NOISE AND VIBRATION IMPACT ANALYSIS

16323 SHOEMAKER AVENUE INDUSTRIAL WAREHOUSE PROJECT

CERRITOS, CALIFORNIA

LSA

November 2022

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CERRITOS, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

City	City of Cerritos
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
ft	feet
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous sound level
PPV	peak particle velocity
project	16323 Shoemaker Avenue Industrial Warehouse Project
RMS	root-mean-square
sf	square feet
SPL	sound power level
VdB	vibration velocity decibels

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the proposed 16323 Shoemaker Avenue Industrial Warehouse Project (project) in Cerritos, California. This report is intended to satisfy the City of Cerritos (City) requirement for a project-specific noise impact analysis by examining the impacts of the project site and evaluating noise reduction measures that the project may require.

PROJECT LOCATION AND DESCRIPTION

The 7.21-acre project site is located on 16323 Shoemaker Avenue, in the City of Cerritos, Los Angeles County, California, and is comprised of Assessor's Parcel Number (APN) 7010-016-050. The project site is currently developed with a single-story tilt-up light manufacturing building totaling approximately 66,519 square feet (sf). Figure 1 illustrates the project site location.

The proposed project would demolish the existing building, surface parking, and related infrastructure to construct a one-story 159,627 sq ft warehouse building, including 6,000 sq ft of office space and 3,000 sq ft of mezzanine space. It should also be noted that 10% of the warehouse would assumed to contain cold storage. The project would include approximately 50,645 sq ft of landscape area. In addition, the project would include a total of 97 parking spaces inclusive of electric vehicle (EV)/clean air/carpool spaces and 20 loading dock doors. The proposed project would not require a change to the City's General Plan land use designation or the current zoning and would be consistent with the City's General Plan and Zoning Ordinance.

Typical operational characteristics include employees traveling to and from the site, delivery of products to the site, truck loading and unloading, and truck maintenance operations. The project is assumed to operate 24 hours per day, 7 days per week; however, this may shift depending on the tenant, as the hours of operation are unknown. The proposed project would generate approximately 273 average daily trips, including 151 passenger vehicle trips, 42 two-axle truck trips, 13 three-axle truck trips, and 66 four-axle truck trips. The proposed project would include the following sustainability features: water-efficient plumbing fixtures, drought-tolerant landscaping, interior and exterior light-emitting diode (LED) light fixtures, solar roofs per CALGreen Code requirements, and EV chargers for up to 2 percent of auto parking. Figure 2 depicts the proposed project's site plan.

EXISTING LAND USES IN THE PROJECT AREA

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

- **North:** Existing industrial uses;
- **East:** Existing industrial uses opposite Shoemaker Avenue;
- **South:** Existing industrial uses opposite Moore Street; and

- **West:** Existing industrial uses.

The closest sensitive receptors to the project site are:

- **South:** Existing single-family homes located approximately 750 feet from the project site near the intersection of Shoemaker Avenue and 166th Street;

- **West:** Existing single-family homes located approximately 2,200 feet from the project site opposite of Bloomfield Avenue.

