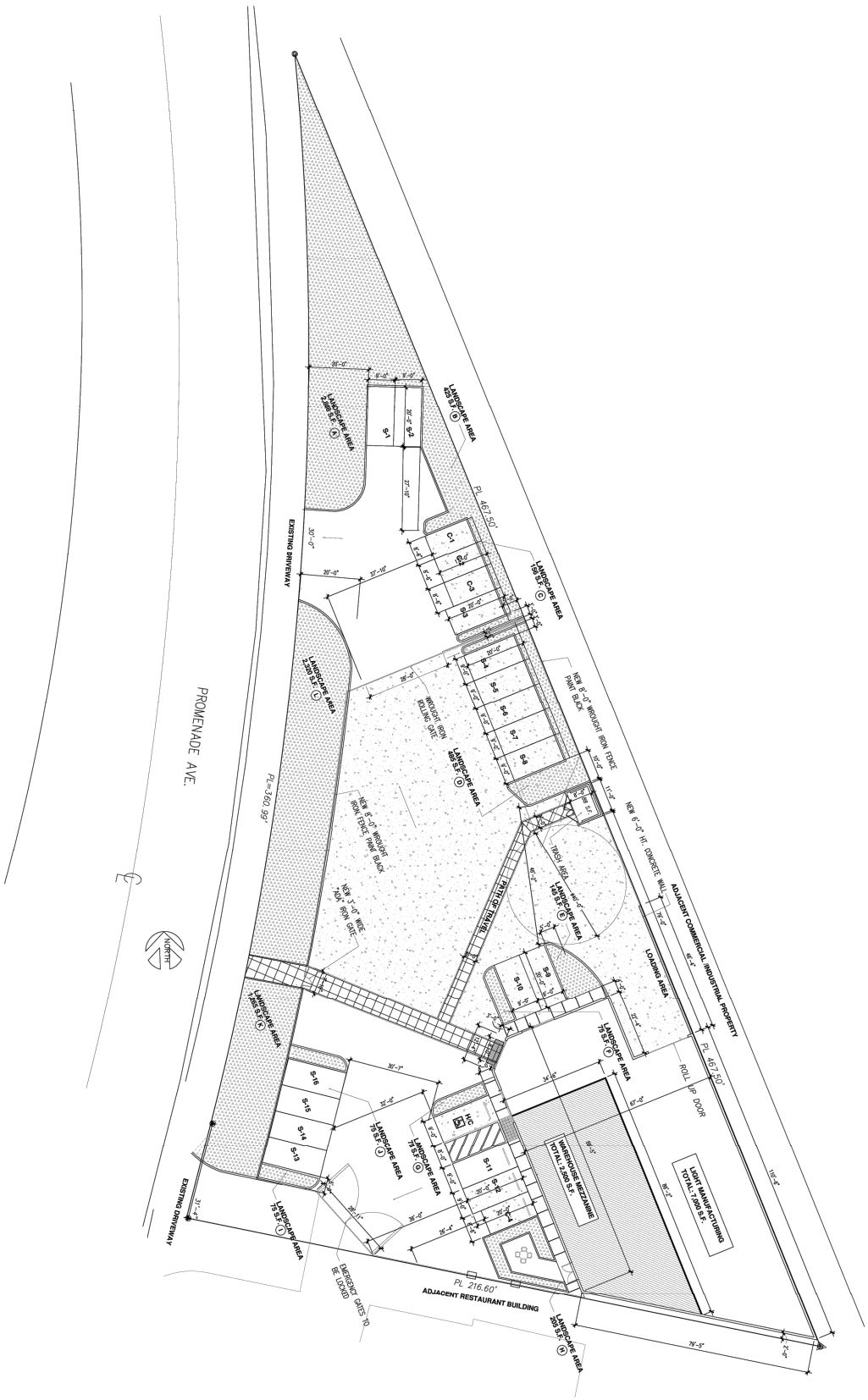
PROMENADE AVENUE LIGHT MANUFACTURING PROJECT
NOISE IMPACT STUDY
City of Corona, CA



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NOISE IMPACT STUDY
City of Corona, California

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

The purpose of this analysis is to evaluate the potential noise impacts from the proposed Promenade Avenue Light Manufacturing Project Noise Impact Study (hereinafter referred to as "Project") and provide recommendations, if necessary, to minimize any potential project noise impacts.

This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.), and the standards and methodology follow the City of Corona Municipal Code and General Plan requirements.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- Identification of the regulatory setting and applicable noise standards
- Analysis of the existing noise environment
- Analysis of the project's operational noise impact on adjacent receptors
- Analysis of the project's construction noise and vibration impact on adjacent sensitive receptors
- Summary of recommended mitigation measures and project design features to reduce noise level impacts.

1.2 Site Location

The proposed project site is located near the northeast corner of Promenade Avenue and Sixth Street, in the City of Corona. The project site is approximately 0.86 acres and is currently vacant.

The nearest noise-sensitive receptors to the project site include the following:

Receptor 1 Existing industrial land use located approximately 43 feet northeast of the project site's northeastern boundary, approximately 114 feet east of the centerline of Promenade Avenue.

Receptor 2 Existing industrial land use located approximately 130 feet northeast of the project site's northeastern boundary, approximately 108 feet northeast of the centerline of Promenade Avenue.

Receptor 3 Existing Park Lane Mobile Home Estates located approximately 305 feet northeast of the project site's northeastern boundary, approximately 271 feet northeast of the centerline of Promenade Avenue.

The project site location map, including sensitive receptor locations, is provided in Exhibit A.

1.3 Project Description

The proposed project consists of constructing and operating a 9,500 square-foot light manufacturing building on an approximately 0.86-acre site. The project includes a total of twenty-one (21) parking spaces and one (1) loading area with a roll-up door. The project site is currently vacant, and no demolition will be required during construction.

The site plan used for this analysis is illustrated in Exhibit B.

This report analyzes the short-term noise impacts associated with construction activities and long-term noise impacts associated with the day-to-day operation of the project. The primary sources of operational noise include rooftop heating, ventilation, and air conditioning (HVAC) equipment, loading dock activity, and parking lot activity (including loading and unloading).

It should be noted that the project, as currently designed, does not include an HVAC system. However, the project will provide hookups for future equipment to be installed, depending on tenant/building requirements. For purposes of this analysis, the project is modeled with the roof mounted HVAC equipment for a conservative and future worst case assessment of noise impacts.

1.4 Summary of Analysis Results

Table 1 provides a summary of the noise analysis results, per the CEQA impact criteria checklist.

Table 1
CEQA Noise Impact Criteria

Noise Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project result in?				
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?			X	
b) Generation of excessive ground-borne vibration or ground-borne noise levels?			X	
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?				X

1.5 Recommended Project Design Features (DF)

The following recommended project design features are assumed to be part of the conditions of approval for the project and integrated into its design.

Operational Design Features

DF-1 All future HVAC equipment will be fully shielded behind the rooftop parapet walls from the line of sight of adjacent properties.

DF-2 A new 6-foot-high concrete masonry unit (CMU) block wall will be installed along the eastern property line, adjacent to the loading area, to screen neighboring uses from noise caused by on-site truck loading activities.

Construction Design Features

DF-3 Construction-related noise activities shall comply with the requirements set forth in the City of Corona Municipal Code Chapter 17.84.040.

1. Construction shall not occur between the hours of 8:00 p.m. and 7:00 a.m. Monday through Saturday;

2. Construction shall not occur between the hours of 6:00 p.m. and 10:00 a.m. on Sundays and federal holidays.

DF-4 During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices and equipment shall be maintained so that vehicles and their loads are secured from rattling and banging. Idling equipment should be turned off when not in use.

DF-5 Locate staging area, generators, and stationary construction equipment as far from any adjacent sensitive receptors as reasonably feasible.

2.0 Fundamentals of Noise and Vibration

This section of the report provides basic information about noise and vibration and presents some of the terms used in the report.

2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as the mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak sounding). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases, as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units of the ratio of actual sound pressures to a reference pressure squared. These units are called decibels and are abbreviated as dB.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple addition or subtraction. When two (2) sounds of equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3dB increase.

If two (2) sounds differ by approximately 10 dB the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels[1]

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz (A-weighted scale), and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighing is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in the noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway), would result in a barely perceptible change in sound level.

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant, while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels. Following are the most commonly used noise descriptors along with brief definitions.

A-Weighted Sound Level

The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level

The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

[1] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

Community Noise Equivalent Level (CNEL)

The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after the addition of ten (10) decibels to sound levels on the night before 7:00 AM and after 10:00 PM.

Decibel (dB)

A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A)

A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ)

The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room

Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n)

The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 is the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, L99, etc.

Noise

Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Percent Noise Levels

See L(n).

Sound Level (Noise Level)

The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter

An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL)

The dBA level which, if it lasted for one (1) second, would produce the same A-weighted sound energy as the actual event.

2.7 Sound Propagation

As sound propagates from a source it spreads geometrically. The sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use the hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground

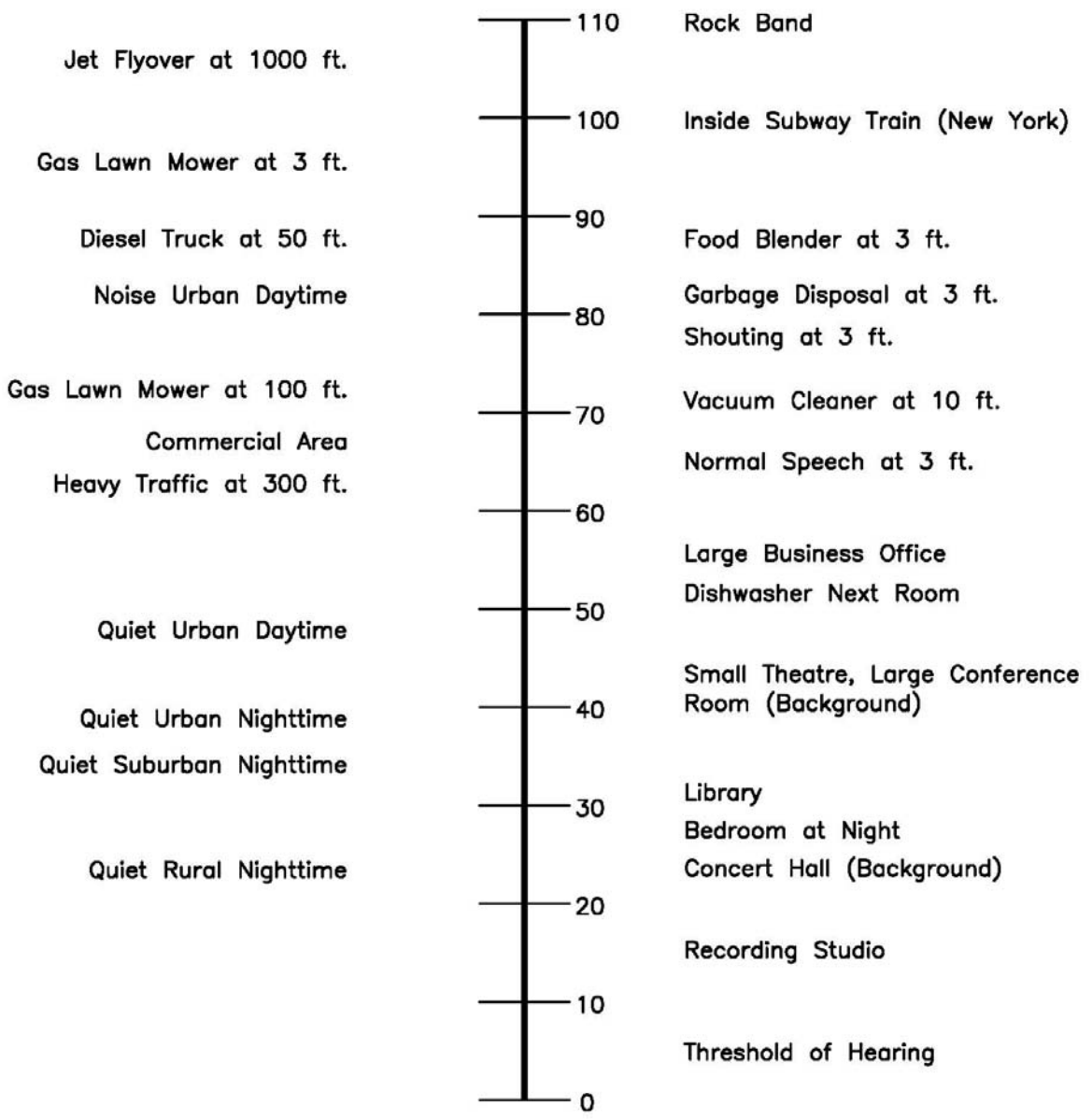
absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet and greater from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

Figure 1 shows typical sound levels from indoor and outdoor noise sources.

Figure 1[2]

TYPICAL SOUND LEVELS FROM
INDOOR AND OUTDOOR NOISE SOURCES



[2] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

2.8 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration that only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV

Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS

Known as the root mean squared (RMS) can be used to denote vibration amplitude.

VdB

A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

2.9 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts.

2.10 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes in order to identify potential vibration impacts that may need to be studied through actual field tests.

2.11 Construction Related Vibration Level Prediction[3]

Operational activities are separated into two different categories. The vibration can be transient or continuous in nature. Each category can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project area site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The thresholds from Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, in the table below provide general guidelines as to the maximum vibration limits for when vibration becomes potentially annoying.

[3] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020

Table 2
Vibration Annoyance Potential Criteria

Human Response	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. The table below provides general vibration damage potential thresholds:

Table 3
Vibration Damage Potential Threshold Criteria

Structure and Condition	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings ruin ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Soil conditions have an impact on how vibration propagates through the ground. The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides suggested "n" values based on soil class. The table below outlines the manual's suggested values and description.

Table 4
Suggested "n" Values Based on Soil Classes

Soil Class	Description of Soil Material	Suggested Value of "n"
I	Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand.	1.4
II	Most sands, sandy clays, silty clays, gravel, silts, and weathered rock.	1.3
III	Hard soils: densely compacted sand, dry consolidated clay, consolidated glacial till, and some exposed rock.	1.1
IV	Hard, component rock: bedrock, freshly exposed hard rock.	1.0

3.0 Regulatory Setting

The proposed project is located in the City of Corona and will be required to comply with the City's adopted noise regulations.

3.1 City of Corona Noise Standards

3.1.1 City of Corona Stationary Noise Standards

The City of Corona outlines its noise regulations and standards within the General Plan Noise Element and Municipal Code Chapter 17.84.040. Noise impacts can be identified as two types based on their sources: transportation and stationary. The noise metric used for transportation-related noise sources, such as freeways, airports, and railroads is the Community Noise Equivalent Level (CNEL), which is a 24-hour time-weighted average noise level. Stationary noise sources, such as industrial or construction noise that may be intrusive to a neighboring private property, utilize the noise metrics that are defined as noise levels that cannot be exceeded for certain percentages of time.

