NOISE AND VIBRATION IMPACT ANALYSIS

REDLANDS AVENUE AND PLACENTIA AVENUE INDUSTRIAL PROJECT

PERRIS, CALIFORNIA

LSA

January 2023

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PERRIS, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

City	City of Perris
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
ft	feet
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous sound level
PPV	peak particle velocity
project	Redlands Avenue and Placentia Avenue Industrial Project
RMS	root-mean-square
sf	square feet
SPL	sound power level

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the proposed Redlands Avenue and Placentia Avenue Industrial Project (project) in Perris, California. The proposed project is also located within the Perris Valley Commerce Center Specific Plan (PVCC SP) planning area. This report is intended to satisfy the City of Perris (City) requirements for a project-specific noise impact analysis by examining the impacts of the project site and evaluating noise reduction measures that the project may require.

PROJECT LOCATION AND DESCRIPTION

The proposed project site is located on the northeast corner of Redlands Avenue and Placentia Avenue in the City of Perris, California. The Project site comprises 2 parcels encompassing approximately 6.21 gross acres and 5.74 net acres. The existing site is currently vacant. Figure 1 illustrates the project site location.

The proposed project would result in the construction and operation of a 121,000 square foot single-story light industrial warehouse building, consisting of 113,000 sq ft of warehouse space, 4,000 square feet of ground floor office space, and 4,000 square feet of mezzanine office. The project would include a total of 84 parking spaces including 12 spaces for low emitting, fuel efficient, and carpool/vanpool vehicles, nine of which would be electric vehicle-only spaces. The proposed project would also provide six bicycle spaces, 16 loading docks, and one grade door. Truck loading docks and trailer parking would be along the northern side of the building oriented away from street frontages. Additionally, 27 truck trailer spaces would be provided across from the dock doors and within the truck court which would be enclosed by sliding gates. The proposed project would also include two outdoor employee break areas, including a bocce ball court and shaded seating area. The project would have approximately 47,507 square feet of landscape area. The project would be consistent with the City's General Plan land use and Zoning designations and, therefore, would not require a change to the General Plan land use designation or the zoning. Figure 2 depicts the proposed project's site plan.

Typical operational characteristics include employees and customers traveling to and from the site, delivery of materials and supplies to the site, truck loading and unloading, and manufacturing activities. The Project is anticipated to operate 7 days a week 24 hours a day.

EXISTING LAND USES IN THE PROJECT AREA

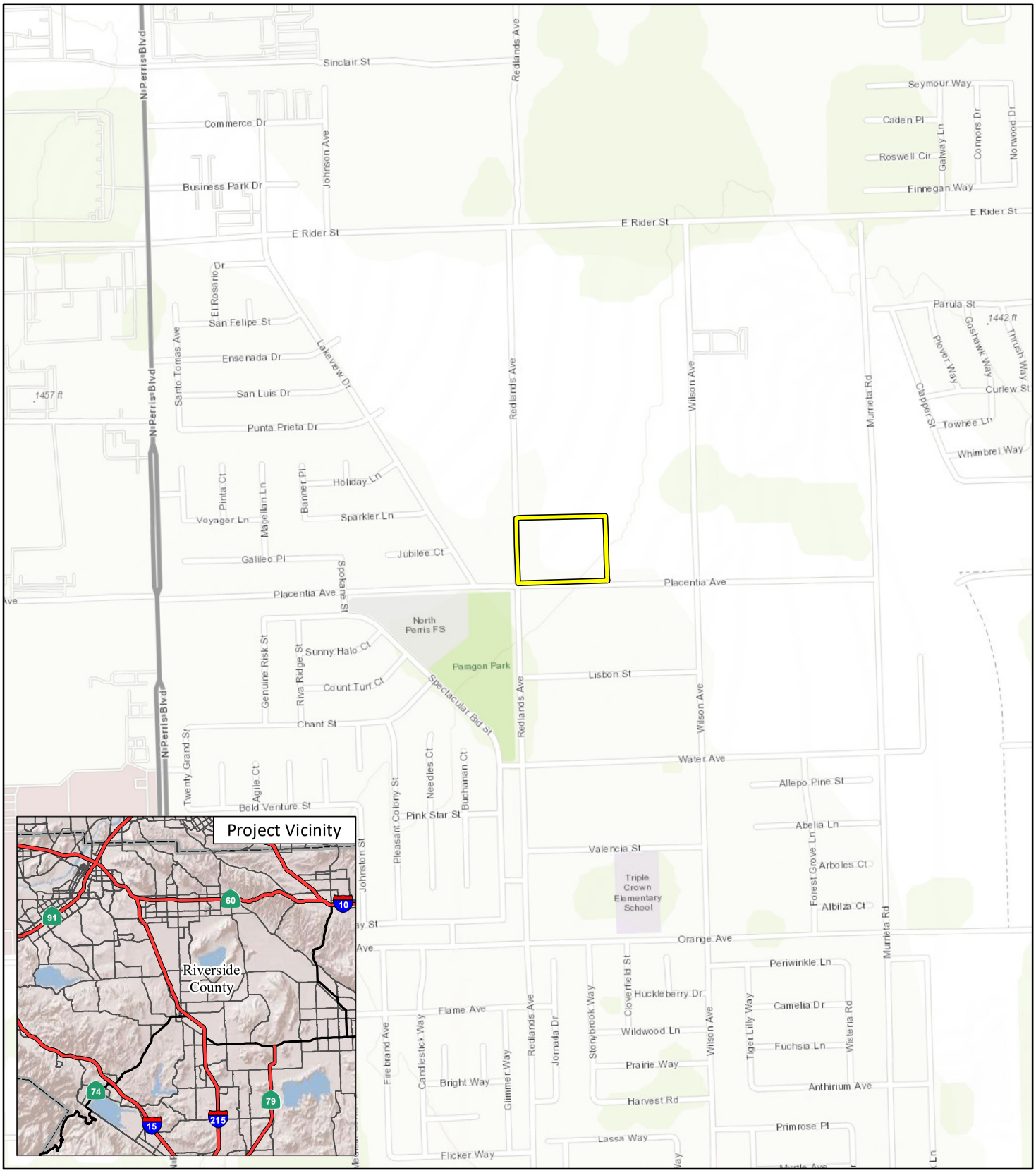
The project site is surrounded primarily by vacant land and residential uses. The areas adjacent to the project site include the following uses:

- **North:** Existing trailer home and attached storage area;
- **East:** Existing undeveloped and vacant land;
- **South:** Existing single-family homes opposite Placentia Avenue; and

- **West:** Existing vacant land and single-family homes opposite Redlands Avenue.

The closest sensitive receptors to the project site are:

- **South:** Existing single-family homes located approximately 80 feet from the project site opposite of Placentia Avenue;
- **North:** Existing trailer home located approximately 120 feet from the project site boundary; and
- **West:** Existing single-family homes located approximately 340 feet from the project site opposite Redlands Avenue.



LEGEND

Project Location

FIGURE 1

N

0 500 1000

FEET

SOURCE: ArcGIS Online Topographic Map (2020)

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Redlands and Placentia Industrial