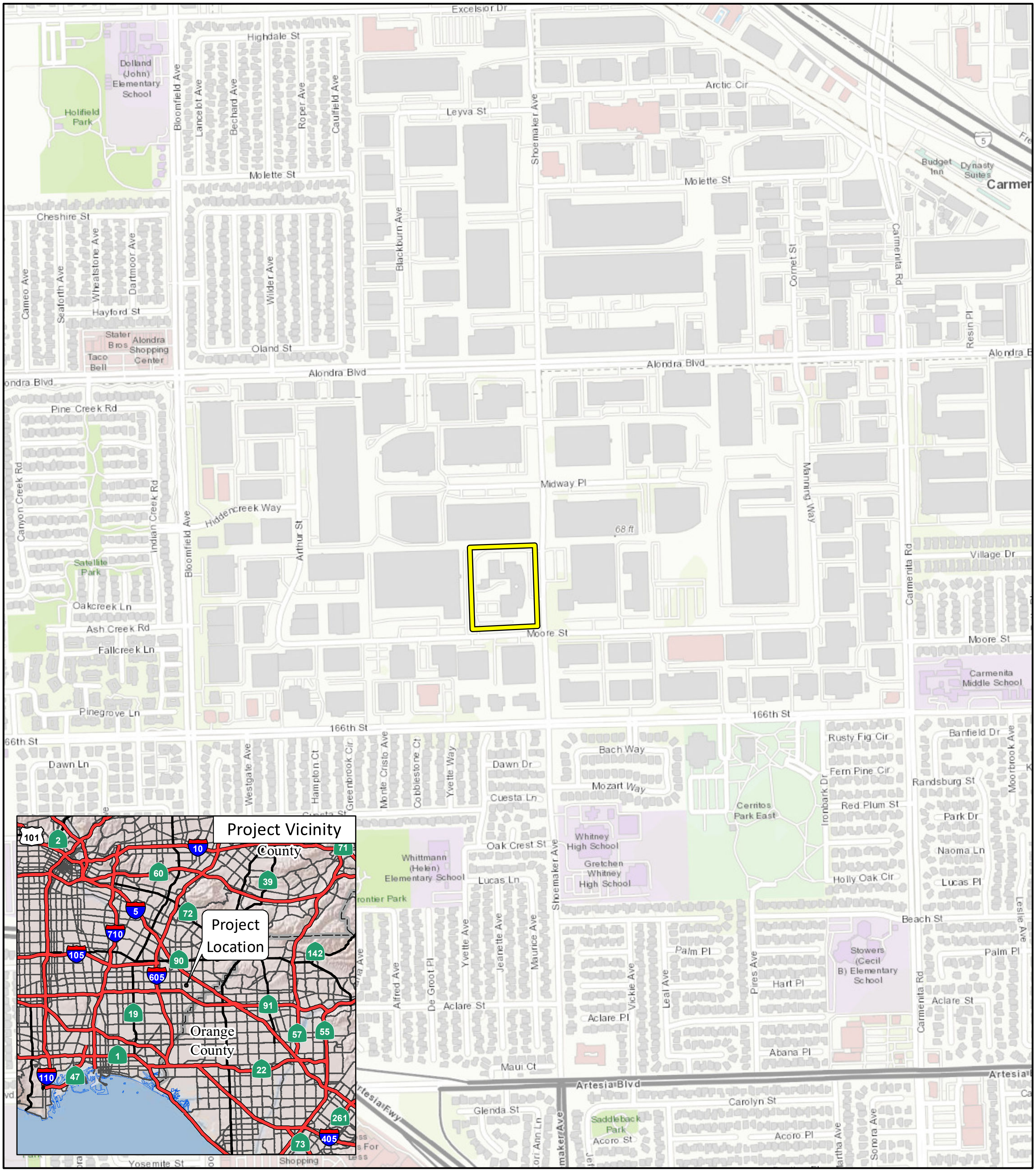

FIGURE 1

LEGEND

Project Location

0 500 1000
FEET

SOURCE: ArcGIS Online Topographic Map (2020)