For the purposes of this study, the stationary noise source standards are applicable. (Per the Corona Municipal Code Section 17.84.040 requirements, an assessment of transportation source noise is only required for the construction of new master planned roads, roadway improvements, rail lines and/or prior to the construction of residential or sensitive land uses adjacent to existing or master planned roads or railways. The proposed project does not necessitate a roadway noise study).

Table 5 shows the City's stationary noise source standards for the land uses adjacent to the project site. The City of Corona Municipal Code Chapter 17.84.040 is provided in Appendix A.

Table 5
City of Corona
Stationary Noise Source Standards[1]

Land Use	Maximum Allowable Noise Level	
	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
Single-, Double- and Multi-Family Residential	55 dBA	50 dBA
Industrial, Manufacturing, or Agricultural	75 dBA	70 dBA

[1] Corona Municipal Code Section 17.84.040 (C)(2).

Per Municipal Code Chapter 17.84.040, it shall be unlawful for any person, entity or operation at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

- The exterior noise standard for a cumulative period of more than 30 minutes in any hour;
- The exterior noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour;
- The exterior noise standard plus 10 dB for a cumulative period of more than five minutes in any hour;
- The exterior noise standard plus 15 dB for a cumulative period of more than one minute in any hour;
- The exterior noise standard plus 20 dB for any period of time;

3.1.2 City of Corona Construction Noise Regulation

Section 17.84.040(D)(2) of the City's municipal code sets the following provisions regarding construction activities noise;

- Construction noise is prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday, and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays. Construction noise is defined as noise which is disturbing, excessive or offensive and constitutes a nuisance involving discomfort or annoyance to persons of normal sensitivity residing in the area, which is generated by the use of any tools, machinery or equipment used in connection with construction operations.

3.2 City of Corona General Plan Noise Element

The City of Corona General Plan Noise element includes goals and policies that are intended to reduce a project's noise impacts and maintain a reasonably quiet environment for people living and working in Corona. The proposed project will be required to comply with the following applicable goals and policies:

Goal N-1 Protect residents, visitors, and noise-sensitive land uses from the adverse human health and environmental impacts created by excessive noise levels from transportation sources by requiring proactive mitigation.

Policies

N-1.1 Reduce noise impacts from transportation noise sources through the design and daily operation of arterial road improvements, enforcement of state motor vehicle noise standards, and other measures consistent with funding capabilities.

- Require site design features and structural building enhancements in the development of residential and other "noise sensitive" land uses that are to be located adjacent to major roads or railroads.

- Encourage enforcement of state motor vehicle noise standards through coordination with the California Highway Patrol and the Corona Police Department.

- Ensure that the Zoning Ordinance, Circulation Element, and Land Use Element of the General Plan fully integrate the policies adopted as part of the Noise Element.

N-1.2 Minimize the rise of vehicle noise from roadways through route location, sensitive roadway design, regulation of traffic volumes and speeds, and working with Caltrans in highway improvements.

N-1.3 Encourage Caltrans to install and maintain mitigation (e.g., noise walls) and/or landscaping elements along highways that are adjacent to existing residential subdivisions or other noise-sensitive areas in order to reduce adverse noise impacts.

N-1.4 Require municipal vehicles and noise-generating mechanical equipment purchased or used by the City to comply with noise performance standards consistent with the latest available noise reduction technology to the extent practicable and cost-effective.

N-1.5 Require new nonresidential development that attracts noise-generating vehicles (e.g., high volumes of traffic, trucking) to design and configure onsite ingress and egress points to divert traffic away from "noise sensitive" land uses, to the greatest extent practicable.

Goal N-2 Prevent and mitigate the adverse impacts of excessive ambient noise exposure, including vibration on residents, employees, visitors, and "noise sensitive" land uses.

Policies

N-2.1 Consider noise and vibration levels in land use planning decisions to prevent future noise and vibration and land use incompatibilities. Considerations may include, but not necessarily be limited to, standards that specify acceptable noise limits for various land uses, noise reduction features, acoustical design in new construction, and enforcement of the California Standards Building Code provisions for indoor and outdoor noise levels.

N-2.2 Require that in areas where existing or future ambient noise levels exceed an exterior noise level of 65 dBA CNEL, all development of new housing, health care facilities, schools, libraries, religious facilities, and other "noise sensitive" uses shall include site design, building enhancements, buffering, and/or mitigation to reduce noise exposure to within acceptable limits.

N-2.3 Require new industrial and new commercial land uses or the major expansion of such uses to demonstrate that ambient noise levels will not exceed an exterior noise level of 65 dBA CNEL on areas containing "noise sensitive" land uses as depicted in Table N-1, N-2, and N-3.

N-2.4 Require development in all areas where the existing or future ambient noise level exceeds 65 dBA CNEL to conduct an acoustical analysis and incorporate special design measures in their construction to reduce interior noise levels to the 45 dBA CNEL level as depicted on Table N-1, N-2, and N-3.

N-2.5 Encourage existing "noise sensitive uses," including schools, libraries, health care facilities, and residential uses, in areas where existing or future noise levels exceed 65 dBA CNEL to incorporate fences, walls, landscaping, and/or other noise buffers and barriers, where appropriate and feasible.

N-2.6 Require development that generates increased traffic and substantial increases in ambient noise levels adjacent to noise sensitive land uses to provide appropriate mitigation measures in accordance with the acceptable limits of the City Noise Ordinance.

N-2.7 Require construction activities that occur in close proximity to existing "noise sensitive" uses, including schools, libraries, health care facilities, and residential uses, to limit the hours and days of operation in accordance with the City Noise Ordinance.

Goal N-3 Discourage the spillover or encroachment of unacceptable noise levels from mixed use, commercial, and industrial land uses on to noise sensitive land uses.

Policies

N-3.1 Provide for the reduction in noise impacts from commercial and industrial operations as controlled and enforced through the City Noise Ordinance.

N-3.2 Incorporate noise reducing designs into new or remodeled commercial and industrial projects. Measures should include, but not be limited, to:

- Sound barriers in front of HVAC units and other similar outdoor mechanical equipment.
- Increase setbacks and buffering of parking areas and primary on-site access drives from adjacent residential areas and other sensitive uses to the maximum extent feasible with walls, fences, berms, and/or adequate landscaping.
- Require vehicle access to commercial or industrial land uses abutting existing or planned residential areas be located at the maximum practical distance from residential areas.
- Orient loading and unloading ramps and drop off zones away from noise sensitive land uses.

N-3.3 Require the design of residential and nonresidential parking structures used on-site and adjacent to noise sensitive land uses

incorporate noise reducing features to minimize vehicular noise from encroaching outside the structure.

N-3.4 Require that restaurants/bars implement operational measures to control the activities of their patrons on-site and within a reasonable distance from the establishment in order to minimize potential noise-related impacts on adjacent residential neighborhoods.

N-3.5 Require mixed-use structures incorporating commercial or institutional and residential uses, or industrial uses adjacent to noise and vibration sensitive uses minimize, through design and construction technology, the transfer or transmission of noise and vibration from the commercial, institutional, or industrial use to the residential land use.

N-3.6 Require nighttime land uses having amplified noise devices to be located in areas of the city that are not directly adjacent to existing and planned "noise-sensitive" land uses.

4.0 Study Method and Procedures

The following section describes the measurement procedures, measurement locations, and noise modeling procedures and assumptions used in the noise analysis.

4.1 Measurement Procedures and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent to the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

RK conducted the sound level measurements in accordance with Caltrans technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (ANSI S1.4: Specification for Sound Level Meter, 1983)

Piccolo-II Type 2 integrating-averaging level meters were used to conduct noise measurements at the project site and property boundaries.

The Leq, Lmin, Lmax, L2, L8, L25, and L50 statistical data were recorded over the measurement time period intervals and the information was utilized to define the noise characteristics for the project. The following gives a brief description of the procedures for sound level measurements:

- Microphones for sound level meters were placed five (5) feet above the ground for long-term noise measurements
- Sound level meters were calibrated before each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Temperature and sky conditions were observed and documented

Appendix B includes photos, field sheets, and measured noise data.

4.2 Stationary Noise Modeling

On-site stationary noise sources were analyzed using SoundPLAN™ noise modeling software. SoundPLAN™ is a standards-based program that incorporates more than twenty national and international noise modeling guidelines.

Projected noise levels from SoundPLAN™ are based on the following key parameters:

- Developing three-dimensional noise models of the project,
- Predicting the project noise levels at the selected community locations and
- Comparing the predicted noise with the existing community ambient noise levels at the receptor locations.

The sides of the buildings, walls, etc. were modeled as reflective surfaces and also as diffractive bodies.

Most of the area surrounding the project site consists of roadways, industrial properties, and parking lots and has been run as a hard site (Ground Factor=0). The elevation profile for the project site is derived from Google Earth and all the receptors are placed at 5 feet above ground level.

Sound Power and Sound Pressure Level

Sound power level is the acoustic energy emitted by a source that produces a sound pressure level at some distance. While the sound power level of a source is fixed, the sound pressure level depends upon the distance from the source and the acoustic characteristics of the area in which it is located.

SoundPLAN requires that the source noise level be input using sound power level and which must be back-calculated based on a measured sound pressure level. The sound power level is calculated using SoundPLAN software by calibrating the source noise level to equal the sound pressure level at an equal distance from the source in which the referenced measurement was taken.

4.2.1 Parking Lot Noise

Parking lot noise would occur from vehicles entering and exiting the site, idling, exhaust, doors slamming, tires screeching, general loading activities, people talking, and the occasional horn honking. Parking lot noise would occur throughout the site and is assessed by using referenced noise levels in the SoundPLAN model. Parking lot noise is based on the type of vehicle and the number of movements per hour. Referenced noise levels for parking lot activities are based on the SoundPLAN™ standard *Parkplatzlärmstudie 2007*. Key inputs for parking lot noise include the size of the area source, number of movements per hour, type of vehicles, and number of parking spaces within each lot.

4.2.2 AC Equipment Noise

The project proposes to install one AC unit on the roof of the project building. To estimate noise level impacts from on-site AC equipment, reference noise levels obtained by RK are utilized. Referenced noise levels represent similar commercial and industrial scale AC equipment operating under similar conditions as would be found on the project site. Table 6 indicates the referenced noise levels of the AC equipment.

Table 6
AC Referenced Noise Levels[1]

Source	Distance from Source (feet)	Noise Levels (dBA)	
		L_{eq}	L_{max}
HVAC – Industrial[1]	3.0	88.5	88.5

[1] Referenced noise levels measured by RK over a 1-minute period.

To estimate the future noise levels during typical operational conditions, referenced noise levels are input into SoundPLAN and projected to the nearest sensitive receptor locations. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography, and physical barriers including buildings and sound walls. The noise levels assume that the AC unit is operating continuously during both daytime and nighttime hours, when in reality will likely operate only intermittently throughout daily operations.

4.2.3 Loading Dock Noise

Loading dock noise would occur from trucks entering and exiting the site, idling, exhaust, loading, and delivery activities. Loading and unloading activities will be located at a designated area near the northeastern boundary of the project site. Truck loading noise levels

are referenced from the SoundPLAN model. "Truck: loading general cargo" has been used to determine the project's loading and unloading activities noise levels.

Table 7 indicates the referenced noise levels for on-site loading and unloading activity.

Table 7
Loading Dock Referenced Noise Levels[1]

Source	Sound Level (dBA Leq)
Truck: Loading General Cargo	80.0

[1] Source: SoundPLAN Emission spectra library.

To estimate the future noise levels during typical operational conditions, noise levels are input into SoundPLAN and projected to the nearest sensitive receptor locations. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography, and physical barriers including buildings and sound walls.

A new 6-foot-high concrete masonry unit (CMU) block wall will be installed along the eastern property line, adjacent to the loading area, to screen neighboring uses from noise caused by on-site truck loading activities.

The noise analysis assumes that loading dock activity will occur during both daytime and nighttime hours.

4.3 Construction Noise Modeling

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model, together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, and baseline parameters for the project site. This study evaluates the potential exterior noise impacts during each phase of construction.

Noise levels were projected from the center of proposed construction activity to the nearest sensitive receptor, a distance of approximately 150 feet. While some construction noise activity may occur closer than 150 feet from the property line, noise levels are averaged over a 1-hour period for purposes of assessing impacts. The methodology used for

assessing construction noise impacts is consistent with the Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual, September 2018[4].

Construction phasing and equipment usage assumptions are referenced from the *Promenade Avenue Light Manufacturing Project Air Quality, Greenhouse Gas, and Energy Impact Study, City of Corona, CA* by RK Engineering Group.

4.4 Construction Vibration Modeling

The construction vibration assessment is based on the methodology set forth within the Caltrans Transportation and Construction Induced Vibration Guidance Manual. The vibration impacts from vibratory rollers and compactors, heavy truck loading, and bulldozer activity are analyzed. All vibratory activity is analyzed as a continuous and/or frequent event and is required to comply with the applicable guidance threshold criteria. It is expected that vibration levels will be highest during the paving phase. No impact pile driving is expected as part of this project.

Vibratory impacts were calculated from the site area property line to the closest sensitive receptors and structures using the reference vibration levels, soil conditions, and the reference equation *PPV= PPV ref (25/D)^n (in/sec)* (from Caltrans Manual) where:

PPV = reference measurement at 25 feet from the vibration source
D = distance from equipment to the property line
n= vibration attenuation rate through the ground (n=1.1 was utilized for this study)

[4] Federal Transit Administration. Transit Nosie and Vibration Impact Assessment Manual. September 2018. Section 7.1. Construction Noise Assessment.

5.0 Existing Noise Environment

The existing noise environment for the project site and surrounding areas has been established based on noise measurement data collected by RK. The project setting is residential/industrial and the primary environmental noise impacting the project site is roadway noise from adjacent streets.

5.1 Noise Measurement Results

To determine the existing noise level environment, RK conducted two (2) 30-minute noise measurements at the project study area.

Noise levels were measured on May 25, 2023 using Piccolo-II Type 2 integrating-averaging sound level meters. The information was utilized to establish the noise characteristics of the existing ambient environment.

The noise monitoring locations were selected based on the proximity and location of adjacent sensitive receptors. Exhibit C graphically illustrates the location of the noise measurements.

- Noise monitoring location one (L-1) was taken on the southwestern border of the existing Park Lane Mobile Home Estates, approximately 440 feet east of the centerline of Promenade Avenue. Ambient noise sources during the measurement period consisted of idling trucks, car shop activity, people talking, and light wind.

- Noise monitoring location two (L-2) was taken near the northeastern border of the project site, approximately 135 feet east of the centerline of Promenade Avenue. Ambient noise sources during the measurement period consisted of idling trucks, car shop activity, people talking, and light wind.