Regional Project Location

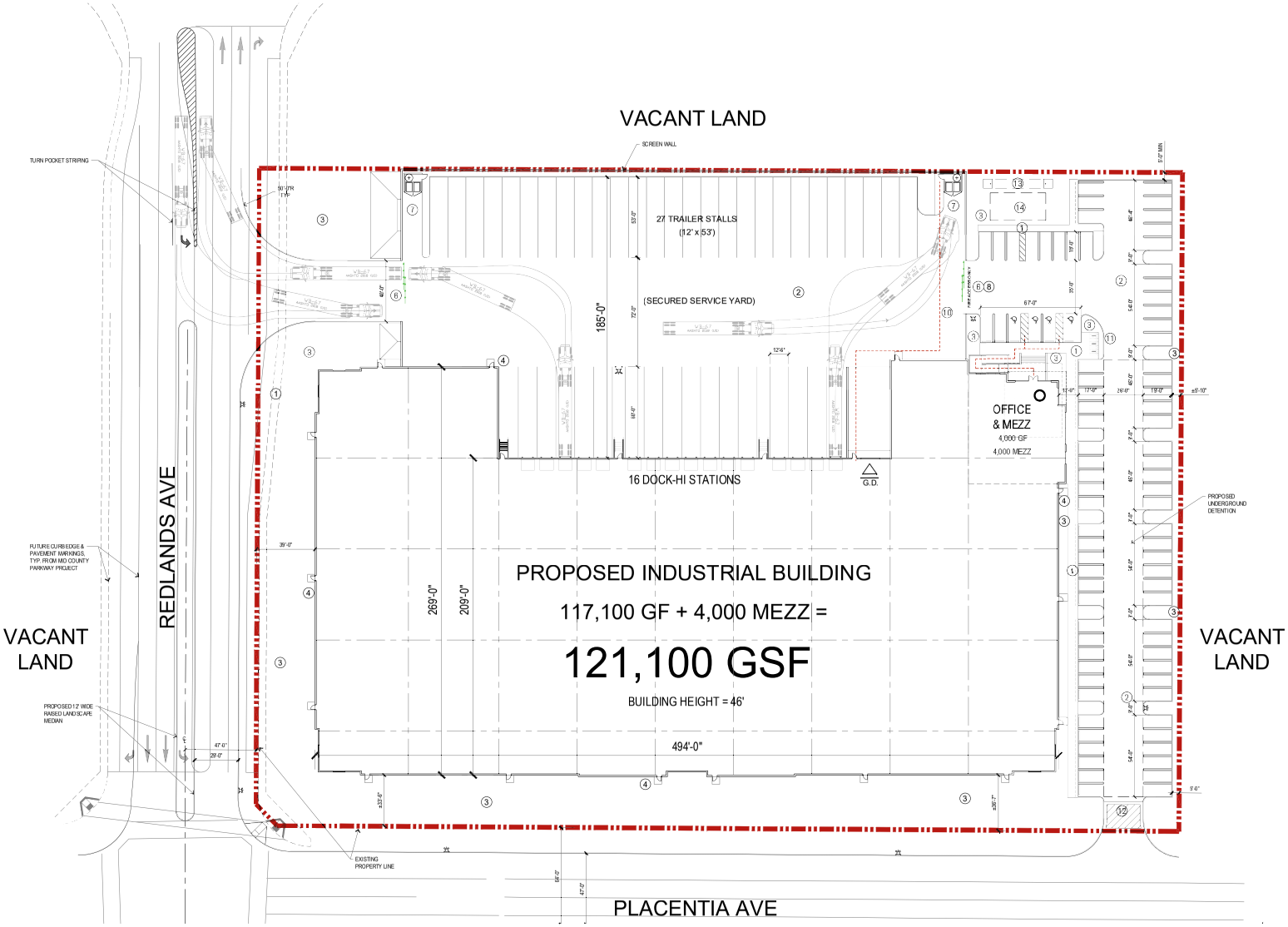

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FIGURE 2

0 15 30
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SOURCE: AO Architecture

Redlands and Placentia Industrial

Site Plan

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NOISE AND VIBRATION FUNDAMENTALS

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

MEASUREMENT OF SOUND

Sound intensity is measured with the A-weighted decibel (dBA) scale 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. Decibels (dB), unlike the linear scale (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations), the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels. CNEL is the time-weighted average noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the relaxation. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term traffic noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts, which are increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a

loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound measurement that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. Usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	Reference level
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA (2022).

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft. When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed

for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings. Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). PPV is used to characterize the potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where "L_v" is the vibration velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States.

REGULATORY SETTING

APPLICABLE NOISE AND VIBATION STANDARDS

The applicable noise and vibration standards governing the project site include the criteria in the City of Perris Noise Element and the City's Municipal Code (PMC). As stated above, the proposed project is located within the PVCC SP. Specific thresholds for vibration as well as direction in regards to thresholds for a significant noise increase were define in the PVCC SP EIR and are utilized within this analysis.

Applicable Noise Standards

City of Perris General Plan

The City of Perris establishes land use compatibility standards in the Noise Element of the City of Perris General Plan (2016). The General Plan Land Use Compatibility Standards for Community Noise Environments are shown in Table C. These standards are based on the Governor's Office of Planning and Research (OPR) and are used to assess the long-term traffic noise impacts on land uses. According to the City's Land Use Compatibility for Community Noise Exposure, noise-sensitive land uses such as single-family residences are normally acceptable with exterior noise levels below 60 dBA CNEL and conditionally acceptable with noise levels below 65 dBA CNEL. Industrial uses, such as the Project, are considered normally acceptable with exterior noise levels of up to 70 dBA CNEL, and conditionally acceptable with exterior noise levels between 70 to 80 dBA CNEL.

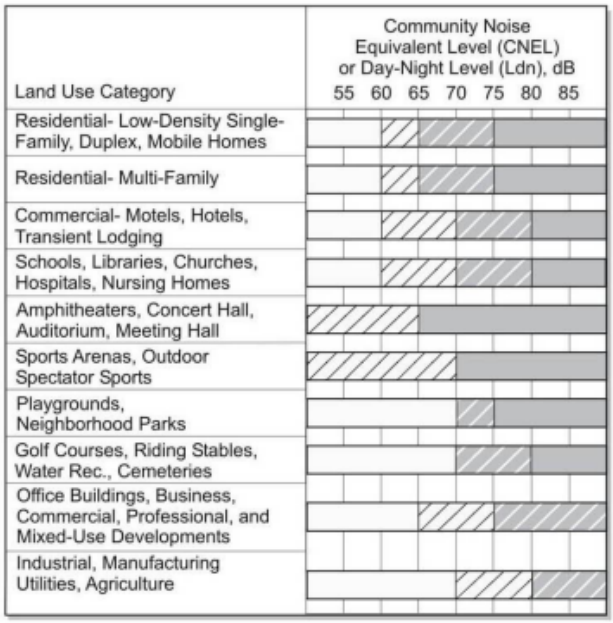
Additionally, the City's General Plan Noise Element includes Implementation Measure V.A.1 which requires that new industrial facilities within 160 feet of the property line of existing noise-sensitive land uses must demonstrate compliance with a 60 dBA CNEL exterior noise level standard.

City of Perris Municipal Code

The City addresses noise in Chapter 7.34, *Noise Control*, of the PMC. Section 7.34.050, *General Prohibition*, establishes the general prohibition of loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity, or which are so harsh, prolonged, or unnatural or unusual in their use, time, or place as to occasion physical discomfort to the inhabitants of the City. The maximum noise performance threshold is 60 dBA between the hours of 10:01 p.m. and 7:00 a.m., and 80 dBA between the hours of 7:01 a.m. and 10:00 p.m., as measured outdoors at a receiving property line.

Section 7.34.060, *Construction Noise*, restricts permissible hours of construction, including the erection, construction, demolition, excavation, alteration, or repair of any building on structure, to the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction is not permitted on Sunday or on legal holidays, with the exception of Columbus Day and Washington's birthday. Additionally, construction activity shall not exceed 80 dBA in residential zones in the City. The City does not specific the appropriate metric for construction assessments, however, it is assumed to be L_{max} for the purposes of this analysis.

Table C: Land Use/Noise Compatibility Guidelines



Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

Normally Acceptable
Specific land use is satisfactory, based on the assumption that any building is of normal conventional construction, without any special noise insulation requirements

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

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.

Clearly Unacceptable
New construction or development should generally not be undertaken.

The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

Source: State of California, Department of Health, City of Monterey Park.

APPLICABLE VIBRATION STANDARDS

According to the PVCC SP EIR, a major concern with regard to construction vibration is building damage. Consequently, construction vibration is generally assessed in terms of peak particle velocity (PPV). The United States Department of Transportation Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, buildings can be exposed to ground-borne vibration levels of 0.5 PPV without experiencing structural damage.

SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. 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?

B. Generation of excessive ground-borne vibration or ground-borne noise levels?

C. 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, would the project expose people residing or working in the project area to excessive noise levels?

While the City of Perris General Plan Guidelines provide direction on noise compatibility and establishes noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearest public and private airports, if any, and the Project's land use compatibility.

Specific Thresholds in PVCC SP EIR

As identified in the PVCC SP EIR, sensitive receivers are areas where humans are participating in activities that may be subject to the stress of significant interference from noise and often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Other receivers include office and industrial buildings, which are not considered as sensitive as single-family homes, but are still protected by City's land use compatibility standards, as discussed below.

Noise level increases at nearest receiver locations resulting from the Project are evaluated based on the PVCC SP EIR Thresholds described below at nearest sensitive receiver locations. Further, CEQA requires that consideration be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact.

According to the PVCC SP EIR, *there is no official "industry standard" of determining significance of noise impacts. However, typically, a jurisdiction will identify either 3 dBA or 5 dBA increase as being the threshold because these levels represent varying levels of perceived noise increases.* The PVCC SP EIR indicates that a 5 dBA noise level increase is considered *discernable to most people in an exterior environment* when the resulting noise levels are below 60 dBA. The PVCC SP EIR also identifies a 3 dBA increase threshold when the noise levels already exceed 60 dBA. In addition, according to the PVCC SP EIR, an increase of 5 dBA or more above without Project noise levels is considered a significant impact at all other sensitive land uses.

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area are transportation facilities such as Placentia Avenue and Redlands Avenue. Additionally, flyovers from operations at the March Air Reserve Base / Inland Port Airport (MARB/IPA) are periodically audible.