16323 Shoemaker Avenue Project

Regional Project Location

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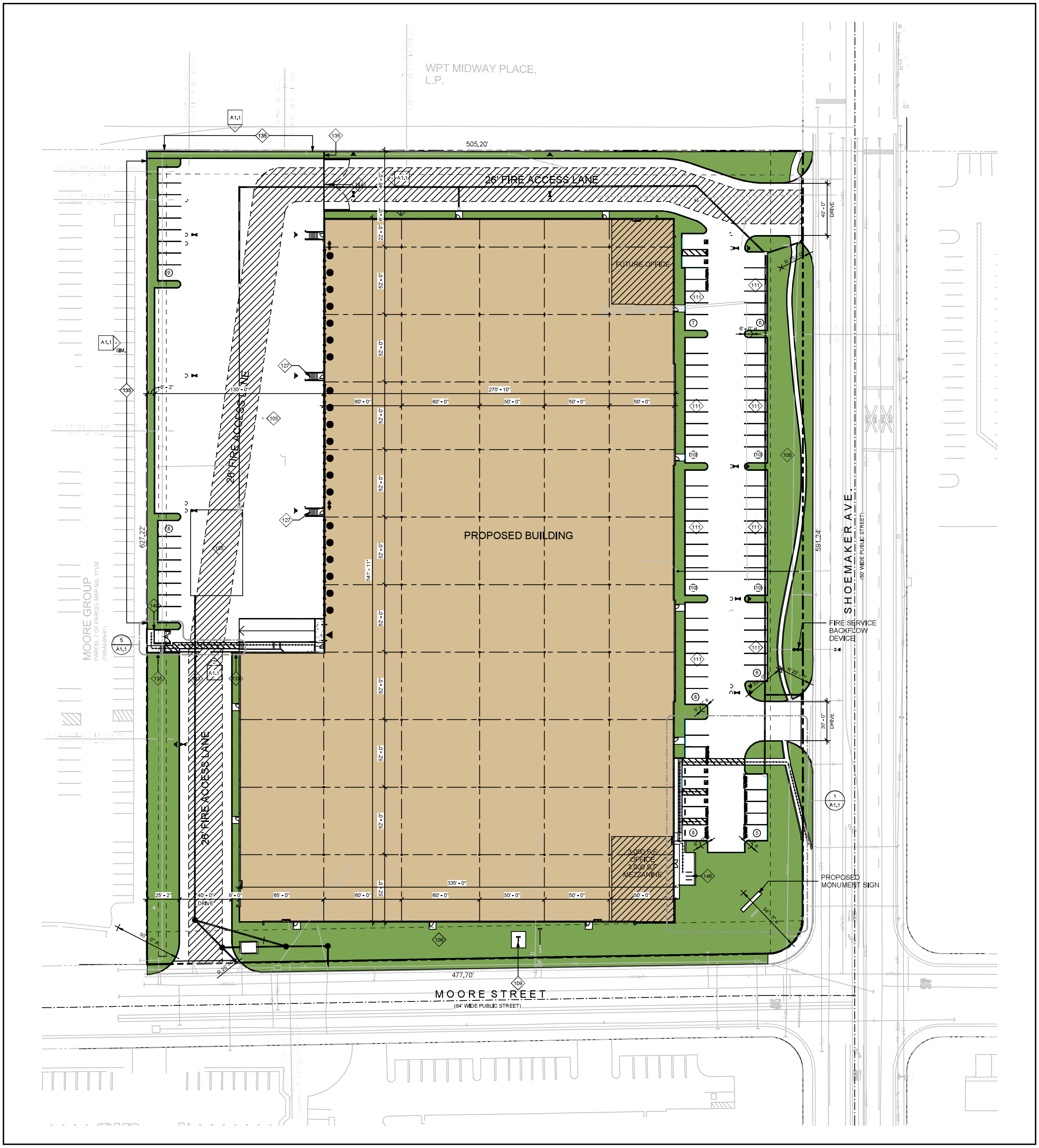

FIGURE 2

0 60 120

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SOURCE: Herdman Architecture Design

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16323 Shoemaker Avenue Industrial Warehouse

Site Plan

NOISE AND VIBRATION FUNDAMENTALS

CHARACTERISTICS OF SOUND

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

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

MEASUREMENT OF SOUND

Sound intensity is measured with the A-weighted decibel (dBA) scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels (dB), unlike the linear scale (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

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

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

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

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

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

Physiological Effects of Noise

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

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

Table A: Definitions of Acoustical Terms

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

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

Table B: Common Sound Levels and Their Noise Sources

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

Source: Compiled by LSA (2022).

FUNDAMENTALS OF VIBRATION

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

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (FTA 2018). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, construction of the project could result in ground-borne vibration that may be perceptible and annoying.

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

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize the potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as

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

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

REGULATORY SETTING

APPLICABLE NOISE STANDARDS

The applicable noise standards governing the project site include the criteria in the City of Cerritos Noise Element and Section 22.80.480, Noise, of the City's Municipal Code (CMC).

City of Cerritos

City of Cerritos General Plan

The City of Cerritos establishes land use compatibility standards in the Noise Element of the City of Cerritos General Plan (2004). The General Plan Land Use Compatibility Standards for Community Noise Environments are shown in Table C. The land use category listed in the General Plan Land Use Compatibility Standards that most closely applies to the proposed project is Industrial, Manufacturing Utilities, Agriculture. Under this designation, up to 75 dBA CNEL is considered to be the "normally acceptable" noise level for this type of new land use development. Additionally, noise levels of up to 70 dBA CNEL are considered "conditionally acceptable" for residential uses.