Noise measurement results are summarized in Tables 8 and 9. Appendix B includes photographs, field sheets, and measured noise data.

Noise measurements were conducted at the above-selected locations to determine the existing ambient noise environment at the project site and nearby surrounding sensitive receptors.

Table 8
Short-Term Noise Measurement Results (dBA) - L-1[1]

Start Time	Stop Time	Leq	Lmax	Lmin	L2	L8	L25	L50
3:25 PM	3:55 PM	58.3	70.1	50.5	65.2	61.6	58.3	56.4

[1] L-1 was recorded on 05/25/2023.

Table 9
Short-Term Noise Measurement Results (dBA) - L-2[1]

Start Time	Stop Time	Leq	Lmax	Lmin	L2	L8	L25	L50
3:25 PM	3:55 PM	65.1	81.9	55.3	69.5	67.3	65.7	64.0

[1] L-2 was recorded on 05/25/2023.

6.0 Operational Noise Impacts

This assessment analyzes the anticipated noise levels generated by the project and compares them to the standards established in the City of Corona Municipal Code Chapter 17.84.040 – Noise.

The primary sources of operational noise include HVAC mechanical equipment, loading dock activity, and parking lot activity.

6.1 Stationary Source Noise Impacts

The City of Corona Municipal Code establishes residential and industrial noise standards for the maximum allowable exterior noise level. SoundPLAN™ noise modeling software is used to predict project-related noise impacts at each of the sensitive receptor locations during daytime and nighttime hours. The predicted noise levels are then compared to the City's noise standards to determine whether the project will result in a significant impact.

This analysis considers all project noise sources operating simultaneously during daytime hours (7:00 a.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.). The result is a worst-case assessment of future noise levels, as not all noise sources would typically be in use at the same time.

Daytime Stationary Source Noise Impacts

Noise levels generated by the project are not expected to exceed the City's daytime noise standards at all receptor locations. The residential and industrial noise standards are established to be 55 dBA Leq and 75 dBA Leq, respectively.

The results of the daytime noise impact analysis are shown in Table 10 and are graphically illustrated in Exhibits D and E. SoundPLAN calculation worksheets are provided in Appendix C.

Table 10
Daytime Stationary Noise Source Impacts

Sensitive Receptor Location	SoundPLAN Receiver	Exterior Noise Level (dBA)	Corona Noise Level Standards (dBA)	Exceeds Standards (?)
1 - Industrial	1	54.8	75	**No**
2 - Industrial	2	58.4		**No**
3 - Residential	3	39.2	55	**No**
	4	47.5		**No**
	5	39.3		**No**

[1] See appendix C for noise SoundPLAN output sheets.
[2] Corona Municipal Code Section 17.84.040 (C)(2). Daytime Noise Standards. 7 a.m. to 10 p.m.

Nighttime Stationary Source Noise Impacts

Noise levels generated by the project are not expected to exceed the City's nighttime noise standards at all receptor locations. The residential and industrial noise standards are established to be 50 dBA Leq and 70 dBA Leq, respectively.

The results of the nighttime noise impact analysis are shown in Table 11 and are graphically illustrated in Exhibits D and F. SoundPLAN calculation worksheets are provided in Appendix C.

Table 11
Nighttime Stationary Noise Source Impacts

Sensitive Receptor Location	SoundPLAN Receiver	Exterior Noise Level (dBA)	Corona Noise Level Standards (dBA)	Exceeds Standards (?)
1 - Industrial	1	54.8	70	**No**
2 - Industrial	2	58.4		**No**
3 - Residential	3	39.2	50	**No**
	4	47.5		**No**
	5	39.3		**No**

[1] See appendix C for noise SoundPLAN output sheets.
[2] Corona Municipal Code Section 17.84.040 (C)(2). Nighttime Noise Standards. 10 p.m. to 7 a.m.

6.2 Roadway Noise Impacts

The project is not expected to cause a substantial increase in ambient noise levels in the vicinity of the site as a result of increased traffic volume along adjacent roadways.

Typically, it takes a doubling of traffic volume along a roadway to cause a perceptible change in ambient noise levels of more than 3 dBA. Per the *Promenade Avenue Light Manufacturing Project Trip Generation & VMT Screening Memorandum*, performed by RK, the project is forecast to generate approximately 45 average daily trips. Due to the extremely low number of trips generated by the project, it can be assumed that the project will not directly or cumulatively double the traffic volumes on either Promenade Avenue or Sixth Street. Therefore, it can be concluded that the project's roadway noise impact is less than significant without the need for further analysis.

6.3 Airport Noise Compatibility

The Corona Municipal Airport, located in Corona, California, is the nearest airport to the project site at a distance of approximately four (4) miles. The project site is not located within the vicinity of the Corona Municipal Airport or any other private airstrips or airport land use plan, nor is it within two miles of a public or private use airport. Therefore, the project will have no impact on airport-adjacent land uses.

6.4 Project Consistency with City of Corona General Plan Noise Element

As demonstrated above, the project will comply with the stationary noise standards established in the City's Municipal Code and General Plan. By complying with the applicable standards and policies, the project will not result in excessive noise or vibration exposure or the spillover of unacceptable noise levels on to the adjacent sensitive receptors.

In particular, the project will implement several noise-reducing design features, as described in Section 6.5 of this report.

Hence, the proposed project will not conflict with the City of Corona General Plan Noise Element's goals and policies.

6.5 Operational Project Design Features (DF)

The following recommended project design features are assumed to be part of the conditions of approval for the project and integrated into its design.

Operational Design Features

DF-1 All future HVAC equipment will be fully shielded behind rooftop parapet walls from the line of sight of adjacent properties and the outdoor areas on the site.

DF-2 A new 6-foot-high concrete masonry unit (CMU) block wall will be installed along the eastern property line, adjacent to the loading area, to screen neighboring uses from noise caused by on-site truck loading activities.

7.0 Construction Noise and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the project site to the surrounding adjacent land uses. The degree of construction noise will vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties.

During the construction period, the contractors would be required to comply with the City of Corona Municipal Code Chapter 17.84.040 which indicates that construction noise is exempt from the noise ordinance, provided any of the following are satisfied:

- Construction does not occur between the hours of 8:00 p.m. and 7:00 a.m., Monday through Saturday
- Construction does not occur between the hours of 6:00 p.m. and 10:00 a.m. on Sundays and federal holidays

In compliance with the City's Municipal Code, it is assumed construction would not occur during the noise-sensitive nighttime hours.

7.1 Typical Construction Noise Levels

Table 12 shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common-type construction equipment. Typical construction noise levels are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

Table 12
Typical Construction Noise Levels[1]

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86
Impact Equipment	
Pneumatic Wrenches	82 - 87
Jack Hammers, Rock Drills	80 - 99
Pile Drivers (Peak)	95-105
Other	
Vibrators	68 - 82
Saws	71 - 82

[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

7.2 Construction Noise Impact Analysis

This assessment analyzes potential noise impacts during all expected phases of construction, including site preparation, grading, building construction, paving, and architectural coating. Noise levels are calculated based on an average distance of equipment over a 1-hour period to the nearest adjacent property.

The project's estimated construction noise levels have been calculated using the Federal Highway Administration Roadway Construction Noise Model Version 1.1. Table 13 shows the noise level impacts at 150 feet.

Although construction activity is exempt from the noise standards in the City's Municipal Code, the Federal Transit Administration (FTA) has provided guidelines for assessment of construction noise impacts in the *Transit Noise and Vibration Impact Assessment Manual.* For the purposes of this study, expected construction noise levels will be analyzed using the General Assessment construction noise criteria provided by the FTA.

FTA guidelines recommend using an average noise level (Leq) threshold, and modeling all equipment at the center of the site, which takes into consideration fluctuations in activity and equipment usage throughout the day. Construction noise calculation worksheets are provided in Appendix D.

Table 13
Project Construction Noise Levels – at 150 Feet

Phase	Equipment	Quantity	Equipment Noise Level at 150 ft (dBA Leq)	Combined Noise Level (dBA Leq)
Site Preparation	Graders	1	75.5	78.0
	Tractors/Loaders/Backhoes	1	74.5	
Grading	Graders	1	75.5	79.0
	Rubber Tired Dozers	1	72.2	
	Tractors/Loaders/Backhoes	1	74.5	
Building Construction	Cranes	1	71.1	78.8
	Forklifts	2	65.5	
	Tractors/Loaders/Backhoes	2	74.5	
Paving	Cement and Mortar Mixers	4	69.3	79.0
	Pavers	1	67.7	
	Rollers	1	70.5	
	Tractors/Loaders/Backhoes	1	74.5	
Architectural Coating	Air Compressors	1	68.2	68.2
Worst Case Construction Phase Noise Level - Leq (dBA)				**79.0**
FTA Daytime General Assessment Construction Noise Criteria – Leq (dBA)[1]				90.0

[1]Source: *Transit Noise and Vibration Impact Assessment Manual, Section 7 Noise and Vibration during Construction,* by the Federal Transit Administration.

The project is expected to generate a maximum noise level of 79.0 dBA. Based on the above table, the project's construction-related noise levels will not exceed the FTA General Assessment Construction Noise Criteria threshold.

7.3 Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures. The nearest adjacent structures are the adjacent restaurant land use located approximately 34 feet south of the project site as well as the industrial land uses located approximately 43 feet northeast of the project site. All structures surrounding the project site are "new structures". No historical or fragile buildings are known to be located within the vicinity of the site.

The construction of the proposed project is not expected to require the use of substantial vibration-inducing equipment or activities, such as pile drivers or blasting. The main sources of vibration impacts during project construction would be the operation of equipment, such as bulldozer activity during demolition and site preparation, loading trucks during grading and excavation, and vibratory rollers during paving.

The construction vibration assessment utilizes the referenced vibration levels and methodology set forth within the Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018. Table 14 shows the FTA-referenced vibration levels.

Table 14
Typical Construction Vibration Levels[1]

Equipment	Peak Particle Velocity (PPV) (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Piledriver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Piledriver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

Table 15 shows the project's construction-related vibration analysis at the nearest structures to the project construction area. Construction impacts are assessed from the closest area on the project site to the nearest adjacent structures, located approximately 34 feet from the project site's southern boundary.

Table 15
Construction Vibration Impact Analysis

Construction Activity	Distance from Project Boundary to Nearest Structure (ft)	Duration	Calculated Vibration Level - PPV (in/sec)	Damage Potential
Vibratory Roller	34	Continuous/Frequent	0.150	Fragile Buildings
Large Bulldozer	34	Continuous/Frequent	0.063	None
Loaded Trucks	34	Continuous/Frequent	0.054	None

As shown in Table 15, the worst-case project-related construction activity is expected to cause vibration levels that fall within the threshold for fragile buildings. Since no fragile

buildings are known to be located within the vicinity of the project site, the impact is considered less than significant.

Construction vibration calculation worksheets are shown in Appendix D.

7.4 Construction Project Design Features

The following recommended project design features include standard rules and requirements, best practices, and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into the site design and construction management plan.

DF-3 Construction-related noise activities shall comply with the requirements set forth in the City of Corona Municipal Code Chapter 17.84.040.

- Construction shall not occur between the hours of 8:00 p.m. and 7:00 a.m., Monday through Saturday
- Construction shall not occur between the hours of 6:00 p.m. and 10:00 a.m. on Sundays and federal holidays

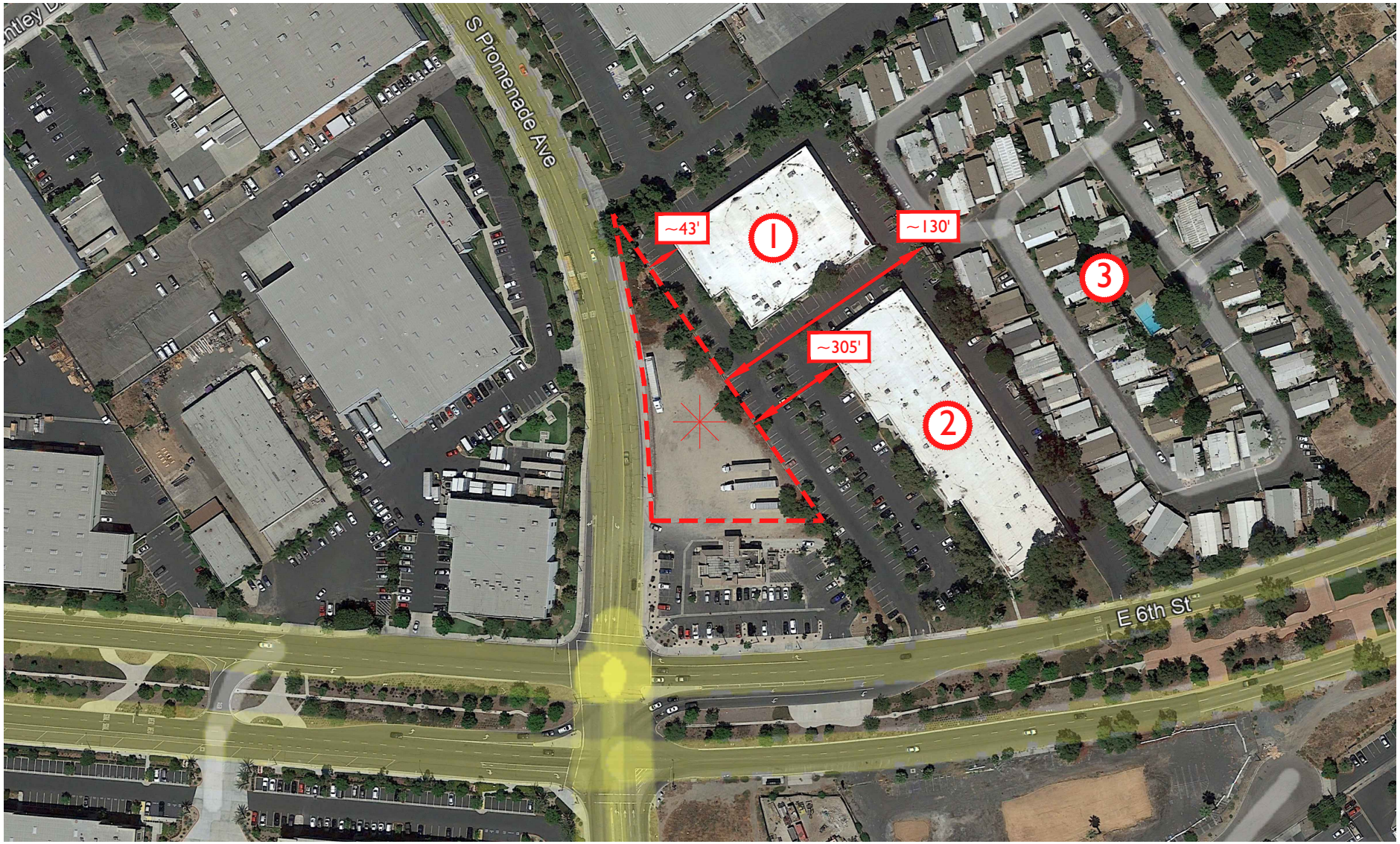
DF-4 During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices and equipment shall be maintained so that vehicles and their loads are secured from rattling and banging. Idling equipment should be turned off when not in use.