AMBIENT NOISE MEASUREMENTS

Long-Term Noise Measurements

Two (2) long-term (24-hour) and one (1) short-term noise level measurements were conducted on May 25 through May 26, 2022, using two (2) Larson Davis Spark 706RC Dosimeters and a Larson Davis 824. Table D provides a summary of the measured hourly noise levels and calculated CNEL level from the long-term noise level measurements. As shown in Table D, the calculated CNEL levels range from 50.7 dBA CNEL to 62.4 dBA CNEL. Hourly noise levels at surrounding sensitive uses are as low as 38.9 dBA L_{eq} during nighttime hours and 42.4 dBA L_{eq} during daytime hours. Long-term noise monitoring survey sheets are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

Table D: Long-Term 24-Hour Ambient Noise Monitoring Results[1]

Location		Daytime Noise Levels[1] (dBA L_{eq})	Evening Noise Levels[2] (dBA L_{eq})	Nighttime Noise Levels[3] (dBA L_{eq})	Daily Noise Levels (dBA CNEL)
LT-1	Near the property northeast of Redlands and Placentia. On a chain-link fence at eastern edge of the property.	42.4 – 47.8	44.4 – 51.9	38.9 – 46.2	50.7
LT-2	On a vacant lot behind property 2835 Lake View Dr. Near a powerline pole.	48.3 – 59.5	52.0 – 52.4	41.7 – 50.1	55.9
ST-1[4]	At the driveway of 451 Placentia Avenue on the northeast corner.	54.1 – 59.5	56.1 – 63.6	50.6 – 57.9	62.4

Source: Compiled by LSA (2022).
Note: Noise measurements were conducted from May 25 to May 26, 2022, starting at 2:00 p.m.
[1] Daytime Noise Levels = noise levels during the hours from 7:00 a.m. to 7:00 p.m.
[2] Evening Noise Levels = noise levels during the hours from 7:00 p.m. to 10:00 p.m.
[3] Nighttime Noise Levels = noise levels during the hours from 10:00 p.m. to 7:00 a.m.
[3] Short-term measurement data estimated based on corresponding long-term
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
CNEL = Community Noise Equivalent Level

EXISTING AIRCRAFT NOISE

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. MARB/IPA is the closest airport use located approximately 3 miles northwest of the project site. Because the project site is not located within the 65 dBA CNEL and 60 dBA CNEL noise contours, no further analysis associated with aircraft noise impacts is necessary. Additionally, there are no helipads or private airstrips within 2 miles from the project area.

LSA

LEGEND

Project Location

ST-1 Short-term Noise Monitoring Location

LT-1 Long-term Noise Monitoring Location

0 100 200

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SOURCE: Google Earth 2022

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FIGURE 3

Redlands and Placentia Industrial

Noise Monitoring Locations

PROJECT IMPACTS

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to 84 dBA L_{max}), the effect on longer-term ambient noise levels would be small when compared to existing daily traffic volumes on Placentia Avenue and Redlands Avenue. Because construction-related vehicle trips would not approach existing daily traffic volumes, traffic noise would not increase by 3 dBA CNEL. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term, construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during construction which includes site preparation, grading, building construction, paving, and architectural coating on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table E lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor, taken from the FHWA *Roadway Construction Noise Model* (FHWA 2006).

Table E: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)[1]	Maximum Noise Level (L_{max}) at 50 Feet[2]
Auger Drill Rig	20	84
Backhoes	40	80
Compactor (ground)	20	80
Compressor	40	80
Cranes	16	85
Dozers	40	85
Dump Trucks	40	84
Excavators	40	85
Flat Bed Trucks	40	84
Forklift	20	85
Front-end Loaders	40	80
Graders	40	85
Impact Pile Drivers	20	95
Jackhammers	20	85
Paver	50	77
Pickup Truck	40	55

Table E: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)[1]	Maximum Noise Level (L_{max}) at 50 Feet[2]
Pneumatic Tools	50	85
Pumps	50	77
Rock Drills	20	85
Rollers	20	85
Scrapers	40	85
Tractors	40	84
Trencher	50	80
Welder	40	73

Source: FHWA Roadway Construction Noise Model User's Guide, Table 1 (FHWA 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Specification 721.560 from the Central Artery/Tunnel program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
FHWA = Federal Highway Administration
L_{max} = maximum instantaneous sound level

Each piece of construction equipment operates as an individual point source. Using the following equation, a composite noise level can be calculated when multiple sources of noise operate simultaneously:

$$Leq\ (composite) = 10 * \log_{10}\left(\sum_{1}^{n} 10^{\frac{Ln}{10}}\right)$$

Using the equations from the methodology above, the reference information in Table E, and the construction equipment list provided, the composite noise level of each construction phase was calculated. When calculating the potential maximum noise level generated, the two loudest pieces of equipment are combined for each phase. The project construction composite noise levels at a distance of 50 feet would range from 78 dBA L_{max} to 88 dBA L_{max} with the highest noise levels occurring during the grading phase.

Once composite noise levels are calculated, reference noise levels can then be adjusted for distance using the following equation:

$$Leq\ (at\ distance\ X) = Leq\ (at\ 50\ feet) - 20 * \log_{10}\left(\frac{X}{50}\right)$$

In general, this equation shows that doubling the distance would decrease noise levels by 6 dBA while halving the distance would increase noise levels by 6 dBA.

To determine the applicable distance, the distance from the construction acoustical average distance is utilized. The acoustical average distance is used to represent noise sources that are mobile or distributed over an area. The average acoustical distance is calculated by multiplying the

shortest distance between the receiver and the noise source area by the farthest distance, and then taking the square root of the product

Table F shows the nearest sensitive uses to the project site, their acoustical average distance from construction activities, and composite noise levels expected during construction for the grading phase, which is expected to result in the greatest noise level as compared to other phases. These noise level projections do not take into account intervening topography or barriers. Construction equipment calculations are provided in Appendix B.

Table F: Potential Construction Noise Impacts at Nearest Receptor

Receptor (Location)	Composite Noise Level (dBA L_{max}) at 50 feet	Distance (feet)	Composite Noise Level (dBA L_{max})
Residences (South)	89	230	76
Residences (North)		295	74
Residences (West)		570	68

Source: Compiled by LSA (2022).
dBA L_{eq} = average A-weighted hourly noise level

While construction noise will vary, it is expected that composite noise levels during construction at the nearest off-site sensitive uses south of the project would reach 76 dBA L_{max}. These predicted noise levels would only occur when all construction equipment is operating simultaneously; and therefore, are assumed to be rather conservative in nature. While construction-related short-term noise levels have the potential to be higher than existing ambient noise levels in the project area under existing conditions, the noise impacts would no longer occur once project construction is completed.

As stated above, noise impacts associated with construction activities are regulated by the City's noise ordinance. The proposed project will be required to comply with the construction hours specified in the City's Noise Ordinance, which states that construction activities are allowed between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction is not permitted on Sunday or on legal holidays, with the exception of Columbus Day and Washington's birthday. It has been confirmed with the project applicant that construction would only occur during daytime hours.

As it relates to off-site uses, construction-related noise impacts would remain below the 80 dBA noise level established by the PMC for the average daily condition as modeled from the center of the project site and therefore would be considered less than significant. Best construction practices presented at the end of this analysis shall be implemented to minimize noise impacts to surrounding receptors.

LONG-TERM TRAFFIC-RELATED VIBRATION IMPACTS

The proposed project would not generate vibration levels related to on-site operations. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration

isolation. Vibration levels generated from project-related traffic on the adjacent roadways would be less than significant and no mitigation measures are required.

SHORT-TERM CONSTRUCTION VIBRATION IMPACTS

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and assesses the potential for building damages using vibration levels in PPV (in/sec). This is because vibration levels calculated in RMS are best for characterizing human response to building vibration, while vibration level in PPV is best for characterizing potential for damage.

Table G shows the PPV and VdB values at 25 ft from the construction vibration source. As shown in Table G, bulldozers, and other heavy-tracked construction equipment (expected to be used for this project) generate approximately 0.089 PPV in/sec or 87 VdB of ground-borne vibration when measured at 25 ft, based on the FTA Manual. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project construction boundary (assuming the construction equipment would be used at or near the project setback line).

Table G: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inch/inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

The formula for vibration transmission is provided below and Table H below provides a summary of off-site construction vibration levels.

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

As shown above, the PVCC SP EIR indicates that buildings can be exposed to ground-vibration levels of 0.5 PPV in/sec without experiencing structural damage.

Table H: Potential Construction Vibration Damage Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (PPV) at 25 feet[1]	Distance (feet) [2]	Vibration Level (PPV)
Residences (South)	0.089	80	0.016
Residences (North)		120	0.008
Residences (West)		335	0.002

Source: Compiled by LSA (2022).
1 The reference vibration level is associated with a large bulldozer which is expected to be representative of the heavy equipment used during construction.
2 The reference distance is associated with the peak condition, identified by the distance from the perimeter of construction activities to surrounding structures
ft = foot/feet
in/sec = inch/inches per second
PPV = peak particle velocity

Based on the information provided in Table H, vibration levels are expected to approach 0.016 PPV in/sec at the surrounding structures and would be below the 0.5 PPV in/sec damage threshold.