Table C: Land Use/Noise Computability Guidelines

Land Use Category	Community Noise Exposure			
	Ldn or CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density	50-60	55-70	70-75	75-85
Residential-Multiple Family	50-65	60-70	70-75	75-85
Transient Lodging-Motel, Hotels	50-65	60-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-65	70-80	80-85
Auditoriums, Concert Halls, Amphitheaters	NA	50-70	NA	65-85
Sports Arenas, Outdoor Spectator Sports	NA	50-75	NA	70-85
Playgrounds, Neighborhood Parks	50-70	NA	67.5-75	72.5-85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-75	NA	70-80	80-85
Office Buildings, Business Commercial and Professional	50-70	67.5-77.5	75-85	NA
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	75-85	NA

Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

NOTES:
Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable: New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.

NA: Not Applicable

City of Cerritos Municipal Code

The City addresses noise in Section 22.80.480, *Noise*, of the municipal code which is designed to control unnecessary, excessive and annoying sounds generated on one piece of property from impacting an adjacent property, and to protect residential areas from noise sources, including noise generated by traffic. Table D presents the maximum noise levels as measured outdoors at a receiving property line for each development area.

The Noise Ordinance prohibits stationary noise sources to exceed the following during the hours of 7:00 a.m. to 7:00 p.m.:

- The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour;
- The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
- The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour.

The CMC restricts permissible hours of all construction, demolition, and grading activities to the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 10:00 a.m. to 5:00 p.m. on Saturday. No construction, demolition, or grading activities are permitted on Sundays and City-observed holidays.

Table D: Sound Level Noise Criteria

Zone or Development Area	Maximum Sound Levels (dBA)
Residential or Agricultural	50
Commercial	60
Industrial	70

Source: *City of Cerritos Municipal Code, Section 22.80.480* (2021).
dBA = A-weighted decibels

Federal Transit Administration

Because the City does not have construction noise level limits, construction noise was assessed using criteria from the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual* (2018) (FTA Manual). Table E shows the FTA's Detailed Analysist Construction Noise Criteria based on the composite noise levels per construction phase.

Table E: Detailed Assessment Construction Noise Criteria

Land Use	Daytime 1-hour L_{eq} (dBA)	Nighttime 1-hour L_{eq} (dBA)
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

APPLICABLE VIBRATION STANDARDS

Federal Transit Administration

Vibration standards included in the FTA Manual are used in this analysis for ground-borne vibration impacts on human annoyance. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table F provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table F: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20×).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100×) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-Octave bands of frequency over the frequency range 8 to 80 Hertz.
FTA = Federal Transit Administration
L_V = velocity in decibels
VdB = vibration velocity decibels
Max = maximum

Table G lists the potential vibration building damage criteria associated with construction activities, as suggested in the FTA Manual. FTA guidelines show that a vibration level of up to 0.5 in/sec in PPV is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For non-engineered timber and masonry buildings, the construction building vibration damage criterion is 0.2 in/sec in PPV.

Table G: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
Reinforced concrete, steel, or timber (no plaster)	0.50
Engineered concrete and masonry (no plaster)	0.30
Non-engineered timber and masonry buildings	0.20
Buildings extremely susceptible to vibration damage	0.12

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
FTA = Federal Transit Administration
PPV = peak particle velocity
in/sec = inch/inches per second

SIGNIFICANCE CRITERIA

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

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

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

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

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

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area are transportation facilities such as Shoemaker Avenue and occasional heavy-duty trucks entering and leaving the site. At the nearest surrounding sensitive receptors, traffic noise on 166th Street and Bloomfield along with industrial uses in the area are the dominant noise sources.

AMBIENT NOISE MEASUREMENTS

Long-Term Noise Measurements

One (1) long-term (24-hour) and one (1) short-term noise level measurements were conducted on April 19, 2022, using a Larson Davis Spark 706RC Dosimeters and a Larson Davis 824. Table H provides a summary of the measured hourly noise levels and calculated CNEL level from the long-term noise level measurement. Hourly noise levels at the surrounding uses are as low as 47.2 dBA L_{eq} during nighttime hours and 52.3 dBA L_{eq} during daytime hours. Long-term noise monitoring survey sheets are provided in Appendix A. Figure 3 shows the monitoring locations.

