximately 85 dBA (L_{max}) at 50 feet from the vehicle, but these occurrences would generally be limited to demolition and soil hauling and be relatively short lived. An estimated maximum of approximately 310 daily combined construction-related trips during overlapping activity phases would result in a noise increase of 0.1 dBA or less when compared to existing traffic volumes along Euclid Avenue and Merrill Avenue, which are 9,000 ADT or higher. PPP N-1 would require that all demolition and soil hauling be conducted during daytime (7:00 AM to 6:00 PM) hours. Noise impacts from construction vehicles would be less than significant.

Level of Significance Before Mitigation: Significant impact.

Impact 5.11-2 Project implementation would result in long-term operation-related noise that would exceed standards. [Threshold N-1]

Mobile Noise

As discussed above, traffic noise increases were calculated using a version of the Federal Highway Administration's (FHWA) Traffic Noise Prediction Model based on existing and future traffic volumes and vehicle mix (auto, medium-duty trucks, and heavy-duty trucks) provided by Urban Crossroads for roadway segments in the project area. The posted speed limits and number of travel lanes were also input to the model. Table 5.11-10 shows the existing and future predicted noise levels at 50 feet from the nearest travel centerline, as well as the predicted traffic noise increase with implementation of the proposed project.

Roadway segments with less than a 0.5 dBA CNEL traffic noise increase were not included in Table 5.11-10. Appendix J, however, contains the traffic noise modeling inputs and outputs for all roadway segments in the project study area. Cumulative traffic noise impacts are discussed below under Section 5.11.5, *Cumulative Impacts*.

As shown in Table 5.11-10, there are several roadway segments along Eucalyptus Avenue from Euclid Avenue to Grove Avenue that would experience a traffic noise increase of greater than 1.5 dBA where the existing ambient is 65 dBA CNEL or greater. This would be considered a significant impact. It should be noted that while the traffic noise increase is greater than 1.5 dBA on Merrill Avenue from Sultana Avenue. to Bon View Avenue, and the existing ambient is greater than 65 dBA CNEL, there are no noise-sensitive uses along this roadway segment. The significance threshold of 3 dBA is applied to the Baker Avenue south of Merrill Avenue. roadway segment since the existing ambient in less than 65 dBA CNEL.

Level of Significance Before Mitigation: Significant impact.

5. Environmental Analysis
NOISE

Table 5.11-10 Traffic Noise Levels for Existing and Project Buildout Conditions

Roadway Segment	Traffic Volumes (ADT)				Traffic Noise Level at 50 Feet (dBA CNEL)				Traffic Noise Increase (dBA CNEL)		
	Existing	Existing Plus Project	2040 No Project	2040 With Project	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Cumulative Noise Increase due to Project
SR-60 WB Offramp	10,382	12,459	15,904	16,080	72.0	72.8	73.9	73.9	0.8	1.9	0.0
SR-60 WB Onramp	7,972	9,629	14,640	15,293	69.6	70.4	72.2	72.4	0.8	2.8	0.2
SR-60 EB Onramp	9,302	12,033	15,232	15,746	72.0	73.1	74.1	74.2	1.1	2.3	0.1
SR-60 EB Offramp	7,607	9,126	12,941	13,167	70.3	71.1	72.6	72.7	0.8	2.4	0.1
Euclid Ave. - SR-60 Ramps to Walnut Ave.	30,254	37,472	53,574	55,193	78.0	79.2	80.5	80.9	1.1	2.8	0.3
Euclid Ave. - Walnut Ave. to Riverside Dr.	27,969	35,219	49,253	50,923	77.9	79.1	80.3	80.7	1.2	2.8	0.4
Euclid Ave. - Riverside Dr. to Chino Ave.	25,245	31,447	45,633	47,416	77.1	78.3	79.7	80.1	1.2	3.0	0.4
Euclid Ave. - Chino Ave. to Schaefer Ave.	27,794	33,913	56,902	58,735	77.2	78.4	80.3	80.8	1.1	3.5	0.4
Euclid Ave. - Schaefer Ave. to Edison Ave.	27,417	33,600	50,385	52,268	77.2	78.4	79.8	80.3	1.2	3.1	0.4
Edison Ave. - Euclid Ave. to Grove Ave.	10,382	11,750	39,770	39,770	71.8	72.4	77.7	77.7	0.5	5.8	0.0
Edison Ave. - West of Euclid Ave.	16,897	20,211	38,059	38,562	74.7	75.5	78.2	78.3	0.8	3.6	0.1
Euclid Ave. - Edison Ave. to Eucalyptus Ave.	28,647	34,635	50,202	52,574	77.0	78.1	79.5	79.9	1.1	2.9	0.5
Euclid Ave. - Eucalyptus Ave. to Project Driveway 1	31,083	35,583	58,875	59,955	77.2	78.0	79.9	80.3	0.9	3.1	0.4
Eucalyptus Ave. - Euclid Ave. to Project Driveway 3	3,025	4,827	19,216	20,735	64.5 (65)	66.5	72.5	72.8	2.0	8.4	0.3
Euclid Ave. - Project Driveway 1 to Project Driveway 2	31,083	35,407	58,875	59,767	77.2	78.0	79.9	80.3	0.9	3.1	0.4
Euclid Ave. - Project Driveway 2 to Merrill Ave.	31,083	35,232	58,875	59,553	76.4	77.2	79.2	79.5	0.8	3.1	0.3