Because construction activities are regulated by the City's Code of Ordinance which states temporary construction, maintenance, or demolition activities are not allowed between the 7:00 p.m. on one day and 7:00 a.m. of the following day, vibration impacts would not occur during the more sensitive nighttime hours.

Other building structures surrounding the project site are farther away and would experience further reduced vibration. Therefore, no construction vibration impacts would occur. No vibration reduction measures are required.

LONG-TERM OFF-SITE TRAFFIC NOISE IMPACTS

The guidelines included in the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) were used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The vehicle percentages used are consistent with those identified in the City's Noise Element for the surrounding roadways. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Table I provides the traffic noise levels for the existing with and without project, and opening year with and without project scenarios. These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn.

The without and with project scenario traffic volumes were obtained from the *Redlands and Placentia Industrial Project Traffic Impact Analysis* (EPD 2022). Appendix C provides the specific assumptions used in developing these noise levels and model printouts.

Table I shows that the increase in project-related traffic noise would be no greater than 0.7 dBA. Noise level increases above 3.0 dBA may be perceptible to some people in an outdoor environment,

but the expected increase is less than the readily perceptible threshold of 5.0 dBA. Therefore, traffic noise impacts from project-related traffic on off-site sensitive receptors would be less than significant, and no mitigation measures are required.

Table I: Traffic Noise Levels Without and With Proposed Project

Roadway Segment	Existing Without Project		Existing With Project			Opening Year		Opening Year With Project		
	ADT	CNEL (dBA) 50 feet from Centerline of Nearest Lane	ADT	CNEL (dBA) 50 feet from Centerline of Nearest Lane	Increase from Existing Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Nearest Lane	ADT	CNEL (dBA) 50 feet from Centerline of Nearest Lane	Increase from Near-Term Conditions
Placentia Avenue between Indian Avenue and Perris Boulevard	1,030	57.6	1,030	57.6	0.0	4,370	63.9	4,660	64.2	0.3
Placentia Avenue between Perris Boulevard and Redlands Avenue	3,320	61.9	3,550	62.2	0.3	5,080	63.7	5,370	64.0	0.3
Placentia Avenue between Redlands Avenue and Wilson Avenue	2,160	60.9	2,330	61.2	0.3	3,250	62.6	3,770	63.3	0.7
Redlands Avenue between Rider Street and Placentia Avenue	5,100	64.9	5,320	65.1	0.2	5,500	65.3	5,650	65.4	0.1
Redlands Avenue between Placentia Avenue and Orange Avenue	5,450	64.6	5,610	64.7	0.1	6,480	65.3	6,580	65.4	0.1

Source: Compiled by LSA (January 2023).
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
Shaded cells indicate roadway segments adjacent to the project site.
ADT = average daily traffic
CNEL= Community Noise Equivalent Level
dBA = A-weighted decibels

LONG-TERM OFF-SITE STATIONARY NOISE IMPACTS

Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from the proposed on-site heating, ventilation, and air conditioning (HVAC) equipment, trash bin emptying activities, and truck deliveries and loading and unloading activities. The potential noise impacts to off-site sensitive land uses from the proposed operations are discussed below. To provide a conservative analysis, it is assumed that operations would occur equally during all hours of the day and that half the 16 loading docks would be active at all times. Additionally, it is assumed that within any given hour, 9 heavy trucks would maneuver to park near or back into one of the proposed loading docks. HVAC equipment is expected to run continuously for the duration of a 24-hour period and trash activities are expected to occur no more than once a day at each location. To determine the future noise impacts from project operations to the noise sensitive uses, a 3-D noise model, SoundPLAN, was used to incorporate the site topography as well as the shielding from the proposed building on-site. A graphic representation of the operational noise impacts is presented in Appendix D.

Heating, Ventilation, and Air Conditioning Equipment

The project is estimated to have four (4) rooftop HVAC units on the proposed building to provide ventilation to the proposed office spaces. The HVAC equipment could operate 24 hours per day and would generate sound power levels (SPL) of up to 87 dBA SPL or 72 dBA L_{eq} at 5 feet, based on manufacturer data (Trane)

Trash Bin Emptying Activities

The project is estimated to have two (2) dumpsters near the northern property line of the proposed project site. The trash emptying activities would occur for a period less than 1 minute and would generate sound power levels (SPL) of up to 118.6 dBA SPL or 84 dBA L_{eq} at 50 feet, based on reference information within SoundPLAN.

Truck Deliveries and Truck Loading and Unloading Activities

Noise levels generated by delivery trucks would be similar to noise readings from truck loading and unloading activities, which generate a noise level of 75 dBA L_{eq} at 20 ft based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]). Delivery trucks would arrive on site and maneuver their trailers so that trailers would be parked within the loading docks. During this process, noise levels are associated with the truck engine noise, air brakes, and back-up alarms while the truck is backing into the dock. These noise levels would occur for a shorter period of time (less than 5 minutes). After a truck enters the loading dock, the doors would be closed, and the remainder of the truck loading activities would be enclosed and therefore much less perceptible. To present a conservative assessment, it is assumed that unloading activities could occur at half of the sixteen (16) docks simultaneously for a period of more than 30 minutes in a given hour. Maximum noise levels that occur during the docking process taken by LSA were measured to be 86 dBA L_{max} at a distance of 20 feet.

Tables J and K below show the combined hourly noise levels generated by the proposed project at the closest off-site land uses. The project-related noise level impacts would range from 44.1 dBA

CNEL to 54.8 dBA CNEL at the surrounding sensitive receptors. These levels would be below the City's exterior daily noise level standard of 60 dBA CNEL and would not result in an increase of 5 dBA CNEL or more.

Furthermore, the maximum noise levels generated would range from 58.7 dBA L_{max} and 69.8 dBA L_{max} at the surrounding sensitive receptors during daytime hours and would range from 45.9 dBA L_{max} and 57.8 dBA L_{max} during nighttime hours. These levels would be below the City's exterior maximum noise standard of 80 dBA L_{max} and 60 dBA L_{max} for daytime and nighttime, respectively. Because project noise levels would not exceed the City' exterior noise level standards or result in an increase of 5 dBA CNEL or more, the impact would be less than significant and no noise reduction measures are required.

Table J: Daily Exterior Noise Level Impacts

Receptor	Direction	Existing Daily Noise Level (dBA CNEL)	Project Daytime Noise Level (dBA L_{eq})	Project Nighttime Noise Level (dBA L_{eq})	Project Daily Noise Level (dBA CNEL)	Daily Noise Level Increase (dBA CNEL)	Potential Operational Noise Impact?[1]
Residential	North	59.7	49.0	48.3	54.8	1.2	No
Residential	West	55.9	46.0	45.8	52.2	1.5	No
Residential	South	62.4	38.6	37.6	44.1	<0.1	No

Source: Compiled by LSA (2022).

[1] A potential operational noise impact would occur if (1) the daily ambient noise level is hour is less than 60 dBA CNEL and an increase of 5 dBA or more occurs, OR (2) the daily ambient noise level is hour is greater than 60 dBA CNEL and an increase of 3 dBA or more occurs.

dBA = A-weighted decibels
CNEL = Community Noise Equivalent Level
L_{eq} = equivalent noise level

Table K: Maximum Exterior Noise Level Impacts

Receptor	Direction	Daytime Maximum Noise Level (dBA L_{max})	Daytime Maximum Noise Level Standard (dBA L_{max})	Nighttime Maximum Noise Level (dBA L_{max})	Nighttime Maximum Noise Level Standard (dBA L_{max})	Potential Operational Noise Impact?
Residential	North	69.8	80	57.8	60	No
Residential	West	59.4		51.7		No
Residential	South	58.7		45.9		No

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
L_{eq} = equivalent noise level

BEST CONSTRUCTION PRACTICES

In addition to compliance with the City's Code of Ordinances allowed hours of construction between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday, the following best construction practices would further minimize construction noise impacts:

- The project construction contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained noise mufflers consistent with manufacturer's standards.
- The project construction contractor shall locate staging areas away from off-site sensitive uses during the later phases of project development.
- The project construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site whenever feasible.

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LSA Associates, Inc. (LSA). 2016. *Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center*. May.

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United States Environmental Protection Agency (EPA). 1978. *Protective Noise Levels, Condensed Version of EPA Levels Document*, EPA 550/9-79-100. November.

APPENDIX A

NOISE MONITORING SHEETS

Noise Measurement Survey – 24 HR

Project Number: ESL2201.22
Project Name: Redlands and Placentia

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN18907)

Site Number: LT-1 Date: 5/25/22

Time: From 2:00 p.m. To 2:00 p.m.

Site Location: Located near the property just northeast of Redlands and Placentia. On a chainlink fence on the eastern edge of the property, northeast of Redlands and Placentia. Near where the two fences meet in the middle along the eastern edge.

Primary Noise Sources: Faint traffic noise on Placentia Ave.