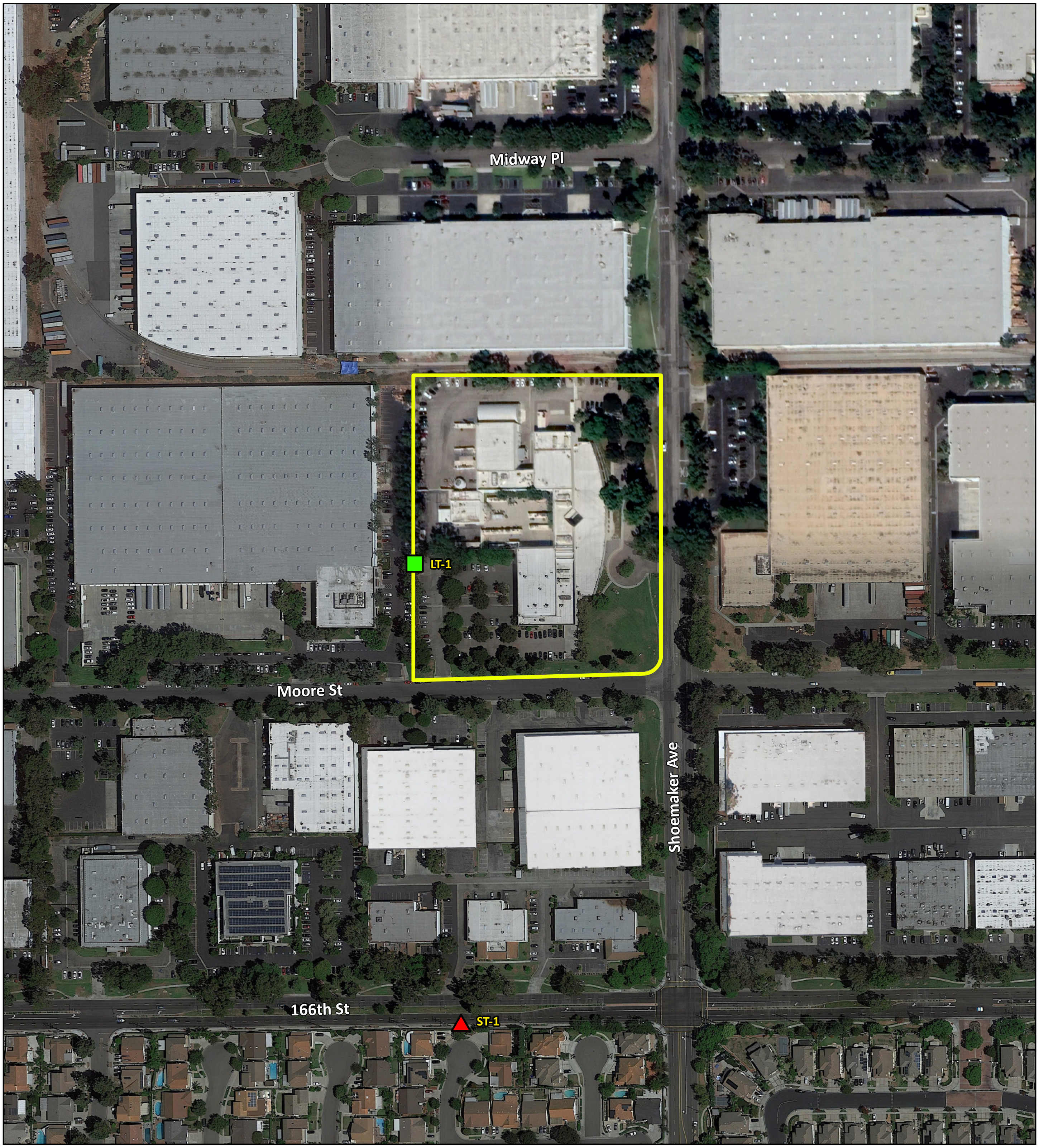
Table H: Long-Term 24-Hour Ambient Noise Monitoring Results

Location		Daytime Noise Levels[1] (dBA L_{eq})	Evening Noise Levels[2] (dBA L_{eq})	Nighttime Noise Levels[3] (dBA L_{eq})	Daily Noise Levels (dBA CNEL)
LT-1	Near the front entrance gate of existing project site. Located on the 2nd tree away from the gate in the southwestern corner of the project site.	52.3 – 55.8	49.8 – 52.0	47.2 – 52.8	57.7
ST-1	Next to property on 16604 Jeanette Ave, Cerritos. On the opposite side of the gated fence along 166th street	64.1	-	-	-

Source: Compiled by LSA (2022).
Note: Noise measurements were conducted from April 19 to April 20, 2022, starting at 1:00 p.m.
1 Daytime Noise Levels = noise levels during the hours from 7:00 a.m. to 7:00 p.m.
2 Evening Noise Levels = noise levels during the hours from 7:00 p.m. to 10:00 p.m.
3 Nighttime Noise Levels = noise levels during the hours from 10:00 p.m. to 7:00 a.m.
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
CNEL = Community Noise Equivalent Level

EXISTING AIRCRAFT NOISE

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. Fullerton Municipal Airport is the closest airport use located approximately 4.3 miles east of the project site. Because the project site is not located within the 65 dBA CNEL and 60 dBA CNEL noise contours, no further analysis associated with aircraft noise impacts is necessary. Additionally, there are no helipads or private airstrips within 2 miles from the project area.