DF-5 Locate staging area, generators, and stationary construction equipment as far from any adjacent sensitive receptors, as reasonably feasible.

Exhibits

Exhibit A

Location Map



Legend:

= Project Site Boundary

= Project Site

= Sensitive Receptor Location

N

RK engineering group, inc.

Exhibit B

Site Plan

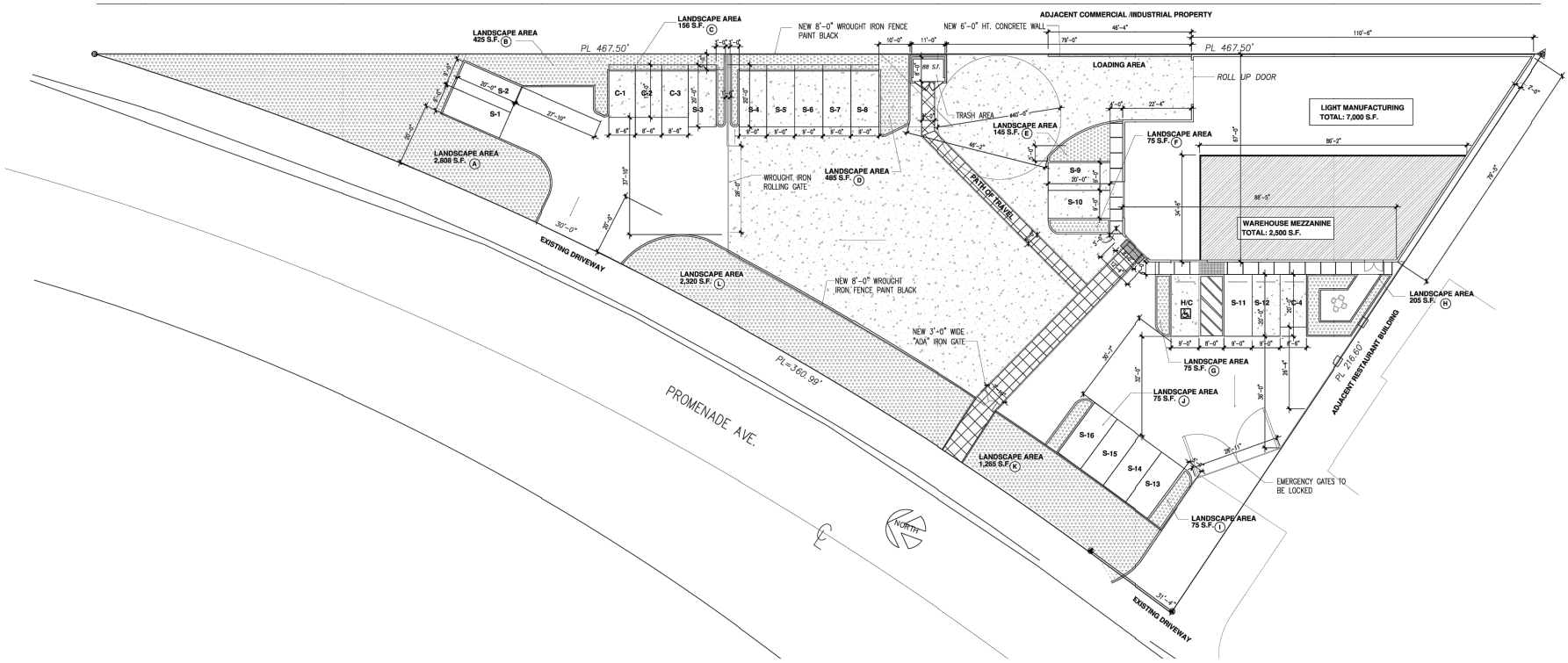


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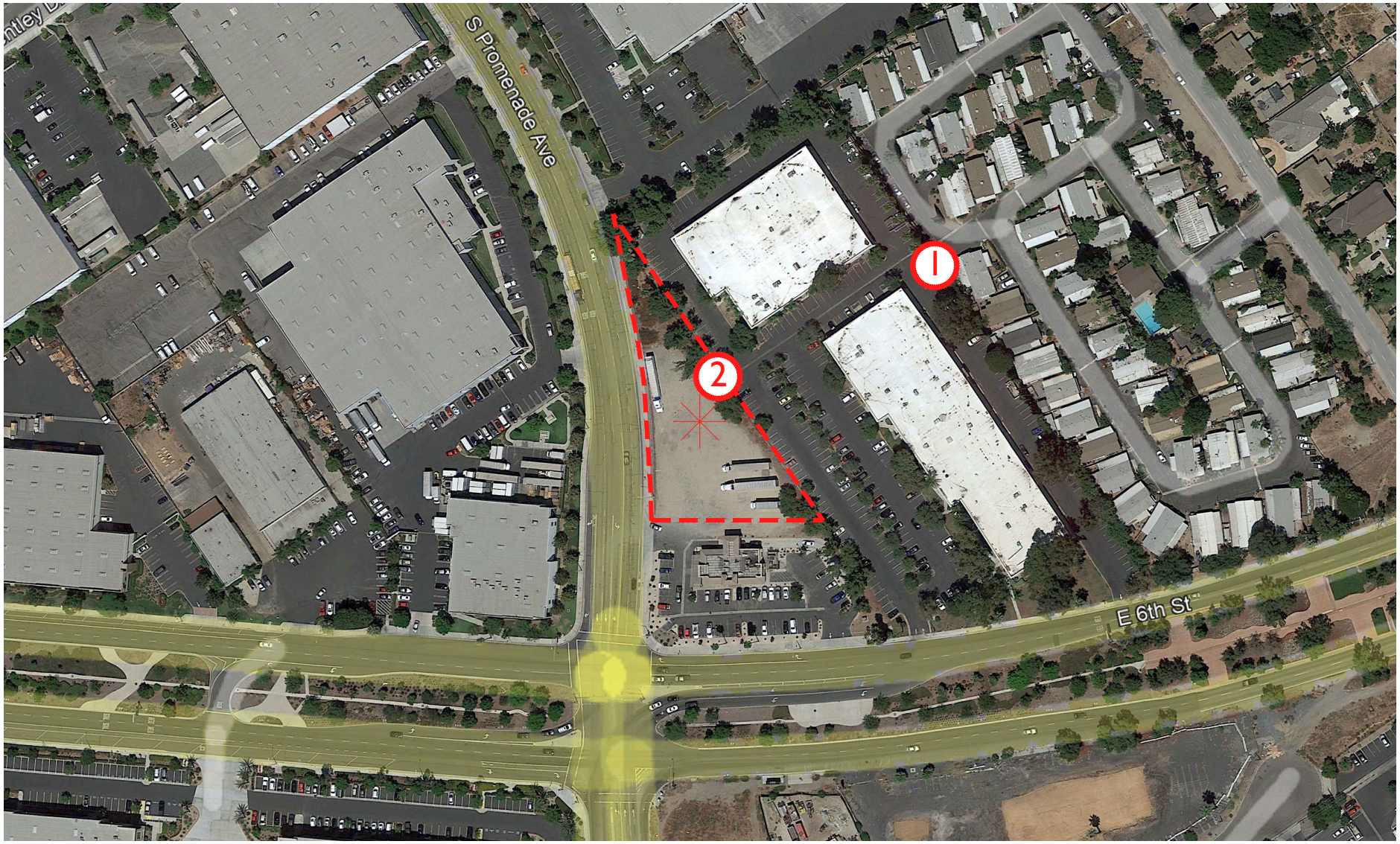
Exhibit C

Noise Monitoring Locations



Legend:

= Project Site Boundary

= Project Site

= Noise Monitoring Location

N

RK engineering group, inc.

Exhibit D

Typical Operational Day/Night Noise Levels (dBA)