5. Environmental Analysis

NOISE

Table 5.11-10 Traffic Noise Levels for Existing and Project Buildout Conditions

	Traffic Volumes (ADT)				Traffic Noise Level at 50 Feet (dBA CNEL)				Traffic Noise Increase (dBA CNEL)		
Roadway Segment	Existing	Existing Plus Project	2040 No Project	2040 With Project	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Cumulative Noise Increase due to Project
Euclid Ave. - Merrill Ave. to Kimball Ave.	31,233	35,589	66,697	67,438	77.2	77.9	80.5	80.6	0.7	3.5	0.2
Euclid Ave. - Kimball Ave. to Bickmore Ave.	19,634	22,414	41,593	42,283	75.1	75.8	78.3	78.6	0.8	3.5	0.3
Kimball Ave. - West of Euclid Ave.	19,320	21,667	34,762	34,812	74.4	74.9	76.9	76.9	0.5	2.6	0.0
Bickmore Ave. - West of Euclid Ave.	4,645	5,542	9,942	9,942	67.7	68.5	71.0	71.0	0.8	3.3	0.0
Euclid Ave. - Bickmore Ave. to Pine Ave.	16,546	18,742	38,862	39,553	74.0	74.7	77.7	78.0	0.8	4.0	0.3
Merrill Ave. - Project Driveway 4 to Sultana Ave.	9,152	11,242	27,664	28,530	71.0	72.5	75.8	76.5	1.5	5.5	0.7
Merrill Ave. - Euclid Ave. to Project Driveway 4	9,152	11,417	27,664	28,706	71.0	72.5	75.8	76.5	1.5	5.5	0.7
Eucalyptus Ave. - Driveway 5 to Sultana Ave.	3,025	5,329	19,216	21,187	64.5 (65)	66.9	72.5	72.9	2.5	8.5	0.4
Eucalyptus Ave. - Driveway 3 to Driveway 5	3,025	5,078	19,216	20,949	64.5 (65)	66.7	72.5	72.9	2.2	8.4	0.4
Eucalyptus Ave. - Sultana Ave. to Bon View Ave.	3,025	4,488	19,216	20,484	64.5 (65)	66.2	72.5	72.8	1.7	8.3	0.3
Merrill Ave. - Sultana Ave. to Bon View Ave.	9,152	11,606	27,664	29,271	71.0	72.6	75.8	76.6	1.6[1]	5.6	0.8
Bon View Ave. - North of Eucalyptus Ave.	2,247	2,530	7,384	7,434	63.9	64.4	69.0	69.1	0.5	5.2	0.0
Eucalyptus Ave. - Bon View Ave. to Grove Ave.	3,402	4,959	14,811	16,042	65.7	67.3	72.1	72.4	1.6	6.7	0.3
Grove Ave. - North of Edison Ave.	7,670	9,045	19,433	19,734	70.5	71.2	74.6	74.6	0.7	4.1	0.1