LSA

FIGURE 3

LEGEND

- Project Site Boundary
- Short-term Noise Monitoring Location (ST-1)
- Long-term Noise Monitoring Location (LT-1)

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SOURCE: Google Earth, 2021

16323 Shoemaker Avenue Industrial Warehouse

Noise Monitoring Locations

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PROJECT IMPACTS

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Based on the results of the construction assessment with the *Air Quality, Health Risk, Greenhouse Gas, and Energy Impact Report for the Mesa Linda Warehouse Project* (LSA 2022), during grading, approximately 123 haul trips per day would occur resulting in an ADT of 370, utilizing a passenger car equivalent factor of 3.0. Although there could be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to 84 dBA L_{max}), the effect on longer-term ambient noise levels would be small when compared to existing daily traffic volumes on the adjacent roads. With an increase of 370 ADT as compared to the estimated Year 2020 ADT of 13,900 on Shoemaker Avenue based on volumes in the City's General Plan, an increase of less than 0.2 dBA CNEL is expected. A noise level increase of less than 1 dBA would not be perceptible to the human ear. Therefore, short-term, construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

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

In addition to the reference maximum noise level, the usage factor provided in Table I is used to calculate the hourly noise level impact for each piece of equipment based on the following equation:

$$L_{eq}(equip) = E.L. + 10\log(U.F.) - 20\log\left(\frac{D}{50}\right)$$

where: L_{eq} *(equip)* = L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period.

E.L. = noise emission level of the particular piece of equipment at a reference distance of 50 ft.

U.F. = usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time.

D = distance from the receiver to the piece of equipment.

Table I: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)[1]	Maximum Noise Level (L_{max}) at 50 Feet[2]
Auger Drill Rig	20	84
Backhoes	40	80
Compactor (ground)	20	80
Compressor	40	80
Cranes	16	85
Dozers	40	85
Dump Trucks	40	84
Excavators	40	85
Flat Bed Trucks	40	84
Forklift	20	85
Front-end Loaders	40	80
Graders	40	85
Impact Pile Drivers	20	95
Jackhammers	20	85
Paver	50	77
Pickup Truck	40	55
Pneumatic Tools	50	85
Pumps	50	77
Rock Drills	20	85
Rollers	20	85
Scrapers	40	85
Tractors	40	84
Trencher	50	80
Welder	40	73

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

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

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

Using the equations from the methodology above, the reference information in Table I, and the construction equipment list provided, the composite noise level of each construction phase was calculated. The project construction composite noise levels at a distance of 50 feet would range from 74 dBA L_{eq} to 88 dBA L_{eq} with the highest noise levels occurring during the site preparation phase.

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

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

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

Table J shows the nearest sensitive uses to the project site, their distance from the center of construction activities, and composite noise levels expected during construction. These noise level projections do not take into account intervening topography or barriers. Construction equipment calculations are provided in Appendix B.

Table J: Potential Construction Noise Impacts at Nearest Receptor

Receptor (Location)	Composite Noise Level (dBA L_{eq}) at 50 feet[1]	Distance (feet)	Composite Noise Level (dBA L_{eq})
Industrial (West)	88	320	72
Industrial (North)		370	70
Industrial (East)		400	70
Industrial (South)		420	69
Residence (South)		1,045	61

Source: Compiled by LSA (2022).
The composite construction noise level represents the site preparation phase which is expected to result in the greatest noise level as compared to other phases.
dBA L_{eq} = average A-weighted hourly noise level

While construction noise will vary, it is expected that composite noise levels during construction at the nearest off-site uses directly west of the project would reach 72 dBA L_{eq}. These predicted noise levels would only occur when all construction equipment is operating simultaneously; and therefore, are assumed to be rather conservative in nature. While construction-related short-term noise levels have the potential to be higher than existing ambient noise levels in the project area under existing conditions, the noise impacts would no longer occur once project construction is completed.