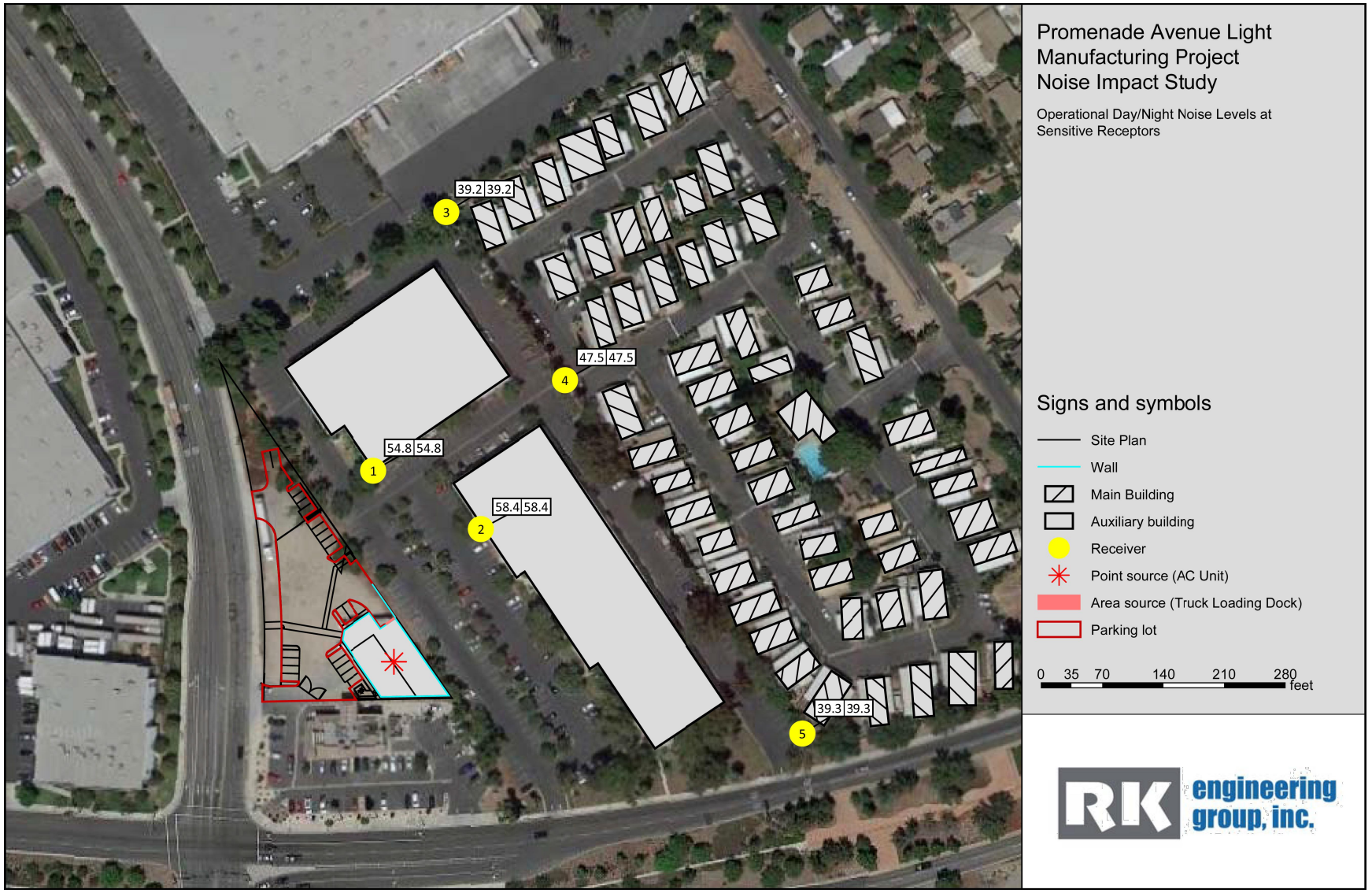


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Exhibit E

Typical Operational Noise Contours (dBA) - Daytime

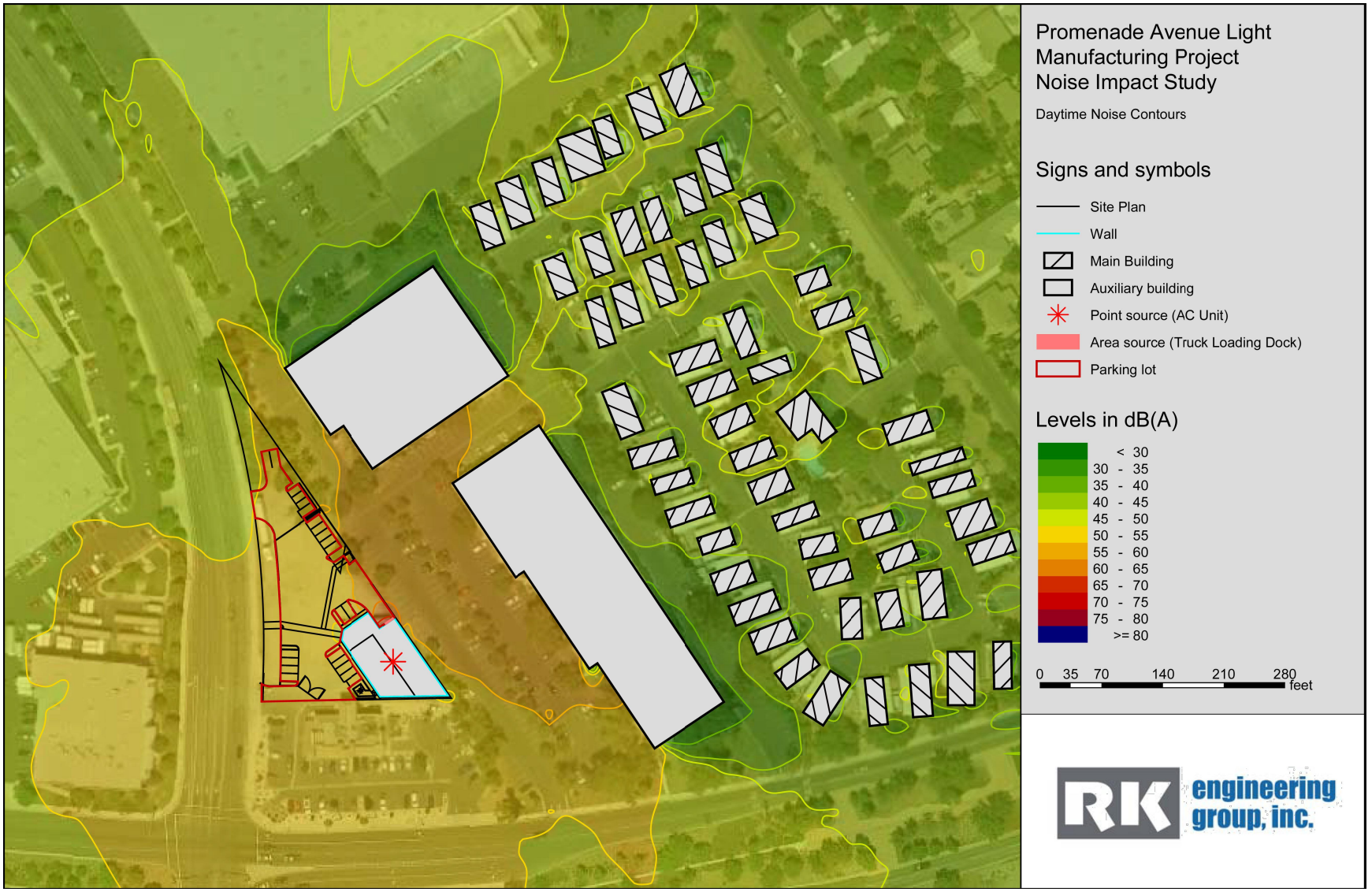

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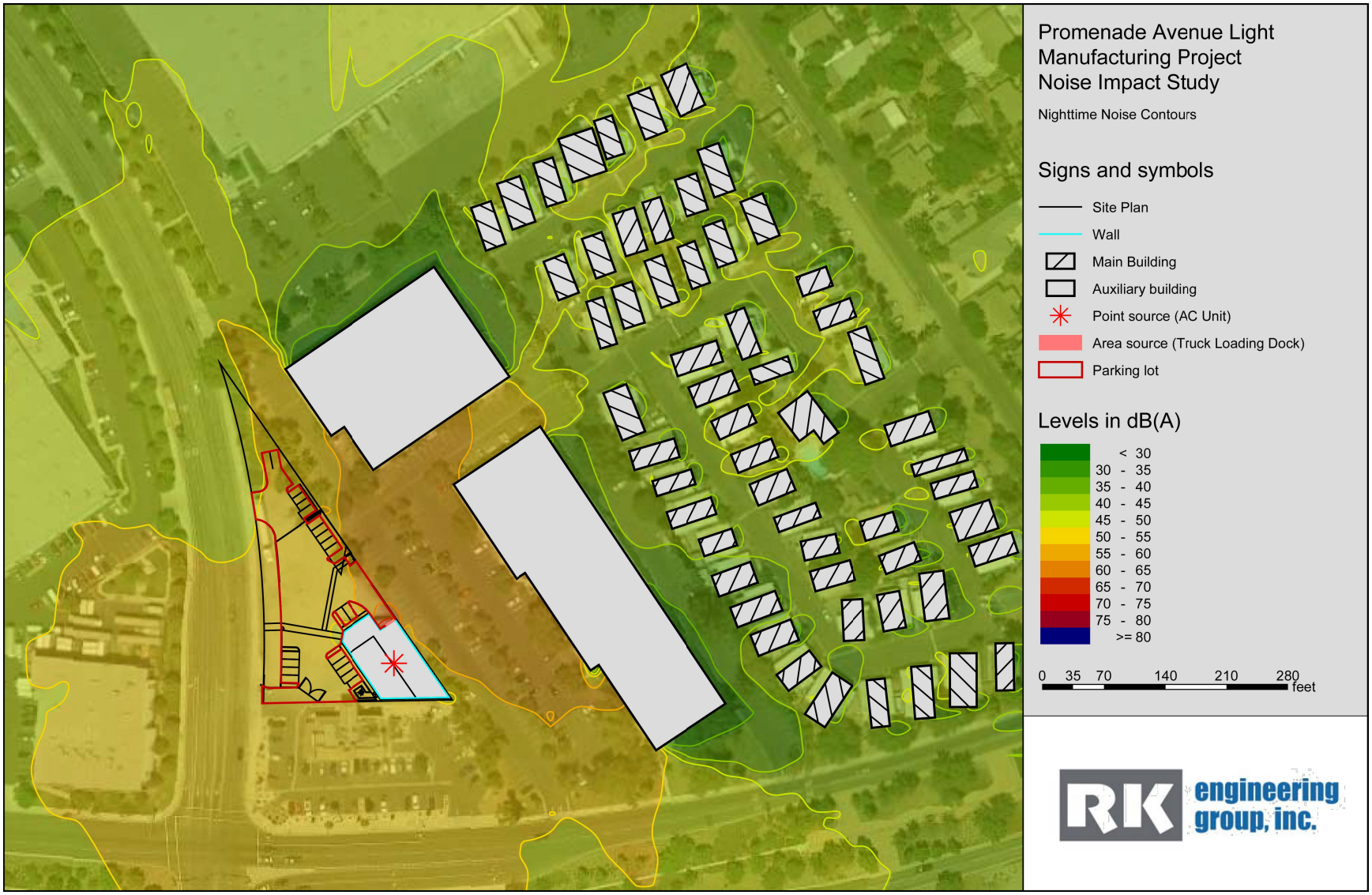
Exhibit F

Typical Operational Noise Contours (dBA) - Nighttime



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Appendices

Appendix A

City of Corona
General Plan Noise Element and
Municipal Code Noise Control

Noise

INTRODUCTION

Noise and vibration are a constant presence in the everyday life of a modern suburban community. Although a certain level of noise and vibration is considered acceptable, excessive noise or vibration interferes with the quality of life in residential neighborhoods; detracts from commerce; and adversely affects sensitive areas or land uses, such as schools and medical settings. Corona, like many other suburban cities, is affected by the noise environment seeks to limit its impact where possible.

Consistent with its vision, the City of Corona's efforts to protect residents and business from excessive noise are guided by the following statement.

Corona is committed to protecting residents, businesses, and visitors from unacceptable levels of noise and vibration that detract from the quality of life. The City will seek to ensure that neighborhoods offer a quiet and peaceful environment, that commercial and industrial sectors operate within acceptable noise levels appropriate for their environment, and that sensitive land uses are protected from noise sources and levels that detract from quality of life.

The noise element strives to preserve the quality of life by protecting the community from the obtrusive impacts of noise- and vibration-generating uses such as traffic, construction, airplanes, and industrial uses, as well as other sources within Corona.

Scope of Element

The authority for general plans to address noise is codified in the California Government Code § 65302(f), which requires that a general plan include: A noise element that shall identify and appraise noise problems in the community. The noise element shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

- Highways and freeways.
- Primary arterials and major local streets.
- Passenger and freight railroad operations and ground rapid transit systems.
- Commercial, general aviation, and helicopter operations; aircraft overflights; and all other facilities and maintenance functions related to airport operation.
- Local industrial plants, including but not limited to railroad classification yards.
- Other ground stationary noise sources, including military installations, identified by local agencies as contributing to the community noise environment.

The intent of the noise element is to establish a pattern of land uses that minimizes the exposure of community residents to excessive noise. This includes maintaining the areas deemed acceptable in terms of noise exposure and requiring appropriate land use controls in areas exposed to excessive noise. This noise element also addresses the issue of vibration and its impact on sensitive land uses.

Related Plans

Several federal, state, and local agencies have adopted legislation and plans intended to minimize exposure of people to sources of loud noise. The noise element is a guideline for compliance with these standards, which include:

- **Transportation-Related Standards**. The City must abide by a number of federal and state regulations related to transportation noise, specifically airports and transportation projects. These are articulated by the federal aviation administration, federal transit administration, federal railroad administration, and Caltrans.
- **Housing and Development**. The US Department of Housing and Urban Development, California Administrative Code, Title 24 of the Health and Safety Code, and other portions of state law address noise standards in residential developments and other nontransportation land uses.
- **Local Standards**. The Corona Municipal Code has set noise performance standards for transportation and stationary noise sources. Transportation noise sources include freeways, airports, and railroads. Stationary noise sources include industrial and mechanical equipment. The code also has vibration performance standards.

The next section provides context for each noise hazard in Corona, followed by goals and policies to achieve the general plan vision.

NOISE CONTEXT

Noise and vibration surround us; they are a constant presence in everyday urban life. To some, noise is welcome when it occurs in a playground, a business district, or other social setting. In other cases, excessive noise can interfere with community or personal quality of life and affect physical health, psychological stability, social cohesion, property values, and economic productivity. The purpose of the noise element in a general plan is to ensure that a community limits the exposure to excessive noise and vibration levels in sensitive areas and at sensitive times of day.

Noise is often defined as annoying or unwanted sound. Health studies have shown that excessive noise can cause adverse psychological and physiological effects on humans. Though sound levels can be easily measured, the variability in subjective and physical responses to sound complicates the analysis of its impact on people. The ear, the hearing mechanism of humans and most animals, receives these sound pressure waves and converts them to neurological impulses, which are transmitted to the brain for interpretation. The interpretation by the auditory system and the brain depends on the characteristics of the sound and on the characteristics of the person hearing it.

Another topic related to noise is vibration. Although less frequent and often accompanied by noise, vibration can also be disturbing. Vibration is an oscillating motion that is transmitted in waves through the earth or solid objects. Groundborne vibration can be due to various explosions, construction activities, or railway and transit movement. Especially for local planning areas where sensitive uses exist or are planned, OPR recommends that groundborne vibration be included in the noise element. This ensures greater consistency with the CEQA Environmental Review Checklist (Cal. Code Regs., Title 14, § 15000 et seq., Appendix G).

Surface mining operations meet vibration standards as conditions of their permits.

Noise and Vibration Terminology

The concept and application of noise and vibration to comprehensive planning and development are difficult to understand without standard definitions that are used in the field of noise and vibration as well as in this section.

Noise and Vibration Terms

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 the human ear or a microphone.

Noise: Sound that is loud, unpleasant, unexpected, or otherwise undesirable. This typically refers to the volume of noise and whether it interferes with other activities.

Ambient Noise: The composite of noise from all sources near and far. The ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Intrusive Noise: Noise that intrudes over ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence; tonal or informational content; and the prevailing noise level.

Decibel (dB): A unitless measure of sound on a logarithmic scale. Decibels may also be "A-weighted" (dBA), which de-emphasizes the very low and very high frequencies similar to the human ear and is correlated with subjective reactions to noise.

Leq: Equivalent energy level. The maximum root-mean-square noise level during a measurement period. Leq is typically computed over 1-, 8-, and 24-hour sample periods. Leq can also be measured as equivalent continuous noise, which is the mean of the noise level, energy averaged over time.

CNEL: Community Noise Equivalent Level. The energy-average of the A-weighted sound levels during a 24-hour period, with 5 dB added from 7:00 p.m. to 10:00 p.m., and 10 dB added from 10:00 p.m. to 7:00 a.m.

Note: For general community/environmental noise, CNEL and Ldn values rarely differ by more than 1 dB. As a matter of practice, Ldn and CNEL values are equivalent and generally interchangeable.

Ldn: Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour period, with 10 decibels added from 10 p.m. to 7 a.m.

For general community/environmental noise, CNEL and Ldn values rarely differ by more than 1 dB. As a matter of practice, Ldn and CNEL values are equivalent and generally interchangeable.

Noise Contours: Lines drawn about a noise source indicating the distance to various levels of noise exposure.

Vibration: 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. It is generally felt rather than heard.

Peak Particle Velocity (PPV). The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

TRANSPORTATION NOISE

In Corona, the primary sources of noise and vibration are related to the prevalence of its transportation infrastructure throughout the community. In addition, as the community is framed by surrounding hills and canyons, Corona's natural topography also increases the degree to which noise and vibration are felt.

Aircraft

The Corona Municipal Airport is a general aviation airport that experiences up to 50,000 annual operations per year. The majority of flights are for recreational purposes only. Because the airport generally serves small aircraft and is in the Prado Flood Control Basin, a half mile from the nearest residential neighborhoods, it is not a substantial source of noise, and noise from the airport does not affect much of the city. As shown in Figure N-2, the noise contours for the airport extend largely within open space areas within the Prado Basin and surrounding industrial uses.

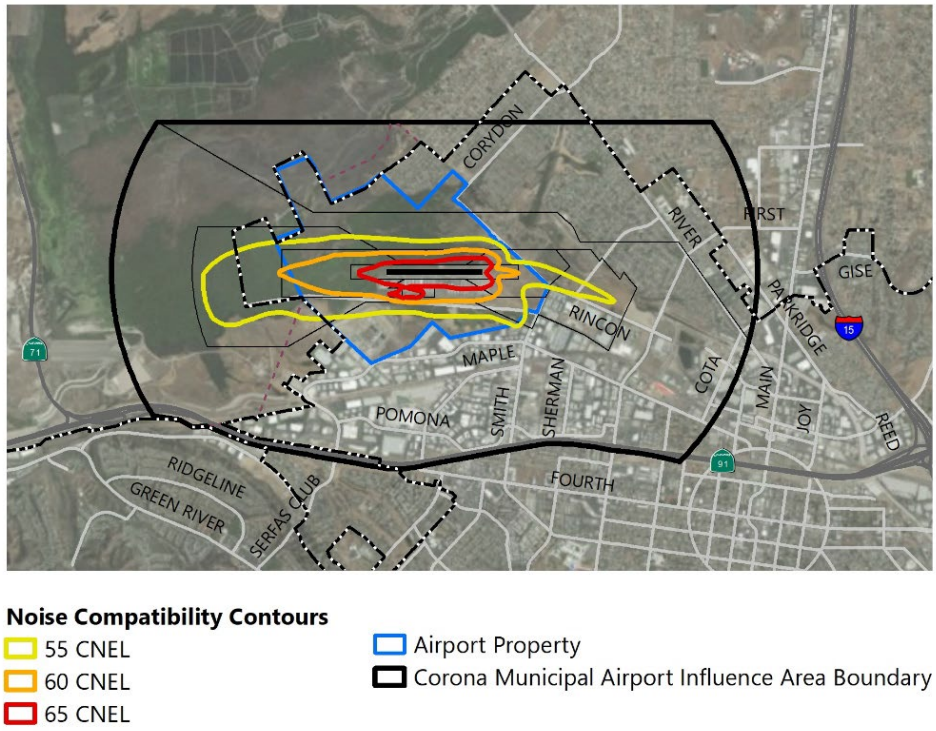

Figure N-1 Corona Municipal Airport Noise Contours

The California Code of Regulations Title 21, Subchapter 6, Airport Noise Standards, establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Noise-sensitive land uses in locations where the aircraft exterior noise level exceeds 65 dBA CNEL are generally incompatible, unless an aviation easement has been acquired or the residence is a high-rise apartment or condominium that achieves an interior CNEL of 45 dBA or less in all habitable rooms. The Corona Municipal Code has a similar noise standard in the airport influence area.

Freeways and Arterials

The major sources of noise and vibration in the community are freeways. Both the SR-91 and I-15 bisect the community and are two of the most heavily traveled freeways in California. Hundreds of thousands of trucks and autos traverse these freeways. Corona has highly used arterial roadways that carry a significant volume of vehicles—Ontario Avenue, Magnolia Avenue, Sixth Street, Main Street, and other arterials. Vibration levels are higher and more noticeable along freeways and local truck routes due to the volume of heavy trucks using these routes.