Table 5.11-10 Traffic Noise Levels for Existing and Project Buildout Conditions

Roadway Segment	Traffic Volumes (ADT)				Traffic Noise Level at 50 Feet (dBA CNEL)				Traffic Noise Increase (dBA CNEL)		
	Existing	Existing Plus Project	2040 No Project	2040 With Project	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Cumulative Noise Increase due to Project
Edison Ave. - Grove Ave. to Walker Ave.	12,014	14,167	46,323	47,252	72.3	73.0	78.1	78.2	0.7	5.9	0.1
Grove Ave. - Edison Ave. to Eucalyptus Ave.	7,658	9,742	23,265	24,495	70.3	71.4	75.2	75.4	1.0	5.0	0.2
Eucalyptus Ave. - East of Grove Ave.	1,393	1,676	11,361	11,361	63.8	64.6	72.9	72.9	0.8	9.1	0.0
Merrill Ave. - Grove Ave. to Flight Ave.	11,738	14,700	28,308	29,902	72.5	73.9	76.3	77.0	1.4	4.5	0.7
Merrill Ave. - Bon View Ave. to Grove Ave.	10,658	13,608	26,714	28,308	72.3	73.8	76.3	77.0	1.5	4.7	0.7
Walker Ave. - North of Edison Ave.	1,619	1,946	9,553	9,603	64.5	65.3	72.2	72.2	0.8	7.7	0.0
Walker Ave. - South of Edison Ave.	954	1,249	11,738	11,738	63.6	64.7	74.5	74.5	1.2	10.9	0.0
Edison Ave. - Walker Ave. to Vineyard Ave.	13,169	15,384	49,135	50,026	72.6	73.2	78.3	78.3	0.7	5.8	0.1
Merrill Ave. - Flight Ave. to Baker Ave.	11,662	14,581	27,536	29,055	72.5	73.9	76.2	76.9	1.4	4.4	0.7
Baker Ave. - South of Merrill Ave.	326	552	1,654	1,654	61.8	64.0	68.8	68.8	2.3[2]	7.0	0.0
Merrill Ave. - Baker Ave. to Hellman Ave.	11,738	14,719	27,077	28,596	72.6	74.0	76.2	76.8	1.4	4.3	0.6
Edison Ave. - Vineyard Ave. to Hellman Ave.	13,169	15,384	65,002	65,843	72.6	73.2	79.5	79.5	0.7	7.0	0.1
Merrill Ave. - Hellman Ave. to Carpenter Ave.	12,001	15,209	30,335	31,716	72.9	74.3	76.9	77.5	1.4	4.6	0.6
Carpenter Ave. - North of Merrill Ave.	766	929	4,296	4,296	60.8	61.7	68.3	68.3	0.8	7.5	0.0

5. Environmental Analysis
NOISE

Table 5.11-10 Traffic Noise Levels for Existing and Project Buildout Conditions

	Traffic Volumes (ADT)				Traffic Noise Level at 50 Feet (dBA CNEL)				Traffic Noise Increase (dBA CNEL)		
Roadway Segment	Existing	Existing Plus Project	2040 No Project	2040 With Project	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Cumulative Noise Increase due to Project
Carpenter Ave. - South of Merrill Ave.	1,983	2,379	4,414	4,414	64.5	65.3	68.0	68.0	0.8	3.5	0.0
Merrill Ave. - Carpenter Ave. to Archibald Ave.	13,219	16,721	30,883	32,264	73.4	74.8	77.1	77.7	1.4	4.2	0.5
Edison Ave. - Hellman Ave. to Archibald Ave.	13,169	15,384	64,437	65,241	72.6	73.2	79.4	79.5	0.7	6.9	0.1
Edison Ave. - Archibald Ave. to Harrison Ave.	19,157	22,396	55,519	56,561	74.4	75.3	79.0	79.3	0.9	4.9	0.3
Ontario Ranch Road - Harrison Ave. to Haven Ave.	18,090	21,347	52,505	53,497	74.4	75.3	79.0	79.3	0.9	4.9	0.3
Ontario Ranch Road - Hamner Ave. to I-15 Ramps	28,760	32,633	58,119	58,985	76.8	77.4	79.8	80.0	0.7	3.2	0.2
Ontario Ranch Road - Haven Ave. to Hamner Ave.	20,186	23,657	50,101	51,018	75.6	76.5	79.6	79.8	0.9	4.2	0.2
I-15 NB Offramp	15,792	18,441	31,234	31,849	72.7	73.3	75.6	75.7	0.7	3.0	0.1
Cantu-Galleano Ranch Rd. - East of I-15 Ramp	19,558	22,992	32,376	32,426	76.2	76.9	78.4	78.4	0.7	2.2	0.0

Source: Traffic data provided by Urban Crossroads, 2019. Traffic noise modeled using the FHWA Traffic Noise Prediction Model methodology.
Notes: **Bold** = significant traffic noise increase
[1] Though the traffic noise increase is greater than 1.5 dBA on Merrill Ave. - Sultana Ave. to Bon View Ave., and the existing ambient is greater than 65 dBA CNEL, there are no noise-sensitive uses along this roadway segment.
[2] A significance threshold of 3 dBA is applied to the Baker Ave. - South of Merrill Ave. roadway segment since the existing ambient in less than 65 dBA CNEL.