As stated above, noise impacts associated with construction activities are regulated by the City's noise ordinance. The proposed project will be required to comply with the construction hours specified in the City's Noise Ordinance, which states that construction activities are allowed between the hours 7:00 a.m. and 6:00 p.m., Monday through Friday, and 10:00 a.m. to 5:00 p.m. on Saturday. No construction, demolition, or grading activities are permitted on Sundays and City-observed holidays.

As it relates to off-site uses, construction-related noise impacts would remain below the 80 dBA and 90 dBA 1-hour construction noise level criteria as established by the FTA for residential uses and industrial uses, respectively, for the average daily condition as modeled from the center of the project site and therefore would be considered less than significant. Best construction practices presented at the end of this analysis shall be implemented to minimize noise impacts to surrounding receptors.

SHORT-TERM CONSTRUCTION VIBRATION IMPACTS

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

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

Table K: Vibration Source Amplitudes for Construction Equipment

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

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

The formulae for vibration transmission are provided below and Tables L and M below provide a summary of off-site construction vibration levels.

$$L_v dB (D) = L_v dB (25 ft) – 30 Log (D/25)$$

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

As shown in Table F above, the threshold at which vibration levels would result in annoyance would be 78 VdB for daytime residential uses and 84 VdB for office type uses. As shown in Table G, the FTA guidelines indicate that for a non-engineered timber and masonry building, the construction vibration damage criterion is 0.2 in/sec in PPV.

Table L: Potential Construction Vibration Annoyance Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (VdB) at 25 feet[1]	Distance (feet) [2]	Vibration Level (VdB)
Industrial (West)	87	320	54
Industrial (North)		370	52
Industrial (East)		400	51
Industrial (South)		420	50
Residence (South)		1,045	38

Source: Compiled by LSA (2022).

1 The reference vibration level is associated with a large bulldozer which is expected to be representative of the heavy equipment used during construction.

2 The reference distance is associated with the average condition, identified by the distance from the center of construction activities to surrounding uses

ft = foot/feet

VdB = vibration velocity decibels

Table M: Potential Construction Vibration Damage Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (PPV) at 25 feet[1]	Distance (feet) [2]	Vibration Level (PPV)
Industrial (West)	0.089	80	0.016
Industrial (North)		40	0.044
Industrial (East)		135	0.007
Industrial (South)		110	0.010
Residence (South)		750	0.001

Source: Compiled by LSA (2022).

1 The reference vibration level is associated with a large bulldozer which is expected to be representative of the heavy equipment used during construction.

2 The reference distance is associated with the peak condition, identified by the distance from the perimeter of construction activities to surrounding structures

ft = foot/feet

in/sec = inch/inches per second

PPV = peak particle velocity

Based on the information provided in Table L, vibration levels are expected to approach 54 VdB at the closest industrial use to the west which is below the 84 VdB annoyance threshold for office type uses. Based on the information provide in Table M, vibration levels are expected to approach 0.044 PPV in/sec at the surrounding structures and would be below the 0.2 PPV in/sec damage threshold.

Because construction activities are regulated by the City's Code of Ordinance which states temporary construction, maintenance, or demolition activities are not allowed between 6:00 p.m. on one day and 7:00 a.m. of the following day, vibration impacts would not occur during the more sensitive nighttime hours.

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

LONG-TERM OFF-SITE TRAFFIC NOISE IMPACTS

As a result of the implementation of the proposed project, off-site traffic volumes on surrounding roadways have the potential to increase. The proposed project trips generated were obtained from the *Transportation Study Scoping Agreement for Shoemaker Avenue Industrial Project* (EPD Solutions, Inc. 2022) (Trip Generation). The proposed project would generate 271 fewer daily vehicle trips as compared to the existing uses. Due to the daily decrease in traffic volumes associates with the proposed project, there would be no traffic noise impacts from project-related traffic to off-site sensitive receptors. No noise reduction measures are required.

LONG-TERM TRAFFIC-RELATED VIBRATION IMPACTS

The proposed project would not generate vibration levels related to on-site operations. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Vibration levels generated from project-related traffic on the adjacent roadways would be less than significant and no mitigation measures are required.