Figure N-2, Existing Transportation Noise Levels, and Figure N-3, Future Transportation Noise Levels, show noise contours from major transportation infrastructure. Noise modeling did not take into account sound walls or other shielding features that would attenuate traffic noise, and thus provides a conservative estimate of the areas actually adversely affected by noise. Generally, the area within the 60 CNEL contour is where residential, lodging, noise and land use compatibility may be a concern. Areas where proposed future development could exceed standards in the land use noise compatibility matrix are required to conduct a detailed acoustical study to determine design features or mitigation to reduce noise and vibration to acceptable levels.

Railroad Lines

The Burlington Northern Santa Fe Railroad (BNSF) operates rail lines that traverse Corona carrying freight trains. This line is also shared by both the Metrolink Commuter Rail and Amtrak Passenger Rail. Train noise is a significant source of noise due to its magnitude and the associated vibration effects. Train noise incorporates the sounds of the locomotive engine, wheel-on-rail noise, and whistles near crossings. About 50 freight trains and 25 Metrolink and Amtrak trains use this rail corridor daily. The number of trains passing through Corona is forecast to double by the year 2040.

Railroad lines typically produce noise levels in excess of 65 CNEL, which is the maximum exterior noise level allowed in areas with sensitive uses, such as housing. in areas nearest the railroad tracks. The 65 dBA CNEL rail noise contour extends 600 feet in both directions from the mainline and 750 feet within ¼ mile of crossings (due to horn sounding) under existing conditions and is projected to extend 1,050 feet from the rail line at buildout of the general plan. While the railroad is generally located in industrial zones, main lines also run adjacent to some residential areas.

Stationary sources of noise include common building or home mechanical equipment, such as air conditioners, ventilation systems, or pool pumps, and industrial facilities, such as manufacturing plants, power plants, or processing plants. Industry in Corona and near the Corona city limits also includes a wide variety of noise sources, such as light manufacturing, truck transportation–related businesses, and heavy manufacturing. Surface mining operations in eastern Corona also produce significant noise. Mining operations, which are one of the largest stationary sources of noise, are regulated pursuant to development agreement and local mining permit.

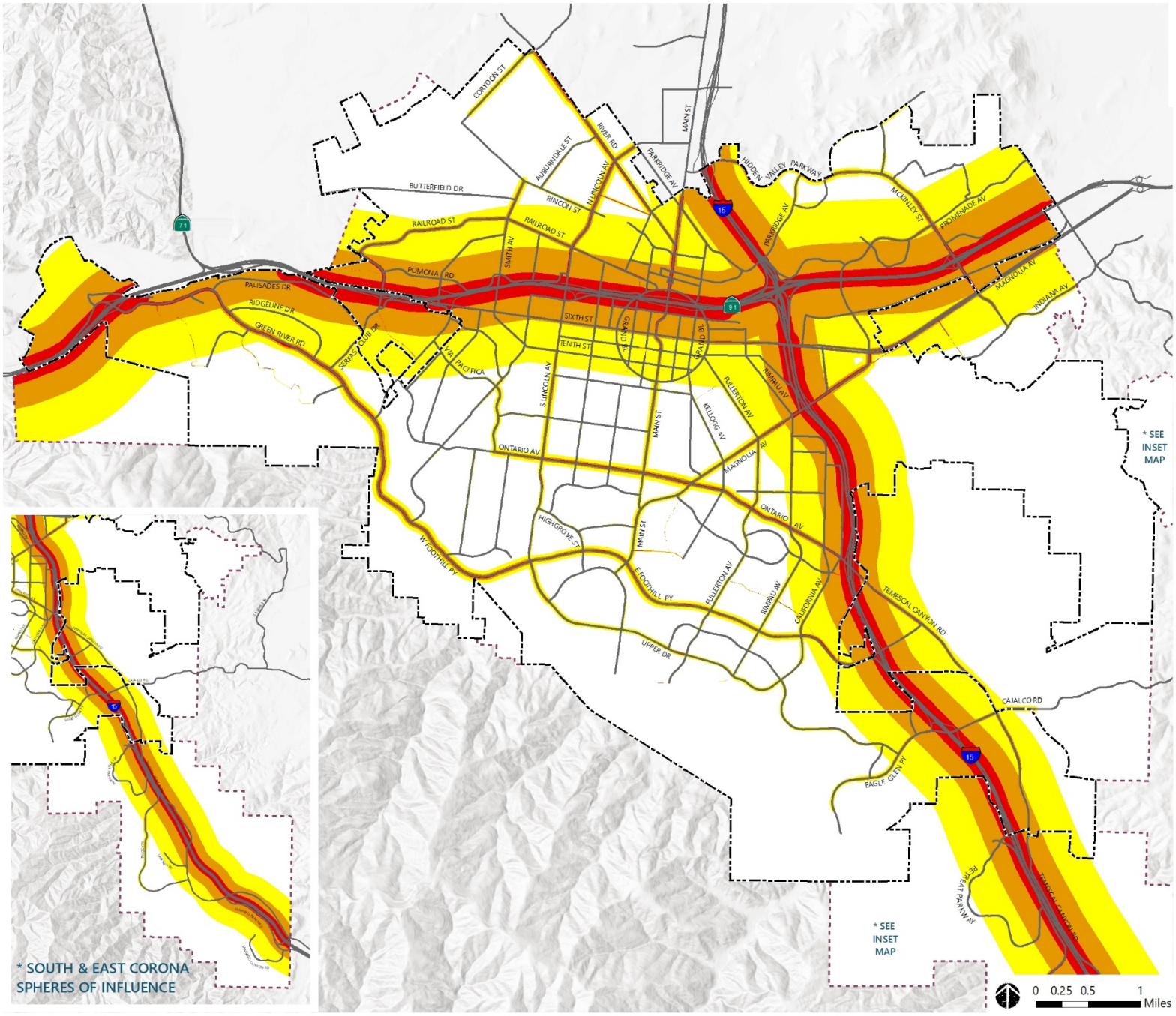

Figure N-2
Existing Transportation Noise

Legend

- 70 CNEL
- 65 CNEL
- 60 CNEL
- City Boundary
- Sphere of Influence Areas

Source:
PlaceWorks 2018

CORONA General Plan

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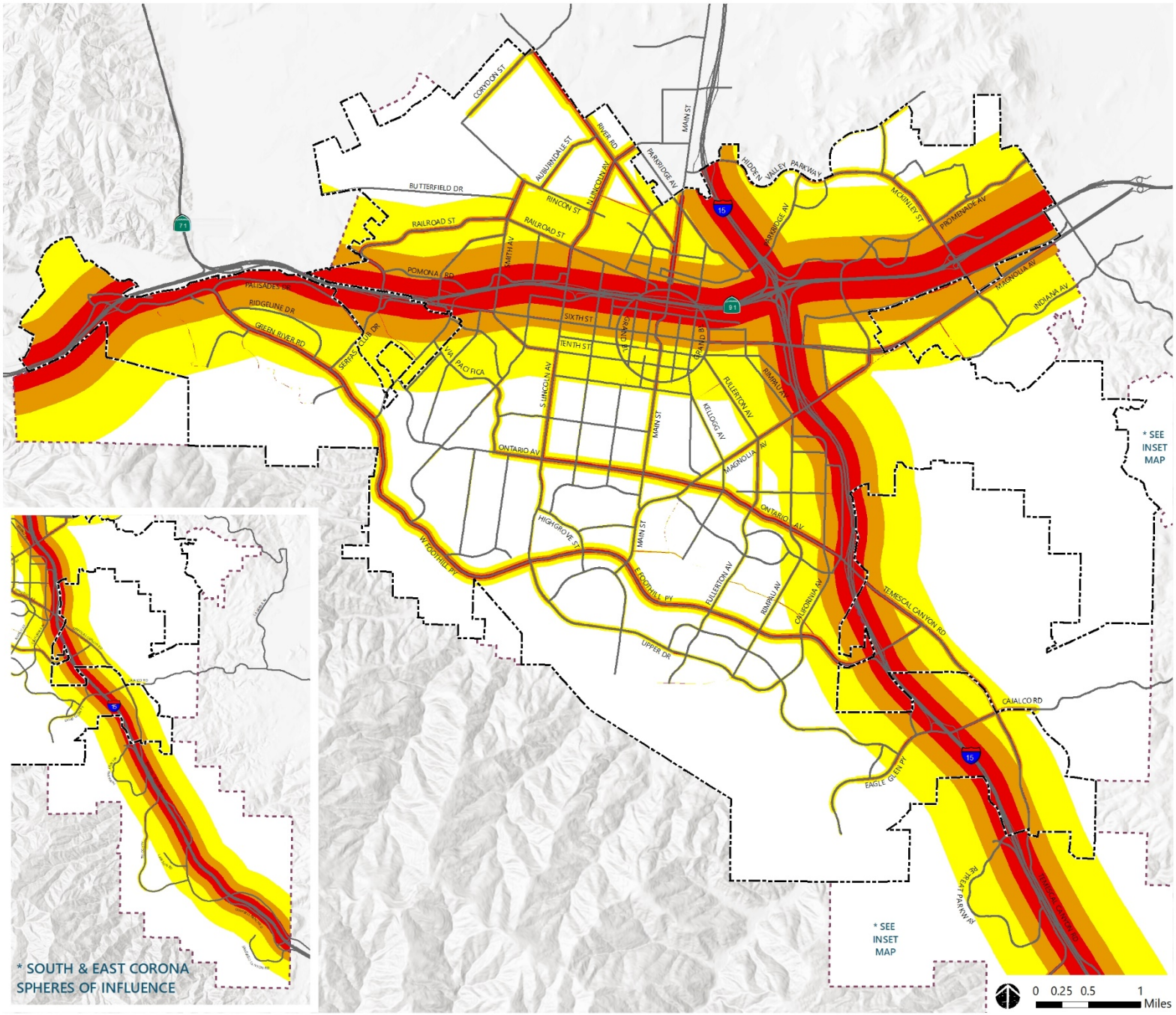

Figure N-3
Future Transportation Noise Levels

Legend

- 70 CNEL
- 65 CNEL
- 60 CNEL
- City Boundary
- Sphere of Influence Areas

Source:
PlaceWorks 2018

CORONA General Plan

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Minimizing Transportation-Related Noise

Transportation is the largest contributor to the noise environment in Corona. The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, the City has no direct control over noise produced by trucks, cars, and trains because state and federal regulations preempt local laws. Therefore, City noise policy focuses on reducing the impacts on people from transportation noise along freeways, roadways, and rail corridors or incorporating measures that either prevent or mitigate those impacts.

Site Planning and Building Design

While transportation noise is the most frequently cited source of noise, much can be done at the building design level to mitigate impacts. Site planning, landscaping, topography and the design and construction of noise barriers are the most common and effective method of alleviating noise impacts. Setbacks and buffers can also reduce noise levels. Noise-attenuating barriers can and will be incorporated into new development projects to reduce noise exposure where needed. The effectiveness of the barrier depends upon: 1) the relative height and materials of the barrier; 2) the noise source; 3) the affected area; and 4) the horizontal distance between the barrier and the affected area. Notable reductions in tire noise have been achieved with implementation of special paving materials, such as rubberized asphalt or open-grade asphalt concrete overlays. Although this noise reduction would be sufficient to avoid the predicted noise increase due to traffic in some cases, the potential up-front and ongoing maintenance costs are such that the cost versus benefits ratio may not be feasible and reasonable.

Freeway Noise Attenuation Strategies

Freeway noise associated with traffic along the SR-91 and I-15 has been mitigated in certain areas with sound walls along both sides of freeways. The SR-15 upgrade project includes elements to shield freeway noise, particularly along areas of the freeways adjoining residential areas. Where needed, the City will continue to pursue mitigation with Caltrans for remaining areas not addressed by freeway enhancement projects. Future improvements to the freeway, including the SR-71 flyover, may also require noise mitigation measures to protect residents from excessive noise from the freeways.

Railroad Noise Mitigation

Mitigating rail noise represents one of the key noise reduction challenges in Corona. Eliminating all at-grade crossings for existing railways would significantly reduce noise impacts and address road/rail traffic conflicts, particularly along highly traveled routes. However, this solution involves costs that are likely beyond the collective resources of the City, federal agencies, and railroad owners/operators. Until such financial resources are secured, City efforts will focus on minimizing excessive noise levels associated with train horns (e.g., Quiet Zones), prioritizing grade separations, and implementing other noise reduction programs to reduce adverse impacts of noise.

The following goals and policies are intended to reduce noise impacts where possible and maintain a reasonable quiet environment for people to live and work in Corona.

GOAL N-1

Protect residents, visitors, and noise-sensitive land uses from the adverse human health and environmental impacts created by excessive noise levels from transportation sources by requiring proactive mitigation.

Policies

N-1.1 Reduce noise impacts from transportation noise sources through the design and daily operation of arterial road improvements, enforcement of state motor vehicle noise standards, and other measures consistent with funding capabilities.

- Require site design features and structural building enhancements in the development of residential and other "noise sensitive" land uses that are to be located adjacent to major roads or railroads.
- Encourage enforcement of state motor vehicle noise standards through coordination with the California Highway Patrol and the Corona Police Department.
- Ensure that the Zoning Ordinance, Circulation Element, and Land Use Element of the General Plan fully integrate the policies adopted as part of the Noise Element.

N-1.2 Minimize the rise of vehicle noise from roadways through route location, sensitive roadway design, regulation of traffic volumes and speeds, and working with Caltrans in highway improvements.

N-1.3 Encourage Caltrans to install and maintain mitigation (e.g., noise walls) and/or landscaping elements along highways that are adjacent to existing residential subdivisions or other noise-sensitive areas in order to reduce adverse noise impacts.

N-1.4 Require municipal vehicles and noise-generating mechanical equipment purchased or used by the City to comply with noise performance standards consistent with the latest available noise reduction technology to the extent practicable and cost-effective.

N-1.5 Require new nonresidential development that attracts noise-generating vehicles (e.g., high volumes of traffic, trucking) to design and configure onsite ingress and egress points to divert traffic away from "noise sensitive" land uses, to the greatest extent practicable.

NOISE AND LAND USE PLANNING

Primary noise sources in the city will not go away. To limit exposure to intrusive noise levels, the federal government, the State of California, and local governments have established standards and ordinances to define acceptable noise levels for certain land uses. As part of the 2004 General Plan, the City adopted exterior land use/noise compatibility guidelines for evaluating land use planning proposals (Table N-1).