Mechanical Equipment

Heating, ventilation, and air conditioning (HVAC) systems are anticipated to be on the rooftop of various buildings. The nearest noise sensitive receptors are residential uses to the north and west. Typical HVAC equipment generates noise levels ranging up to 72 dBA at a distance of 3 feet.

City of Ontario

Residential uses to the north would be subject to the City of Ontario noise level standards. The nearest HVAC equipment at proposed Building 8 could be approximately 150 feet from the residential uses. At that distance, HVAC noise levels would attenuate to approximately 38 dBA, which is below the 65 dBA L_{eq} daytime and 45 dBA L_{eq} nighttime noise limits. Noise associated with HVAC equipment would be less than significant for residential uses in the City of Ontario.

City of Chino

Residential uses to the west would be subject to the City of Chino noise level standards. The nearest HVAC equipment at proposed Building 6 could be approximately 300 feet from the residential uses. At that distance, HVAC noise levels would attenuate to 32 dBA, which is below the 55 dBA L_{50} daytime and 50 dBA L_{50} nighttime noise limits. Noise associated with HVAC equipment would be less than significant for residential uses in the City of Chino.

Loading Docks

The proposed project would have operational noise associated with truck loading bay operations such as truck movements, idling, and loading/unloading. Reference noise levels from a survey of truck loading dock operational noise were used to evaluate potential noise impacts. The sampling accounted for the major noise sources associated with one truck, such as airbrake discharge, king-pin coupling, back-up warning 'beep' tone, and drive-off. Reference noise levels for a single truck are shown in Table 5.11-11 in several different noise metrics.

The proposed project would construct eight buildings with loading docks generally oriented towards the center of the project away from nearby sensitive receptors. To evaluate multiple trucks operating at the project site simultaneously, the single-truck reference levels were adjusted to include the maximum number of trucks at a given building at one time. For the closest residences in Ontario to the north across Eucalyptus Avenue, a scenario was developed assuming all 12 of the loading docks proposed at Building 8 operating at the same time from a distance of 350 feet. Additionally, since the warehouse buildings will act as noise barriers between the truck bays and the receptor locations by providing shielding, barrier attenuation was included.[3] Finally, it was assumed that seven loading docks could be in operation at proposed Building 1 where only partial shielding is provided by the buildings (Buildings 7 and 8 would provide partial shielding) between the loading docks and the residences approximately 750 feet to the north of Building 1.

For the closest residences in Chino to the west across Euclid Avenue, a scenario was developed assuming all 21 of the loading docks proposed at Building 4 operating at the same time from a distance of 475 feet. Again,

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3 Additional information about the barrier attenuation used is provided in Appendix J

since the warehouse buildings will act as noise barriers between the truck bays and the receptor locations, barrier attenuation was included.

Table 5.11-11 Warehouse-Related Truck Loading Noise

Noise Metric	Reference Level One Truck at 50 feet (dBA)	Combined Receptor Exposure (dBA) Including Distance and Barrier Attenuation	
		Residences to the north (City of Ontario)	Residences to the west (City of Chino)
L_{50}	40	29.3	25.7
L_{25}	42	31.3	27.7
L_{8}	53	42.3	38.7
L_{2}	54	43.3	39.7
L_{max}	75	64.3	60.7

Notes: Detailed calculation results are included in Appendix J
Reference noise levels from PlaceWorks, 2012, City of Industry- Macy's Trucking Yard Noise Survey (Trailer Hook-up Simulation (typical))
Ln is equal to the noise level that is exceeded for n percent of the measurement
L50 is equal to the noise level exceeded for 30 minutes in any hour
L25 is equal to the noise level exceeded for 15 minutes in any hour
L8 is equal to the noise level exceeded for 5 minutes in any hour
L2 is equal to the noise level exceeded for 1 minute in any hour
Lmax is the maximum peak level throughout any noise measurement

Loading dock noise levels are not expected to exceed 45 dBA Leq nighttime threshold at the closest residence north in the City of Ontario. The Leq noise level metric (energy average noise level) is generally similar in value to the L50 noise level (the noise level exceeded half of the measurement period). The L50 noise level at the closest residence in the City of Ontario is predicted to be 29 dBA, well below the limit of 45 dBA. In addition, loading dock noise levels would be below the City of Chino nighttime standards (50 dBA L_{50}, 55 dBA L_{25}, 60 dBA L_{8}, 65 dBA L_{2}, and 70 dBA L_{max}) at the closest residences to the west. Loading dock noise levels would be even lower at the Egan Lyle High School and Youth Correctional Facility further to the southwest of the project site. Operational loading dock noise from the proposed project would be less than significant.