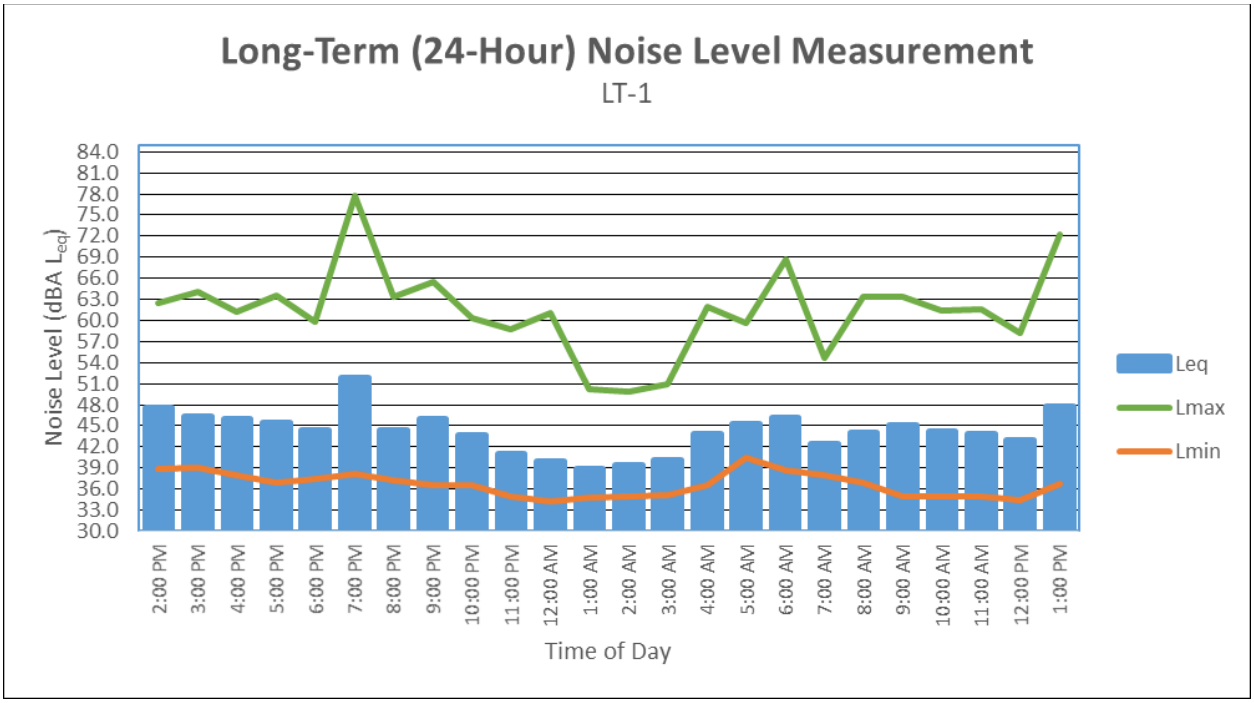
Comments: Chainlink fence that surrounds property is about 6 feet tall.

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
2:00 PM	5/25/22	47.5	62.5	38.9
3:00 PM	5/25/22	46.4	64.1	39.1
4:00 PM	5/25/22	45.9	61.2	37.9
5:00 PM	5/25/22	45.5	63.5	36.9
6:00 PM	5/25/22	44.4	59.8	37.5
7:00 PM	5/25/22	51.9	77.7	38.2
8:00 PM	5/25/22	44.4	63.3	37.3
9:00 PM	5/25/22	46.0	65.5	36.5
10:00 PM	5/25/22	43.7	60.3	36.6
11:00 PM	5/25/22	41.0	58.8	35.0
12:00 AM	5/26/22	39.9	61.0	34.3
1:00 AM	5/26/22	38.9	50.2	34.7
2:00 AM	5/26/22	39.4	49.8	35.0
3:00 AM	5/26/22	40.0	51.0	35.2
4:00 AM	5/26/22	43.8	61.9	36.5
5:00 AM	5/26/22	45.3	59.7	40.4
6:00 AM	5/26/22	46.2	68.7	38.6
7:00 AM	5/26/22	42.4	54.6	38.0
8:00 AM	5/26/22	43.9	63.3	36.9
9:00 AM	5/26/22	45.0	63.3	35.0
10:00 AM	5/26/22	44.2	61.4	34.9
11:00 AM	5/26/22	43.8	61.5	35.0
12:00 PM	5/26/22	42.9	58.3	34.5
1:00 PM	5/26/22	47.8	72.2	36.7

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-1
Noise Level (dBA Leq)
84.0
81.0
78.0
75.0
72.0
69.0
66.0
63.0
60.0
57.0
54.0
51.0
48.0
45.0
42.0
39.0
36.0
33.0
30.0
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
Time of Day
Leq
Lmax
Lmin

Noise Measurement Survey – 24 HR

Project Number: ESL2201.22
Project Name: Redlands and Placentia

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18908)

Site Number: LT-2 Date: 5/25/22

Time: From 2:00 p.m. To 2:00 p.m.

Site Location: On a vacant lot behind property 2835 Lake View Dr, Perris, CA 92571. Near A powerline pole.

Primary Noise Sources: Dog barking in the backyard of 2835 Lake View Dr, Perris, CA 92571

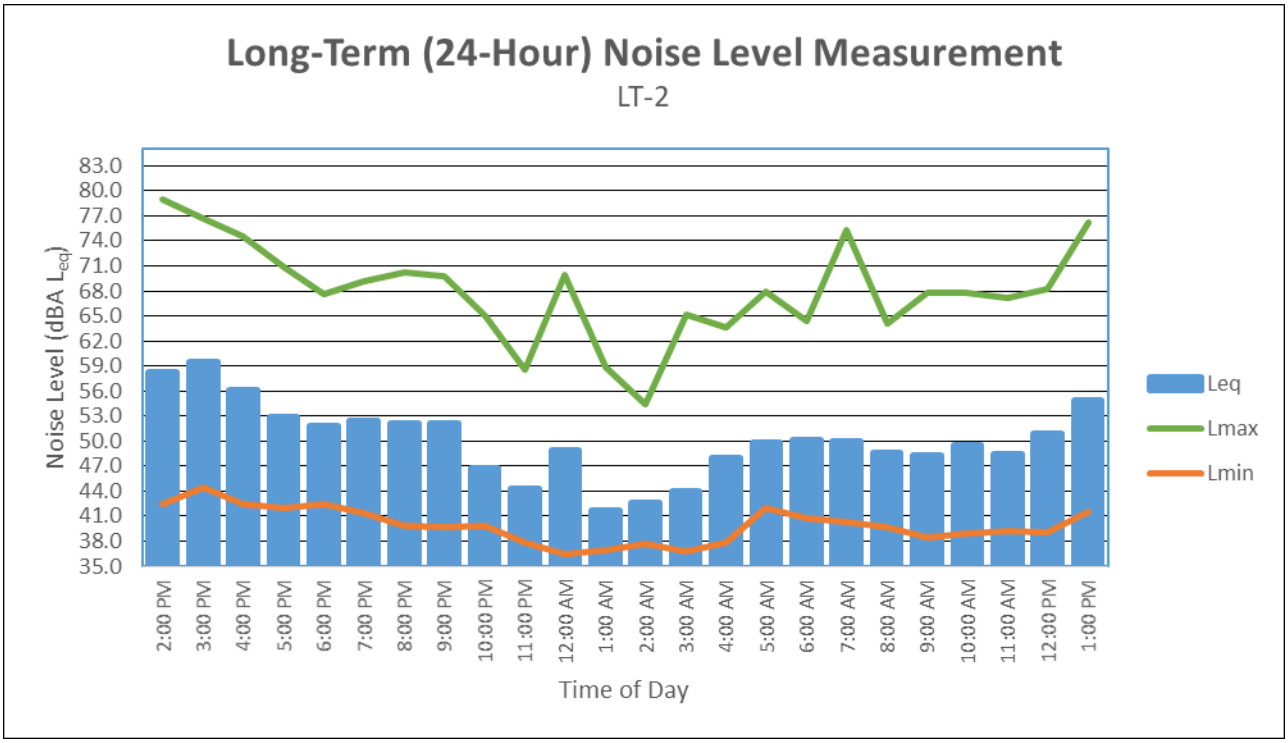
Comments: 7 inch block height

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
2:00 PM	5/25/22	58.2	78.9	42.5
3:00 PM	5/25/22	59.5	76.7	44.4
4:00 PM	5/25/22	56.1	74.5	42.5
5:00 PM	5/25/22	52.8	70.9	42.0
6:00 PM	5/25/22	51.9	67.6	42.4
7:00 PM	5/25/22	52.4	69.2	41.3
8:00 PM	5/25/22	52.0	70.2	39.8
9:00 PM	5/25/22	52.1	69.7	39.7
10:00 PM	5/25/22	46.8	65.0	39.9
11:00 PM	5/25/22	44.3	58.5	37.8
12:00 AM	5/26/22	49.0	69.9	36.4
1:00 AM	5/26/22	41.7	58.9	37.0
2:00 AM	5/26/22	42.6	54.4	37.7
3:00 AM	5/26/22	44.0	65.2	36.7
4:00 AM	5/26/22	48.0	63.6	37.9
5:00 AM	5/26/22	49.9	68.0	42.0
6:00 AM	5/26/22	50.1	64.4	40.7
7:00 AM	5/26/22	49.9	75.3	40.3
8:00 AM	5/26/22	48.6	64.1	39.7
9:00 AM	5/26/22	48.3	67.8	38.5
10:00 AM	5/26/22	49.5	67.7	38.9
11:00 AM	5/26/22	48.5	67.2	39.2
12:00 PM	5/26/22	50.9	68.2	39.1
1:00 PM	5/26/22	54.9	76.2	41.5