Table N-1 Noise Levels and Land Use Compatibility Guidelines

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	**Uses**	**<55**	**60**	**65**	**70**	**75**	**80>**	
Residential	Single Family, Duplex	A	A	B	B	D	D	D
	Multiple Family	A	A	B	B	C	D	D
	Hotel, Motel Lodging	A	A	B	C	C	D	D
Commercial Regional, District	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	B	B	C	C	D
Commercial Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
Commercial Office, Institution	Office Building, R&D, Professional Offices, City Office Building	A	A	A	B	B	C	D
Rec. Institutional Civic Center	Amphitheatre, Concert Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Amusement Park, Miniature Golf, Sports Club, Equestrian Center	A	A	A	B	B	D	D
Commercial, General, Special, Industrial, and Institutional	Auto Service Station, Auto Dealer, Manu-facturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools' Classroom	A	A	B	C	C	D	D
Open Space	Local, Community, and Regional Parks	A	A	A	B	C	D	D
Open Space	Golf Course, Cemetery, Nature Centers Wildlife Reserves and Habitat	A	A	A	A	B	C	C

Zone A: Clearly Compatible: Specified land use is satisfactory, based on the assumption that any buildings involved are of conventional construction without any special noise insulation requirements.
Zone B: Normally Compatible: New construction should be undertaken only after detailed analysis of the noise reduction requirements and needed noise insulation features are determined. Conventional construction, with closed windows and fresh air supply or air conditioning, will normally suffice.
Zone C: Normally Incompatible: 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 the design.
Zone D: Clearly Incompatible: New development should generally not be undertaken.

GOAL N-2

Prevent and mitigate the adverse impacts of excessive ambient noise exposure, including vibration on residents, employees, visitors, and "noise sensitive" land uses.

Policies

N-2.1 Consider noise and vibration levels in land use planning decisions to prevent future noise and vibration and land use incompatibilities. Considerations may include, but not necessarily be limited to, standards that specify acceptable noise limits for various land uses, noise reduction features, acoustical design in new construction, and enforcement of the California Standards Building Code provisions for indoor and outdoor noise levels.

N-2.2 Require that in areas where existing or future ambient noise levels exceed an exterior noise level of 65 dBA CNEL, all development of new housing, health care facilities, schools, libraries, religious facilities, and other "noise sensitive" uses shall include site design, building enhancements, buffering, and/or mitigation to reduce noise exposure to within acceptable limits.

N-2.3 Require new industrial and new commercial land uses or the major expansion of such uses to demonstrate that ambient noise levels will not exceed an exterior noise level of 65 dBA CNEL on areas containing "noise sensitive" land uses as depicted in Table N-1, N-2, and N-3.

N-2.4 Require development in all areas where the existing or future ambient noise level exceeds 65 dBA CNEL to conduct an acoustical analysis and incorporate special design measures in their construction to reduce interior noise levels to the 45 dBA CNEL level as depicted on Table N-1, N-2, and N-3.

N-2.5 Encourage existing "noise sensitive uses," including schools, libraries, health care facilities, and residential uses, in areas where existing or future noise levels exceed 65 dBA CNEL to incorporate fences, walls, landscaping, and/or other noise buffers and barriers, where appropriate and feasible.

N-2.6 Require development that generates increased traffic and substantial increases in ambient noise levels adjacent to noise sensitive land uses to provide appropriate mitigation measures in accordance with the acceptable limits of the City Noise Ordinance.

N-2.7 Require construction activities that occur in close proximity to existing "noise sensitive" uses, including schools, libraries, health care facilities, and residential uses, to limit the hours and days of operation in accordance with the City Noise Ordinance.

SPECIFIC LAND USE STANDARDS

In addition to land use compatibility standards, the Corona Municipal Code sets forth interior and exterior noise limits for individual land uses (Table N-2) and performance standards for industrial and commercial land uses as well (Table N-3)

Table N-2 Interior and Exterior Noise Standards

Land Use Categories		Average CNEL	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single Family, Duplex, Multiple Family	45[3]	65
	Mobile Home	NA	65[4]
Commercial; Industrial; and Institutional	Hotel, Motel, Transient Lodging	45	65[5]
	Commercial Retail, Bank, Restaurant; Sports Club	55	NA
	Office Building, Research and Develop. Professional Offices, City Offices	50	NA
	Amphitheatre, Concert Hall Auditorium, Meeting Hall	45	NA
	Gymnasium (Multipurpose)	50	NA
	Manufacturing, Warehousing, Wholesale, Utilities	65	NA
	Movie Theatres	45	NA
Institutional	Hospital, Schools' classroom	45	65
	Church, Library	45	NA
	Parks	NA	65

Notes:
1. Indoor environment excluding bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to: private yard of single family, multi-family private patio or balcony that is served by a means of exit from inside, mobile home park, hospital patio, park's picnic area, school's playground, and hotel and motel recreation area.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. Except those areas affected by aircraft noise.

Table N-3 Stationary Noise Sources: Performance Standards

	Exterior Noise		Interior Noise	
Land Use Categories	**7am–10pm**	**10 pm–7am**	**7am–10pm**	**10 pm–7am**
Residential Land Uses	55 dBA	50 dBA	45 dBA	35 dBA
Other Sensitive Land Uses	55 dBA	50 dBA	45 dBA	35 dBA
Commercial Uses	65 dBA	60 dBA	N/A	N/A
Industrial, Manufacturing, Agricultural	75 dBA	70 dBA	N/A	N/A
See Municipal Code for exceptions and detailed clarifications				

GOAL N-3

Discourage the spillover or encroachment of unacceptable noise levels from mixed use, commercial, and industrial land uses on to noise sensitive land uses.

Policies

N-3.1 Provide for the reduction in noise impacts from commercial and industrial operations as controlled and enforced through the City Noise Ordinance.

N-3.2 Incorporate noise reducing designs into new or remodeled commercial and industrial projects. Measures should include, but not be limited, to:

- Sound barriers in front of HVAC units and other similar outdoor mechanical equipment.
- Increase setbacks and buffering of parking areas and primary on-site access drives from adjacent residential areas and other sensitive uses to the maximum extent feasible with walls, fences, berms, and/or adequate landscaping.
- Require vehicle access to commercial or industrial land uses abutting existing or planned residential areas be located at the maximum practical distance from residential areas.
- Orient loading and unloading ramps and drop off zones away from noise sensitive land uses.

N-3.3 Require the design of residential and nonresidential parking structures used on-site and adjacent to noise sensitive land uses incorporate noise reducing features to minimize vehicular noise from encroaching outside the structure.

N-3.4 Require that restaurants/bars implement operational measures to control the activities of their patrons on-site and within a reasonable distance from the establishment in order to minimize potential noise-related impacts on adjacent residential neighborhoods.

N-3.5 Require mixed-use structures incorporating commercial or institutional and residential uses, or industrial uses adjacent to noise and vibration sensitive uses minimize, through design and construction technology, the transfer or transmission of noise and vibration from the commercial, institutional, or industrial use to the residential land use.

N-3.6 Require nighttime land uses having amplified noise devices to be located in areas of the city that are not directly adjacent to existing and planned "noise-sensitive" land uses.

GOAL N-4

Minimize noise impacts created by railroad transit and airport operations and flight patterns on residential areas and other "noise sensitive" land use areas.

Policies

N-4.1 Work closely with the Burlington Northern Santa Fe Railroad operators to install and maintain noise mitigation features where operations impact existing and planned residential areas or other "noise-sensitive" areas.

N-4.2 Support the establishment of train operation restrictions (Quiet Zones) to reduce the noise levels of blaring horns in residential areas and adverse impacts on other "noise-sensitive" areas.

N-4.3 Require that development of new housing, health care facilities, schools, libraries, religious facilities, and other "noise sensitive" land uses near the railroad line include buffering and/or construction mitigation measures to reduce noise exposure to levels within acceptable limits.

N-4.4 Restrict development of land uses within the 65 dBA CNEL contour of the Corona Municipal Airport to industrial, agricultural, or other open space activities; require that all development in the vicinity of the Airport comply with the noise standards in the Airport Master Plan.

N-4.5 Work closely with the Corona Municipal Airport and operators on-site to ensure that the airport's operations do not exceed noise levels specified in the municipal code, generate adverse noise conditions in the City of Corona that are not allowed in the Airport Master Plan, nor exceed noise levels in the countywide airport land use compatibility policies.

17.84.040 Noise.

(A) **Purpose and intent**.

(1) The purpose of this section is to regulate noise and vibration in the interest of the public health, safety and general welfare. The city finds that certain noise levels and vibrations are detrimental to the public health, safety and general welfare and that the primary sources of noise in the city are freeways, highways, manufacturing uses, railroads, the airport and construction noise. The noise element of the General Plan contains the city's policies regarding noise and identifies noise contours for existing and future roadways and the Corona Municipal Airport, which are implemented by this chapter. The General Plan noise element shall govern all noise standards and policies.

(2) In order to control unnecessary, excessive and annoying noise and vibration in the city, it is hereby declared to be the policy of the city to prohibit such noise and vibration generated from or by all sources as specified in this chapter. It shall be the policy of the city to maintain quiet in those areas which exhibit low noise levels and to implement programs to reduce noise in those areas within the city where noise levels are above acceptable values. It is the intent of the city to minimize noise impacts to adjacent land uses pursuant to the standards identified herein.

(B) **Definitions**. Terms found in this chapter shall be defined as follows. Additional definitions are found in the noise element of the General Plan.

(1) "**A-weighted sound level**." The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter network is designed to simulate the response of the human ear. The A-weighted sound level is expressed by the symbol dBA.

(2) "**Ambient noise**." The composite of noise from all existing sources near and far. The ambient noise level constitutes the normal or existing level of environmental noise at a given location, excluding any alleged offensive noise.

(3) "**Cumulative period**." An additive period of time composed of individual time segments which may be continuous or interrupted.

(4) "**Community noise equivalent level (CNEL)**." The average equivalent A-weighted sound level during a 24 hour day, obtained after addition of five decibels to sound levels between 7:00 p.m. and 10:00 p.m. and the addition of ten decibels to sound levels between 10:00 p.m. and 7:00 a.m.

(5) "**Decibel (dB)**." A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

(6) "**Impulsive noise**." A noise of short duration, usually less than one second, and of high intensity, with an abrupt onset and rapid decay.

(7) "**Noise study**." An acoustical analysis performed by a qualified noise engineer which determines the potential noise impacts of a roadway, land use or operation of equipment. The noise study will generate noise contours and recommend mitigation for noise impacts which exceed the city's noise standards.

(8) "**Sensitive land uses**." Those specific land uses which have associated human activities that may be subject to stress or significant interference from noise. Sensitive land uses include single family residential, multiple family residential, churches, hospitals and similar health care institutions, convalescent homes, libraries and school classroom areas.

(9) "**Simple tone noise**." A noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished. When measured, a simple tone noise shall exist if the one-third octave band sound pressure levels in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two continuous one-third octave bands as follows: 5 dB for frequencies of 500 hertz or above or by 15 dB for frequencies less than or equal to 125 hertz.

(10) "**Sound attenuation device**." An enclosure, blanket, vault, box, wall, fence, panel, baffle, coating, material, silencer, or other appurtenance, mechanism, or device intended to reduce the noise level of mechanical equipment.

(C) **Noise standards**.

(1) The noise ordinance identifies two separate types of noise sources: transportation and stationary. Transportation related noise sources, such as freeways, airports and railroads, are identified within this chapter and are mainly for the planning stages of project development. The noise metrics used for this noise type is the Community Noise Equivalent Level (CNEL) which is a 24 hour time weighted average noise level. The other type of noise standard is for stationary noise sources, such as industrial or construction noise, that may be intrusive to a neighboring private property. The noise metric used for stationary sources is defined as noise levels that cannot be exceeded for certain percentages of time. The noise standards shown in Table 1 are for regulating the impact of stationary noise sources to a neighboring private property. Standards for transportation related noise are found in Table 2.

(2) Stationary noise sources.

TABLE 1 **STATIONARY NOISE SOURCE STANDARDS**	
	MAXIMUM ALLOWABLE NOISE LEVELS

TYPE OF LAND USE	Exterior Noise Level		Interior Noise Level	
	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
Single-, Double- and Multi-Family Residential	55 dBA	50 dBA	45 dBA	35 dBA
Other Sensitive Land Uses	55 dBA	50 dBA	45 dBA	35 dBA
Commercial Uses	65 dBA	60 dBA	Not applicable	Not applicable
Industrial, Manufacturing or Agricultural	75 dBA	70 dBA	Not applicable	Not applicable

(a) Each of the noise limits specified here shall be reduced by 5 dBA for impulse or simple tone noises; provided, however, that if the ambient noise level exceeds the resulting standards, the ambient shall be the standard.

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

(c) If the intruding noise is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the source is in operation shall be compared directly to the allowable noise level standards as specified respective to the measurement location's designated land use and for the time of the day the noise level is measured. The reasonableness of temporarily discontinuing the noise generation by an intruding noise source shall be determined by the Code Enforcement Officer for the purpose of establishing the existing ambient noise level at the measurement location.

(d) Exterior noise:

1. It shall be unlawful for any person, entity or operation at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

   a. The noise standard for a cumulative period of more than 30 minutes in any hour;

   b. The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour;

   c. The noise standard plus 10 dB for a cumulative period of more than five minutes in any hour;

   d. The noise standard plus 15 dB for a cumulative period of more than one minute in any hour; or

   e. The noise standard plus 20 dB for any period of time.

2. In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to the category shall be increased to reflect the 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.

(e) Interior noise. It shall be unlawful for any person at any location within the incorporated area of the city to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such a person which causes the noise level when measured within any other residential dwelling unit or sensitive land use to exceed:

1. The noise standard for a cumulative period of more than five minutes in any hour;

2. The noise standard plus 5 dB for a cumulative period of more than one minute in any hour; or

3. The noise standard plus 10 dB, or the maximum measured ambient, for any period of time.

(3) Transportation noise sources.

TABLE 2

TRANSPORTATION NOISE SOURCE STANDARDS

TYPE OF LAND USE	EXTERIOR NOISE LEVEL	INTERIOR NOISE LEVEL
	(Private Outdoor Living Areas)	
Residential (Roadway)	65 CNEL	45 CNEL
Residential (Airport)	65 CNEL	45 CNEL
Other sensitive land uses (Roadway)	65 CNEL	45 CNEL
Other sensitive land uses (Airport)	65 CNEL	45 CNEL
Hotels/Motels (Roadway)	65 CNEL	45 CNEL

Hotels/Motels (Airport)	65 CNEL	45 CNEL

(a) **Roadway noise**. A noise study shall be performed prior to the construction of new master planned roads, roadway improvements, rail lines and/or prior to the construction of residential or sensitive land uses adjacent to existing or master planned roads or railways. The noise study shall identify the existing and future noise contours for the roadway and propose mitigation measures to reduce the noise impacts to a maximum of 65 dBA CNEL in the private outdoor living area of residences and to a maximum interior noise level of 45 dBA CNEL for residential and sensitive land uses, as shown in Table 2.