Level of Significance Before Mitigation: Less than significant impact.

Impact 5.11-3: The project would not create significant ground borne vibration. [Threshold N-2]

Architectural Vibration Damage

Construction operations can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The effects from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures.

Table 5.11-12 summarizes vibration levels for typical construction equipment at a reference distance of 25 feet. Typical construction equipment can generate vibration levels ranging up to 0.21 in/sec PPV at 25 feet. Vibration levels at a distance greater than 25 feet would attenuate 0.2 in/sec PPV or less.

Table 5.11-12 Vibration Levels for Typical Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Vibratory Roller	0.21
Large Bulldozer	0.089
Loaded Trucks	0.079
Jackhammer	0.035
Small Bulldozer	0.003

Source: FTA, 2018. *Transit Noise and Vibration Impact Assessment*, September.

The closest residential structures in both the City of Ontario (residences to the north) and residential structures in the City of Chino (residences to the west) are located beyond 25 feet from possible off-site road and utility work. Therefore, vibration levels would attenuate to below the 0.2 in/sec PPV threshold, and this impact would be less than significant.

Vibration Annoyance

Table 5.11-13 show typical vibration annoyance levels (VdB) at 25 feet. The nearest sensitive receptors are residences 300 feet north of the Building 8 area center. At that distance, VdB levels would attenuate to 62 VdB or less on average, which is well below the significance threshold of 94 VdB. Residences to the west in Chino would experience even lower vibration levels on average. Therefore, this impact would be less than significant.

Table 5.11-13 Vibration Annoyance Levels for Typical Construction Equipment

Equipment	VdB at 25 feet	VdB at 300 feet
Vibratory Roller	94	62
Large Bulldozer	87	55
Loaded Trucks	86	54
Jackhammer	79	47
Small Bulldozer	58	26

Source: Federal Transit Administration (FTA), 2018. *Transit Noise and Vibration Impact Assessment*, September.

Operational Vibration

The proposed project would include truck movement activity at the proposed project site. These movements would generally be low-speed (i.e., less than 15 miles per hour) and would occur over new, smooth surfaces. For perspective, Caltrans has studied the effects of propagation of vehicle vibration on sensitive land uses and notes that "heavy trucks, and quite frequently buses, generate the highest earthborn vibrations of normal traffic." Caltrans further notes that the highest traffic-generated vibrations are along freeways and state routes. Their study finds that "vibrations measured on freeway shoulders (five meters from the centerline of the nearest lane) have never exceeded 0.08 inches per second, with the worst combinations of heavy trucks and poor roadway conditions (while such trucks were moving at freeway speeds). This level coincides with the maximum recommended safe level for ruins and ancient monuments (and historic buildings)" (Caltrans, 2013). Since the project's truck movements would be a low speed (not at freeway speeds), would be over smooth surfaces (not under poor roadway conditions), project-related vibration associated with truck activity would not result in excessive ground borne vibrations; no vehicle-generated vibration impacts would occur. In addition, there are no sources of substantial ground borne vibration associated with the project, such as rail or subways. The proposed project would not create or cause any vibration impacts due to operations.

Level of Significance Before Mitigation: Less than significant impact.

Impact 5.11-4: The proximity of the project site to an airport or airstrip would not result in exposure of future workers to excessive airport-related noise. [Threshold N-3]

Chino Airport

The proposed project is across Merrill Avenue from the Chino Airport. The Chino General Plan's Noise Element has noise contours for the Chino Airport. The noise contours show the project site outside the 65 dBA CNEL contour and, in addition, the proposed project would be an industrial business park, which is not considered a noise-sensitive land use. Therefore, there would be no impact.