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-2
Noise Level (dBA Leq)
83.0
80.0
77.0
74.0
71.0
68.0
65.0
62.0
59.0
56.0
53.0
50.0
47.0
44.0
41.0
38.0
35.0
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
Time of Day
Leq
Lmax
Lmin

Noise Measurement Survey

Project Number: ESL2201.22 Test Personnel: Kevin Nguyendo

Project Name: Placentia and Redland Equipment: Larson Davis 824

Site Number: ST-1 Date: 5/26/22 Time: From 12:16 p.m. To 12:36 p.m.

Site Location: Located on the driveway of 451 Placentia ave on the northeast corner.

Primary Noise Sources: Frequent gusts of wind. Busy traffic noise on Placentia. Jet planes Flying in circles.

Measurement Results

	dBA
L_{eq}	54.6
L_{max}	71.6
L_{min}	41.4
L_{peak}	94.2
L_2	65.3
L_8	60.4
L_{25}	52.6
L_{50}	48.3
SEL	

Atmospheric Conditions:

Maximum Wind Velocity (mph)	9.2
Average Wind Velocity (mph)	2.6
Temperature (F)	95.5
Relative Humidity (%)	35
Comments:	

Comments: File # 33. Vehicles accelerating regularly. Garbage truck operating 3 minutes Into measurement.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

:

Location Photo:

APPENDIX B

CONSTRUCTION NOISE LEVEL CALCULATIONS

Construction Calculations

Phase: Site Preparation

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Noise Level (dBA) Leq
Dozer	3	82	40	50	0.5	82	83
Tractor	4	84	40	50	0.5	84	86
					Combined at 50 feet	**86**	**88**
					Combined at Receptor 230 feet	**73**	**74**

Phase: Grading

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Noise Level (dBA) Leq
Excavator	1	81	40	50	0.5	81	77
Grader	1	85	40	50	0.5	85	81
Dozer	1	82	40	50	0.5	82	78
Tractor	3	84	40	50	0.5	84	85
					Combined at 50 feet	**89**	**87**
					Combined at Receptor 230 feet	**76**	**74**
					Combined at Receptor 295 feet	**74**	**72**
					Combined at Receptor 570 feet	**68**	**66**

Phase:Building Construstion

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Noise Level (dBA) Leq
Crane	1	81	16	50	0.5	81	73
Man Lift	3	75	20	50	0.5	75	73
Generator	1	81	50	50	0.5	81	78
Tractor	3	84	40	50	0.5	84	85
Welder / Torch	1	74	40	50	0.5	74	70
					Combined at 50 feet	**87**	**86**
					Combined at Receptor 230 feet	**74**	**73**

Phase:Paving

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Noise Level (dBA) Leq
Paver	2	77	50	50	0.5	77	77
All Other Equipment > 5 HP	2	85	50	50	0.5	85	85
Roller	2	80	20	50	0.5	80	76
					Combined at 50 feet	**87**	**86**
					Combined at Receptor 230 feet	**73**	**73**

Phase:Architectural Coating

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Noise Level (dBA) Leq
Compressor (air)	1	78	40	50	0.5	78	74
					Combined at 50 feet	**78**	**74**
					Combined at Receptor 230 feet	**65**	**61**

Sources: RCNM

[1]- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

APPENDIX C

FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing -01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Indian Avenue and Perris Boulevard
NOTES: Redlands and Placentia Industrial Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1030 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	109.1

TABLE Existing -02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Perris Boulevard and Redlands Avenue
NOTES: Redlands and Placentia Industrial Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3320 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	114.6	234.8

TABLE Existing -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Redlands Avenue and Wilson Avenue
NOTES: Redlands and Placentia Industrial Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2160 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	84.5	175.7

TABLE Existing -04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Rider Street and Placentia Avenue
NOTES: Redlands and Placentia Industrial Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5100 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 20 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	69.4	144.6	309.1

TABLE Existing -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Placentia Avenue and Orange Avenue
NOTES: Redlands and Placentia Industrial Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5450 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	75.6	152.5	323.5

TABLE Existing - With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Indian Avenue and Perris Boulevard
NOTES: Redlands and Placentia Industrial Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1030 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	109.1

TABLE Existing - With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Perris Boulevard and Redlands Avenue
NOTES: Redlands and Placentia Industrial Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3550 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	65.7	119.2	245.1

TABLE Existing - With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Redlands Avenue and Wilson Avenue
NOTES: Redlands and Placentia Industrial Project - Existing - With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2330 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL 70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	88.5	184.6

TABLE Existing - With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Rider Street and Placentia Avenue
NOTES: Redlands and Placentia Industrial Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5320 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 20 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.13

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	71.2	148.6	317.9

TABLE Existing - With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Placentia Avenue and Orange Avenue
NOTES: Redlands and Placentia Industrial Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5610 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	76.9	155.4	329.8

TABLE Opening Year-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Indian Avenue and Perris Boulevard
NOTES: Redlands and Placentia Industrial Project - Opening Year

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4370 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	64.9	131.5	279.3

TABLE Opening Year-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Perris Boulevard and Redlands Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5080 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	77.3	148.1	309.7

TABLE Opening Year-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Redlands Avenue and Wilson Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3250 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	108.9	229.7

TABLE Opening Year-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Rider Street and Placentia Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5500 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 20 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	72.7	151.9	325.0

TABLE Opening Year-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Placentia Avenue and Orange Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6480 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	83.5	170.5	362.8

TABLE Opening Year - With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Indian Avenue and Perris Boulevard
NOTES: Redlands and Placentia Industrial Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4660 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	67.4	137.1	291.4

TABLE Opening Year - With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Perris Boulevard and Redlands Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5370 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	79.5	153.3	321.2

TABLE Opening Year - With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Placentia Avenue between Redlands Avenue and Wilson Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3770 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.28

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	59.8	119.7	253.3

TABLE Opening Year - With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Rider Street and Placentia Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5650 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 20 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	73.9	154.6	330.9

TABLE Opening Year - With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Redlands Avenue between Placentia Avenue and Orange Avenue
NOTES: Redlands and Placentia Industrial Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6580 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	73.80	12.29	9.13
M-TRUCKS	2.75	0.16	0.33
H-TRUCKS	1.33	0.04	0.17