(b) **Airport noise**. Sensitive land uses, site-built homes and institutional uses are prohibited in airport noise contours above 65 dBA CNEL. All subdivisions within two miles of the Corona Municipal Airport or within the 65 dBA CNEL contour shall show and record an avigation easement for the benefit of the airport. The avigation easement shall provide notification to potential buyers and occupants of the presence of the easement and the potential for over flights and aircraft noise.

(D) **Special provisions**.

(1) **Mechanical equipment in residential zones.** Upon application for a building permit to install mechanical equipment, such as air conditioner and pool equipment, in a residential zone, the equipment shall be setback at least ten feet from an adjoining property line except where a five foot high block sound wall is maintained extending a distance of two feet on each side of such equipment and situated either between such equipment and the property line or on said property line. Exception: Mechanical equipment in residential zones shall be permitted closer than ten feet from an adjoining property line without a five foot high block sound wall when sound attenuation devices approved by the Building Official are installed. The noise level with sound attenuation devices installed shall comply with the limits and conditions specified in § 17.84.040(C)(2) when measured from any adjoining property. The approved sound attenuation devices shall be maintained and any approvals shall not be construed to permit violations of this code.

(2) **Construction noise**. Construction noise is prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays. Construction noise is defined as noise which is disturbing, excessive or offensive and constitutes a nuisance involving discomfort or annoyance to persons of normal sensitivity residing in the area, which is generated by the use of any tools, machinery or equipment used in connection with construction operations.

(3) **Noise devices**. In accordance with Chapter 9.24, no loudspeaker, bells, gongs, buzzers, mechanical equipment or other sounds, attention-attracting or communication device associated with any use adjacent to residential or sensitive land uses shall be discernible beyond the boundary line of the parcel, except fire protection devices, burglar alarms and church bells. Noise generated by these sources shall be enforced by the Police Department.

(4) **Noisy animals**. Noise generated by animals shall be regulated by the Police Department in accordance with Chapter 6.11.

(E) **Exemptions**. The following activities shall be exempt from these noise standards:

(1) Special events pursuant to an approved special use permit. Noise impacts shall be evaluated and conditioned as part of the special use permit;

(2) Filming pursuant to a film permit. Noise impacts shall be evaluated and conditioned as part of the film permit;

(3) Activities conducted on public parks, public playgrounds and public or private school grounds, including school athletic and entertainment events that are conducted under the sanction of the school or which a license or permit has been duly issued pursuant to any provision of city code;

(4) Noise sources associated with the maintenance of real property, provided the activities take place between the hours of 7:00 a.m. to 8:00 p.m. on any day except Sunday or between the hours of 9:00 a.m. to 8:00 p.m. on Sunday;

(5) Any activity too the extent regulation thereof has been preempted by state or federal law;

(6) Repairs to and replacement of mechanical equipment in residential zones installed by permit prior to May 20, 1993 shall be exempt from the requirements in division (D) of this section;

(7) Noise variances granted pursuant to subsection (H)(1) below;

(8) Short-term, non-continuous operations associated with government and public utility facilities that are necessary to maintain the delivery of services for the benefit of public health and safety.

(F) **Noise level measurements**. All noise shall be measured in accordance with the following standards. Measurements shall be taken of the ambient noise level and any alleged offensive noise. If the measurement location is on the boundary of two different noise zones, the lower noise level standard shall apply.

(1) **Sound level meter**. A sound level meter shall mean an instrument meeting the American National Standards Institute's S1.4 - 1971 for Type 1 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

(2) **Ambient noise**. A measurement of the ambient noise level shall be taken according to the procedures in this chapter. If the ambient noise level exceeds the standard, the ambient level shall be the standard. If an alleged intruding

noise source is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the alleged intruding noise source is in operation shall be compared directly to the applicable noise level standard.

(G) **Noise studies required**. As referenced in division (C) of this section, there are essentially two different types of noise sources that have been identified in Corona and each has its own noise metrics as well as its own required noise studies. The noise metrics used for transportation related noise sources is the CNEL which is a 24 hour time weighted average noise level. The noise metrics used for stationary sources are defined as noise levels that cannot be exceeded for certain percentages of time.

(1) **Predevelopment noise studies**. A predevelopment noise study is performed prior to development and is designed to project future noise levels and recommend mitigation measures to be implemented in project development. All noise studies shall be prepared by a registered noise engineer as approved by the city. Noise studies will be required for the construction of master planned roadways, for development adjacent to master planned roadways, when a noise generating use, such as a factory, is proposed in proximity to residential uses and when residential uses are proposed in proximity to an existing noise source. The need for a noise study will be determined at development plan review. Predevelopment noise studies shall project future noise levels based on proposed uses, traffic volumes and other relevant future conditions. Existing and projected noise shall be evaluated pursuant to the noise standards within this chapter and the noise element of the General Plan. Mitigation measures shall be proposed to bring noise levels into compliance with these standards. Mitigation measures may consist of walls, berms, setbacks, landscaping, building materials, construction methods and any other means whereby noise can be reduced to the maximum amounts within this chapter.

(2) **Studies of existing stationary noise**. At times it will be necessary to study the noise generated by an existing source, either due to alleged violations of the noise ordinance or for monitoring purposes. These noise studies shall be prepared by a registered noise engineer as approved by the city in accordance with the standards in Table 1.

(H) **Noise variance**.

(1) The owner or operator of a noise or vibration source which violates any of the provisions of this chapter may file an application with the Community Development Department for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with the provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance and a proposed time schedule for its accomplishment. The application shall be accompanied by a fee as determined by City Council resolution. A separate application shall be filed for each noise source; provided, however, that several fixed sources on a single property may be combined into one application. An application for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted.

(2) The Board of Zoning Adjustment shall evaluate all applications for variance from the requirements of this chapter and may grant the variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. The terms, conditions and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, the Board shall consider the following:

(a) The magnitude of the nuisance caused by the offensive noise;

(b) The uses of property within the area of impingement by the noise;

(c) The time factors related to study, design, financing and construction of remedial work;

(d) The economic factors related to age and useful life of the equipment;

(e) The general public interest, welfare and safety.

(3) Any variance granted by the Board shall be by resolution and shall be transmitted to the Code Enforcement Officer for enforcement. Any violation of the terms of the variance shall be unlawful and enforced pursuant to division (I) of this section.

(I) **Enforcement**.

(1) It shall be unlawful for any person at any location within the City of Corona to create any exterior noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured according to this chapter to exceed the maximum allowable noise levels in Table 1 of § 17.84.040(C).

(2) No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his or her duty.

(3) Any person violating any provision of this chapter shall be deemed guilty of a misdemeanor.

(4) The operation or maintenance of any device, instrument, vehicle or machinery in violation of any noise standard identified in this chapter is declared to be a public nuisance and may be abated pursuant to the nuisance abatement procedure in Chapter 8.32 of this code.

(5) Pursuant to § 1.08.020(A) of this code, each person shall be deemed guilty of a separate offense for each and every day during any portion of which any violation of any provision of this chapter is committed, continued or permitted by such

person and shall be punished accordingly.

(`78 Code, § 17.84.040.) (Ord. 3277 §§ 4, 5, 2018; Ord. 3188 § 3, 2015; Ord. 2372 § 2, 1999; Ord. 2161 § 1 (part), 1993.)

Appendix B

Field Data and Photos

Field Sheet

Project: Promenade Avenue Light Manufacturing Project
Engineer: B. Morrison
Date: 05/25/2023
JN: 3076-2022-02

Measurement Address: Promenade Avenue and 6th Street
City: Corona, CA
Site No.: 1

Sound Level Meter:
Piccolo II
Serial # P0222082204
P0222082205
P0221010801

Calibrator:
BSWA
Serial # 500732

Calibration Record:

	Input, dB/	Time
1	94.0	3:21 PM
2	94.0	3:21 PM
3	/	/
4	/	/
5	/	/

Conditions:

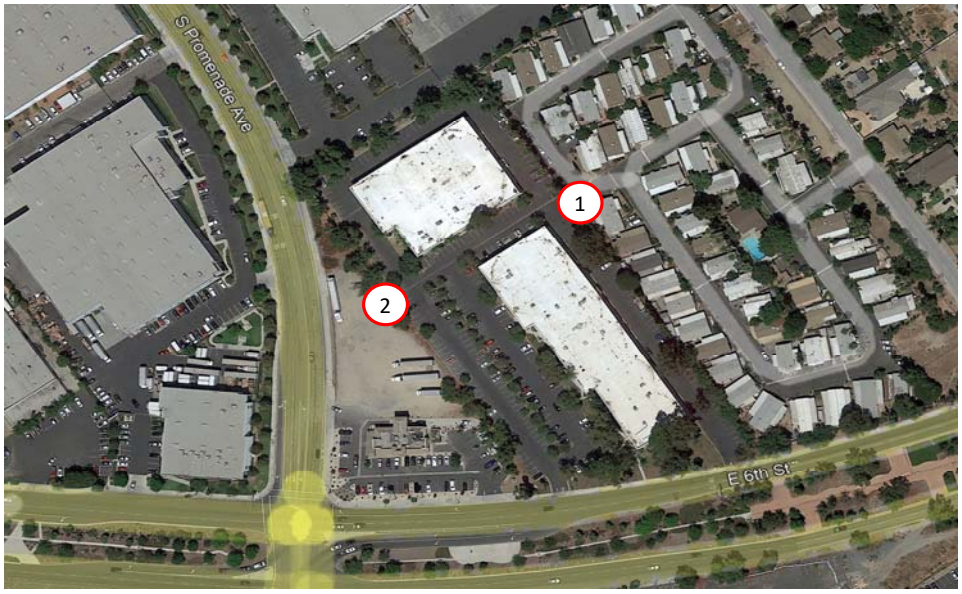
Temp:	69 Deg. F.
Windspeed:	10 m.p.h.
Direction:	East
Skies:	Clear

Meter Settings:
☑ A-WTD ☐ C-WTD
☐ LINEAR ☐ IMPULSE
☑ SLOW ☐ FAST
☐ 1/1 OCT ☐ 1/3 OCT
☐ ___ MINUTE INTERVALS
☑ L(N) PERCENTILE VALUES

Notes:
Each Measurement was taken for a duration of 30 minutes. Ambient noise sources during the measurement period consisted of idling trucks, car shop activity, people talking, and wind.

Measurement Type:
☐ Long-term
☑ Short-term

		Start Time	Stop Time	Leq	Lmax	Lmin	L2	L8	L25	L50
Interval	1	3:25 PM	3:55 PM	58.3	70.1	50.5	65.2	61.6	58.3	56.4
		Comments: Measurement was taken on the southwestern border of the existing Park Lane Mobile Home Estates, approximately 440 feet east of the centerline of Promenade Avenue.								
	2	3:27 PM	3:57 PM	65.1	81.9	55.3	69.5	67.3	65.7	64.0
		Comments: Measurement was taken near the northeastern border of the project site, approximately 135 feet east of the centerline of Promenade Avenue.								
	3									
		Comments:								
	4									
		Comments:								
	5									
		Comments:								



1 = Noise Monitoring Location

RK engineering group, inc.

Field Sheet - Photos

Project: Promenade Avenue Light Manufacturing Project	**Engineer:** B. Morrison	**Date:** 05/25/2023 **JN:** 3076-2022-02
Measurement Address: Promenade Avenue and 6th Street	**City:** Corona, CA	**Site No.:**

RK engineering group, inc.

Field Sheet - Photos

Project: Promenade Avenue Light Manufacturing Project	**Engineer:** B. Morrison	**Date:** 05/25/2023 **JN:** 3076-2022-02
Measurement Address: Promenade Avenue and 6th Street	**City:** Corona, CA	**Site No.:**

RK engineering group, inc.

Appendix C

Noise Analysis Results
(SoundPLAN Results Sheets)

Contribution levels of the receivers

Source name		Traffic lane	Level Day	Level Night
			dB(A)	
1	1.Fl		54.8	54.8
AC Unit		-	54.6	54.6
Parking Lot		-	31.4	29.8
Truck Loading Dock		-	40.5	40.5
2	1.Fl		58.4	58.4
AC Unit		-	58.2	58.2
Parking Lot		-	29.0	27.4
Truck Loading Dock		-	44.8	44.8
3	1.Fl		39.2	39.2
AC Unit		-	39.2	39.2
Parking Lot		-	7.4	5.8
Truck Loading Dock		-	13.8	13.8
4	1.Fl		47.5	47.5
AC Unit		-	47.4	47.4
Parking Lot		-	19.5	18.0
Truck Loading Dock		-	32.2	32.2
5	1.Fl		39.3	39.3
AC Unit		-	39.3	39.3
Parking Lot		-	6.8	5.2
Truck Loading Dock		-	5.1	5.1

Appendix D

Construction and Vibration Analysis Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/26/2023
Case Description: Promenade Avenue Light Manufacturing Project

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	58.3	58.3	58.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	100	85		150	0
Tractor	No	100	84		150	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Grader		75.5	75.5
Tractor		74.5	74.5
	Total	75.5	78

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/26/2023
Case Description: Promenade Avenue Light Manufacturing Project

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Grading	Residential	58.3	58.3	58.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	100	85		150	0
Dozer	No	100		81.7	150	0
Tractor	No	100	84		150	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Grader		75.5	75.5
Dozer		72.2	72.2
Tractor		74.5	74.5
	Total	75.5	79

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/26/2023
Case Description: Promenade Avenue Light Manufacturing Project

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	58.3	58.3	58.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	100		80.6	150	0
Pickup Truck	No	100		75	150	0
Pickup Truck	No	100		75	150	0
Tractor	No	100	84		150	0
Tractor	No	100	84		150	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Crane		71.1	71.1
Pickup Truck		65.5	65.5
Pickup Truck		65.5	65.5
Tractor		74.5	74.5
Tractor		74.5	74.5
	Total	74.5	78.8

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/26/2023
Case Description: Promenade Avenue Light Manufacturing Project

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Paving	Residential	58.3	58.3	58.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	100		78.8	150	0
Concrete Mixer Truck	No	100		78.8	150	0
Concrete Mixer Truck	No	100		78.8	150	0
Concrete Mixer Truck	No	100		78.8	150	0
Paver	No	100		77.2	150	0
Roller	No	100		80	150	0
Tractor	No	100	84		150	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Mixer Truck		69.3	69.3
Concrete Mixer Truck		69.3	69.3
Concrete Mixer Truck		69.3	69.3
Concrete Mixer Truck		69.3	69.3
Paver		67.7	67.7
Roller		70.5	70.5
Tractor		74.5	74.5
	Total	74.5	79

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/26/2023
Case Description: Promenade Avenue Light Manufacturing Project

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	58.3	58.3	58.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	100		77.7	150	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Compressor (air)		68.2	68.2
	Total	68.2	68.2

*Calculated Lmax is the Loudest value.