Ontario International Airport

The proposed project is approximately 5 miles south of the Ontario International Airport. The Ontario International Airport Land Use Compatibility Plan Policy Map 2-3, Noise Impact Zones, shows airport noise contours. The map shows the proposed project site to be outside the 60-65 dB CNEL contour. As discussed above, the proposed project would be an industrial business park, which is not considered a noise-sensitive land use. There would be no impact.

Level of Significance Before Mitigation: No impact.

5.11.4 Cumulative Impacts

A significant cumulative traffic noise increase would be identified if project traffic were calculated to contribute 1 dBA or more under Cumulative Plus Project conditions to a significant traffic noise increase over existing conditions. That is, if a cumulative traffic noise increase of greater than the 3 dBA significance threshold of perceptibility is calculated, and the relative contribution from project traffic is calculated to contribute 1 dBA or more to this cumulative impact, it would be considered cumulatively considerable. As shown in Table 5.11-10, a cumulative traffic noise increase of greater than 3 dBA would occur along several roadway segments. However, in no case would the project contribute 1 dBA or more to the cumulative impact. Therefore, the proposed project would not result in a cumulative contribution related to noise and impacts would be less than significant.

5.11.5 Level of Significance Before Mitigation

The following impacts would be less than significant: 5.11-3 and 5.11-4.

Without mitigation, the following impacts would be **potentially significant**:

- **Impact 5.11-1** At times construction noise levels could exceed the 65 dBA significance threshold at the nearest sensitive receptors. In addition, since construction of the project is anticipated to last over two years, impacts from construction noise are considered significant.
- **Impact 5.11-2** There are several roadway segments along Eucalyptus Avenue from Euclid Avenue to Grove Avenue that would experience a traffic noise increase of greater than 1.5 dBA where the existing ambient is 65 dBA CNEL or greater. This would be considered a significant impact.

5.11.6 Mitigation Measures

Impact 5.11-1

N-1 Prior to issuance of demolition, grading and/or building permits, a note shall be provided on construction plans indicating that during grading, demolition, and construction, the project applicant shall be responsible for requiring contractors to implement the following measures to limit construction-related noise:

- Construction activity is limited to the daytime hours between 7:00 AM to 6:00 PM on weekdays and between 9:00 AM to 6:00 PM on Saturday per the City of Ontario Municipal Code. Construction is prohibited on Sundays and federal holidays per the City of Chino Municipal Code.
- During the entire active construction period, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment re-design, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Require that impact tools (e.g., jack hammers and hoe rams) be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment such as generators, air compressors shall be located as far as feasible from nearby noise-sensitive uses.

- Stockpiling of materials shall be located as far as feasible from nearby noise-sensitive receptors.
- Construction traffic shall be limited to approved haul routes established by the City and other agencies and shall be prohibited during nighttime hours (10:00 PM to 7:00 AM).
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.
- Erect temporary noise barriers (at least as high as the exhaust of equipment and breaking line-of-sight between noise sources and sensitive receptors) to maintain construction noise levels at or below the performance standard of 65 dBA. Barriers shall be constructed with a solid material that has a density of at least 4 pounds per square foot with no gaps from the ground to the top of the barrier. Effective locations for barriers are along Euclid Avenue and Eucalyptus Avenue where residences are directly across the street.

Impact 5.11-2

N-2 Prior to the issuance of building permits, the project applicant shall install and maintain rubberized or special asphalt paving, such as open grade asphalt concrete (OGAC) along Eucalyptus Avenue from Euclid Avenue to Grove Avenue.

5.11.7 Level of Significance After Mitigation

Impact 5.11-1

Mitigation Measure N-1 would reduce construction noise levels by up to 15 dBA, which would reduce construction noise levels below the significance threshold of 65 dBA at nearby sensitive receptors (estimated up to 54 dBA L_{eq} during rough grading). Therefore, with implementation of Mitigation Measure N-1, construction noise impacts would be reduced to a level of less than significant.

Impact 5.11-2

Notable reductions in tire noise have been achieved via the implementation of special paving materials, such as rubberized asphalt or open-grade asphalt concrete overlays. For example, the California Department of Transportation conducted a study of pavement noise along Interstate 80 in Davis and found an average improvement of 6–7 dBA compared to conventional asphalt overlay with only minimal noise increases over a ten-year period (Caltrans 2011). Traffic noise level increases of up to 2.5 dBA CNEL are estimated along Eucalyptus Avenue. Therefore, with implementation of Mitigation Measure N-2, this impact would be reduced to a level of less than significant.

5.11.8 References

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5. Environmental Analysis
NOISE

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