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	84.2	172.2	366.5

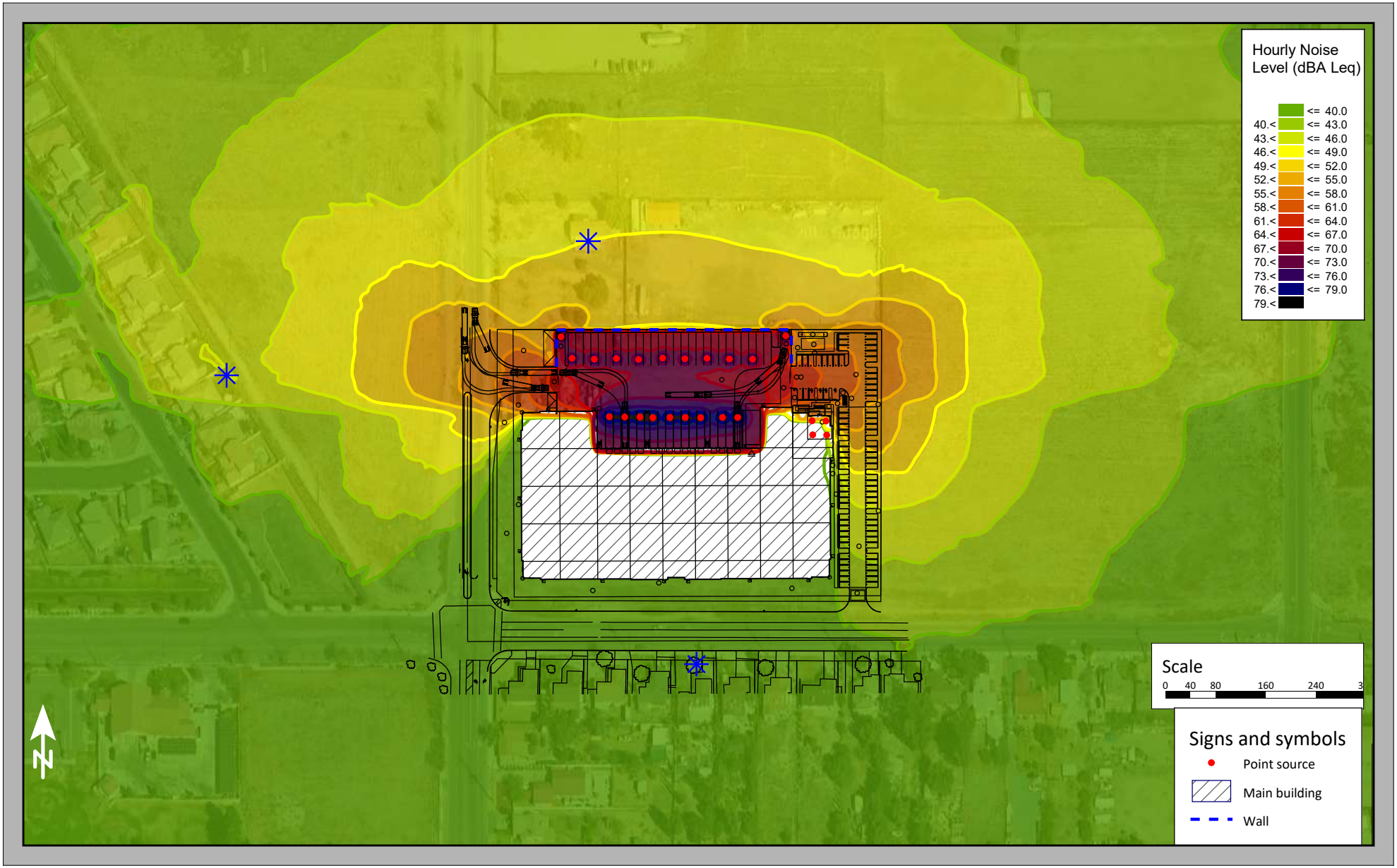
APPENDIX D

SOUNDPLAN NOISE MODEL PRINTOUTS

Redlands and Placentia

Project No. ESL2201.22

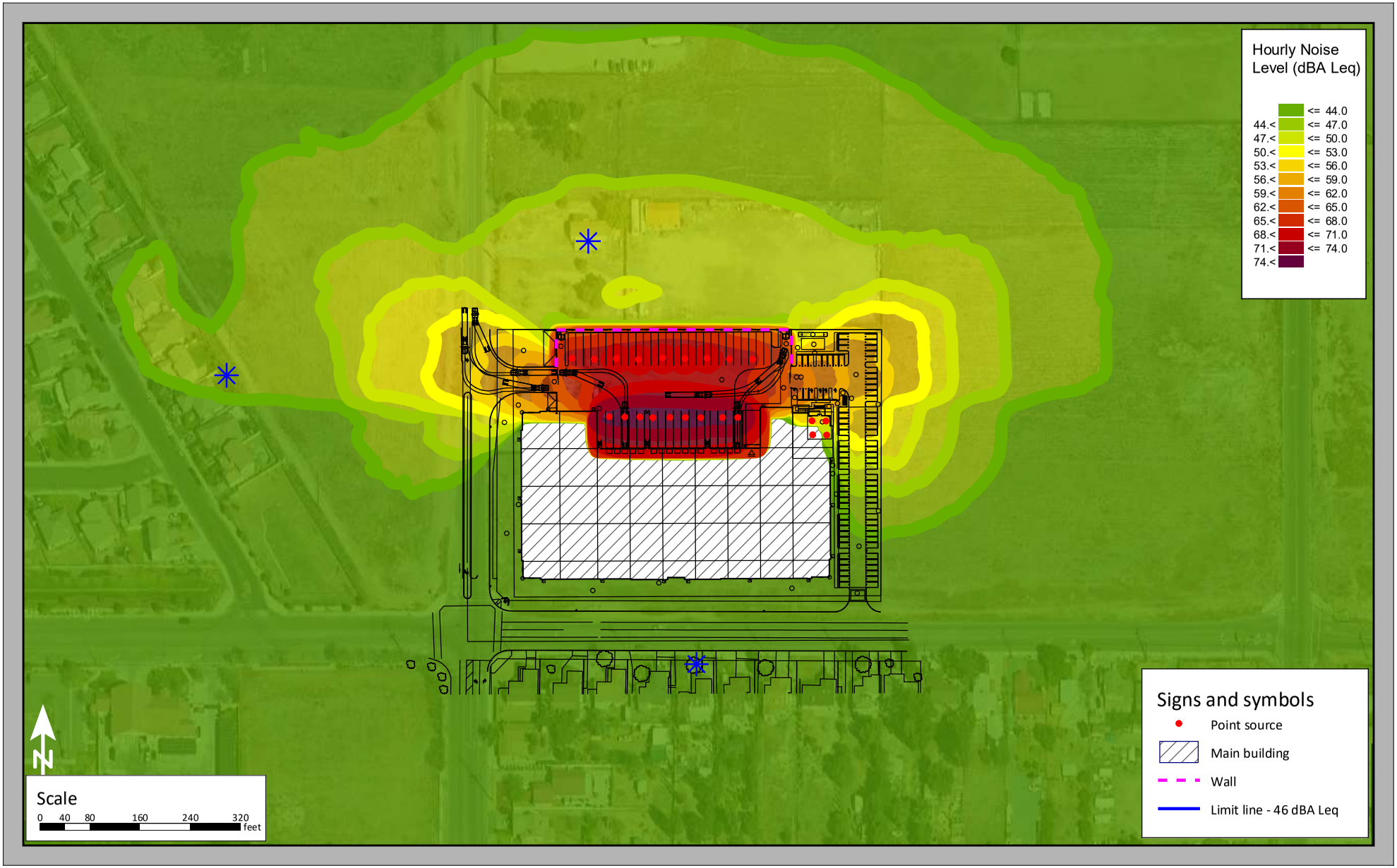
Project Operational Noise Levels - Daytime - Leq



Redlands and Placentia

Project No. ESL2201.22

Project Operational Noise Levels - Night - Leq



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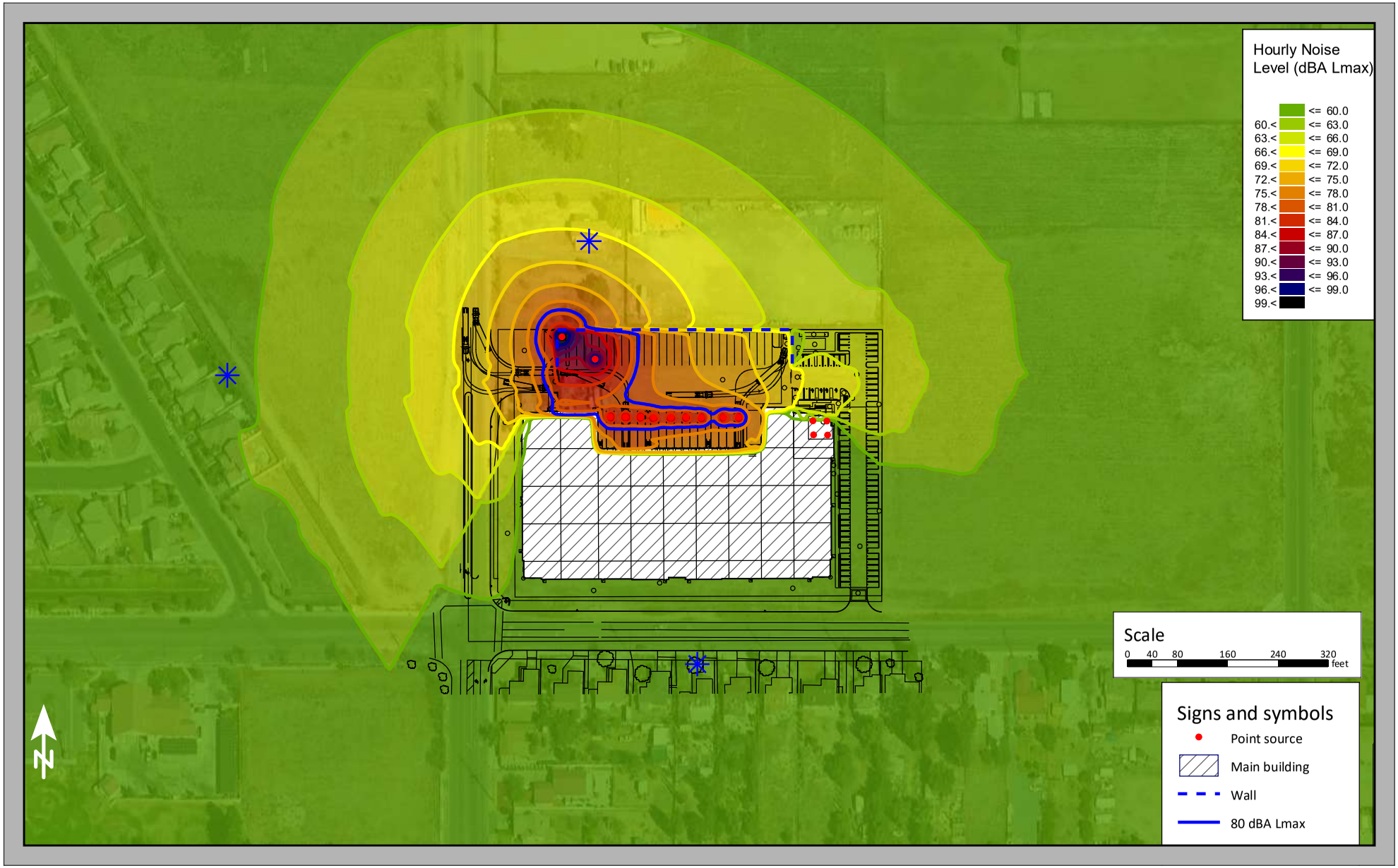
Redlands and Placentia

Project No. ESL2201.22

Project Operational Noise Levels - Day Max



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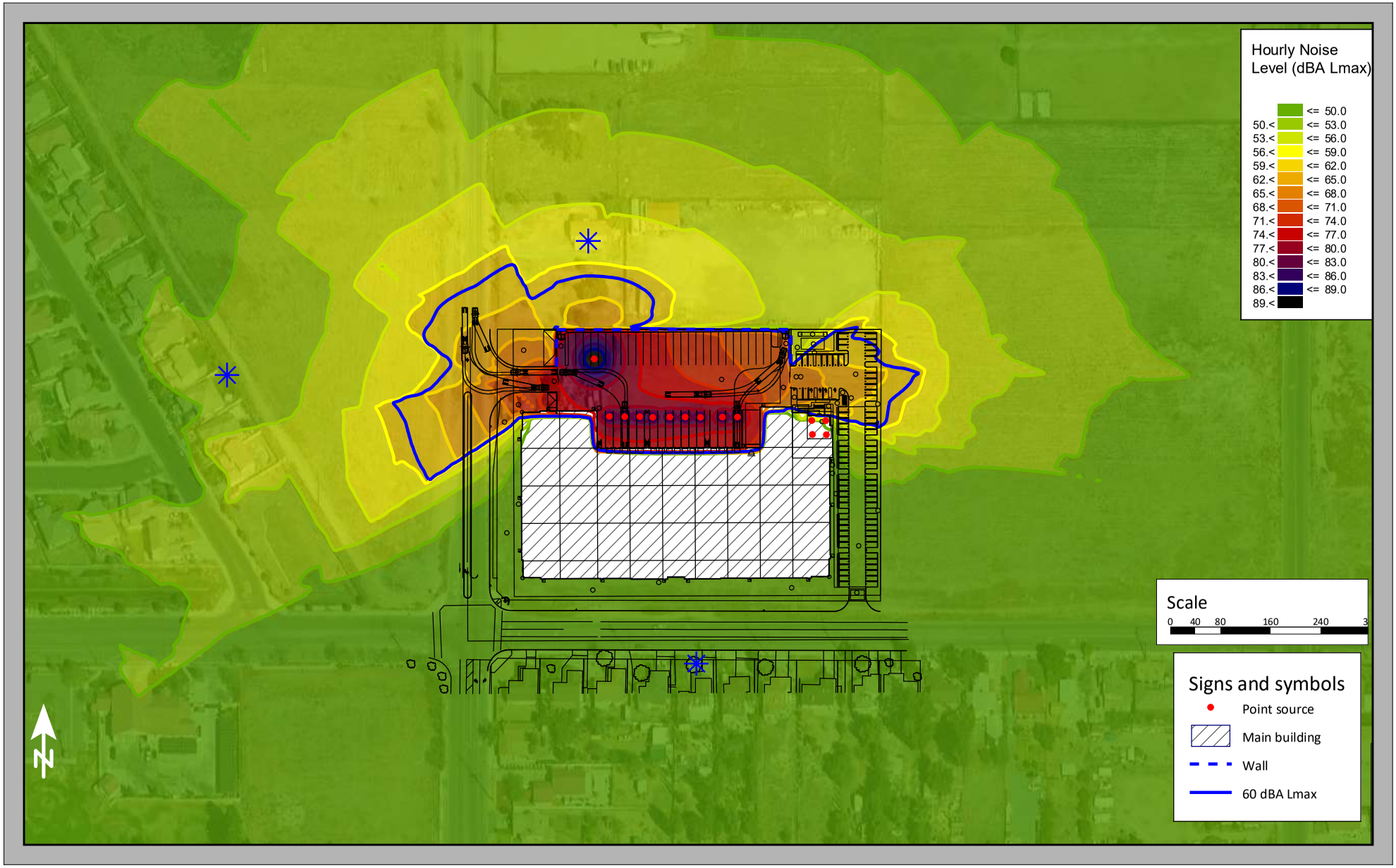
Redlands and Placentia

Project No. ESL2201.22

Project Operational Noise Levels - Night - Max



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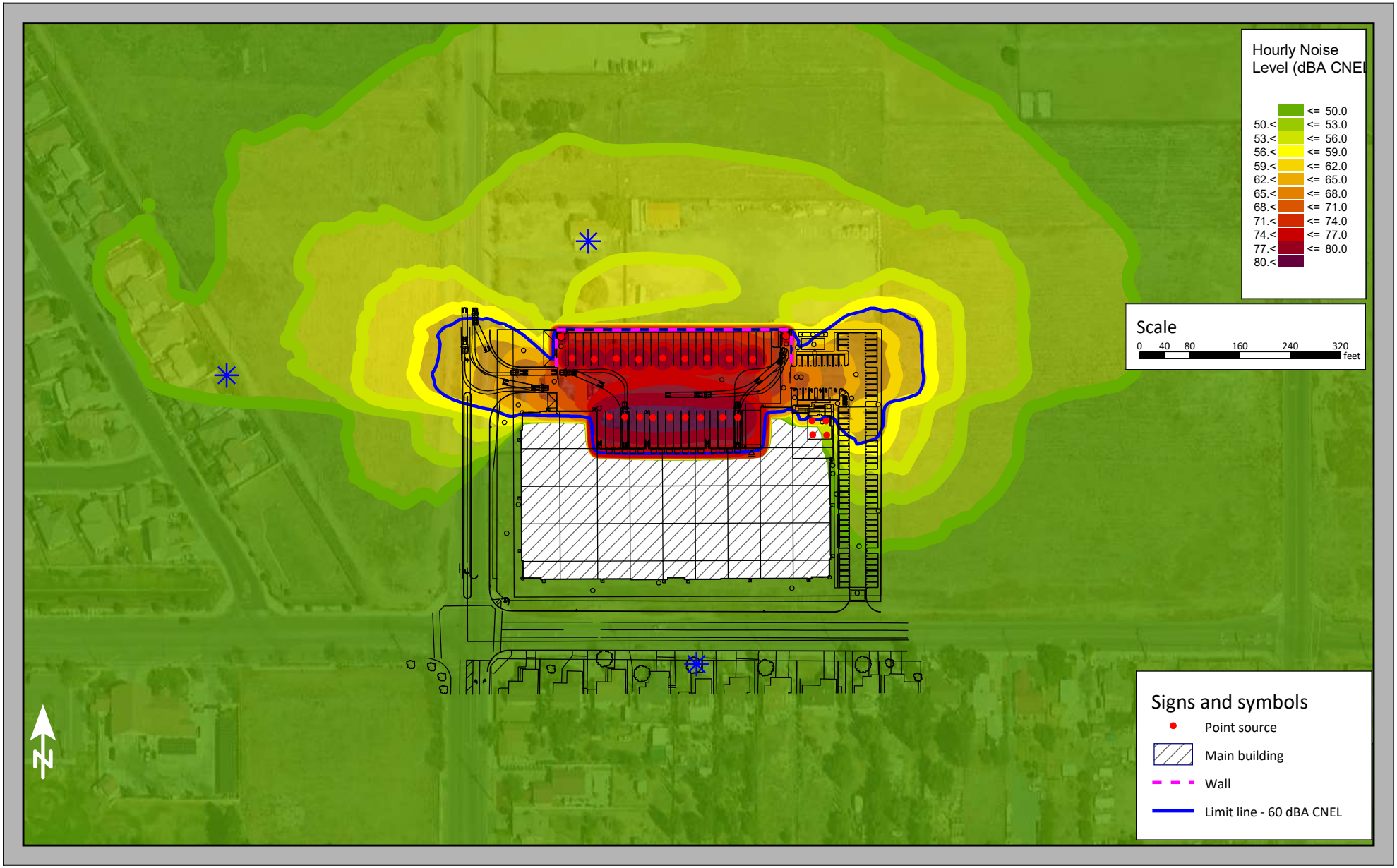
Redlands and Placentia

Project No. ESL2201.22

Project Operational Noise Levels - Daily Noise Level



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