LONG-TERM OFF-SITE STATIONARY NOISE IMPACTS

Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from the proposed on-site heating, ventilation, and air conditioning (HVAC) equipment, cold storage fan units, and truck deliveries and loading and unloading activities. The potential noise impacts to off-site sensitive land uses from the proposed HVAC and cold storage equipment as well as truck delivery activities are discussed below. To provide a conservative analysis, it is assumed that operations would occur equally during all hours of the day. Additionally, it is assumed that within any given hour, seven (7) heavy trucks would maneuver to park near or back into one of the proposed loading docks, consistent with the number of trucks at peak hour (p.m.) according to the Trip Generation. To determine the future noise impacts from project operations to the noise sensitive uses, a 3-D noise model, SoundPLAN, was used to incorporate the site topography as well as the shielding from the proposed building on-site. A graphic representation of the operational noise impacts is presented in Appendix C.

Heating, Ventilation, and Air Conditioning Equipment

According to the site plan, The project has seven (7) rooftop HVAC units on the proposed building to provide ventilation to the proposed office spaces. The HVAC equipment could operate 24 hours per day and would generate sound power levels (SPL) of up to 87 dBA SPL or 72 dBA L_{eq} at 5 feet, based on manufacturer data (Trane).

Cold Storage Fan Units

According to the project description, approximately 10% of the project would be cold storage. Noise levels generated by cold storage fan units would be similar to noise readings from previously gathered reference noise level measurements, which generate a noise level of 57.5 dBA L_{eq} at 60 ft based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]).

Truck Deliveries and Truck Loading and Unloading Activities

Noise levels generated by delivery trucks would be similar to noise readings from truck loading and unloading activities, which generate a noise level of 75 dBA L_{eq} at 20 ft based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]). Delivery trucks would arrive on site and maneuver their trailers so that trailers would be parked within the loading docks. During this process, noise levels are associated with the truck engine noise, air brakes, and back-up alarms while the truck is backing into the dock. These noise levels would occur for a shorter period of time (less than 5 minutes). After a truck enters the loading dock, the doors would be closed and the remainder of the truck loading activities would be enclosed and therefore much less perceptible. To present a conservative assessment, it is assumed that unloading activities could occur at seven (7) docks simultaneously for a period of more than 30 minutes in a given hour.

Table N below shows the combined hourly noise levels generated by HVAC equipment and truck delivery activities at the closest off-site land uses. The project-related noise level impacts would range from 24.5 dBA L_{eq} to 62.3 dBA L_{eq} at the surrounding receptors. These levels would be below the City's noise standard of 50 dBA L_{eq} at the residential land uses and below the noise standard of 70 dBA L_{eq} for industrial land uses. Because project noise levels would not exceed the maximum permissible noise levels, the impact would be less than significant, and no noise reduction measures are required.

Table N: Exterior Noise Level Impacts

Receptor	Direction	Noise Level Standard (dBA L_{eq})	Project Generated Noise Levels (dBA L_{eq})	Potential Operational Noise Impact?[1]
Industrial	West	70	62.3	No
Residential	South	50	33.6	No
Residential	West	50	24.5	No

Source: Compiled by LSA (2022).

[1] A potential operational noise impact would occur if (1) the project noise impacts are greater than the applicable noise standard, OR (2) if the quietest ambient hour is greater than the applicable noise standard and project noise impacts are 3 dBA greater than the quietest ambient hour.

dBA = A-weighted decibels

L_{eq} = equivalent noise level

BEST CONSTRUCTION PRACTICES

In addition to compliance with the City's Code of Ordinances allowed hours of construction between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 10:00 a.m. to 5:00 p.m. on Saturday. No construction, demolition, or grading activities are permitted on Sundays and City-observed holidays., the following best construction practices would further minimize construction noise impacts:

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

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Harris, Cyril M., editor. 1991. *Handbook of Acoustical Measurements and Noise Control*. Third Edition.

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

Trane. *Fan Performance - Product Specifications RT-PRC023AU-EN.*

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

APPENDIX A

NOISE MONITORING SHEETS

Noise Measurement Survey – 24 HR

Project Number: ESL2201.21
Project Name: Shoemaker Industrial

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

Site Number: LT-1 Date: 4/19/22

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: Near the front entrance gate of existing project site. Located on a tree in the southwestern corner of the project site. Second tree away from the gate.

Primary Noise Sources: Occasional heavy-duty trucks leaving/entering the facility and noise From the front gates opening and closing.

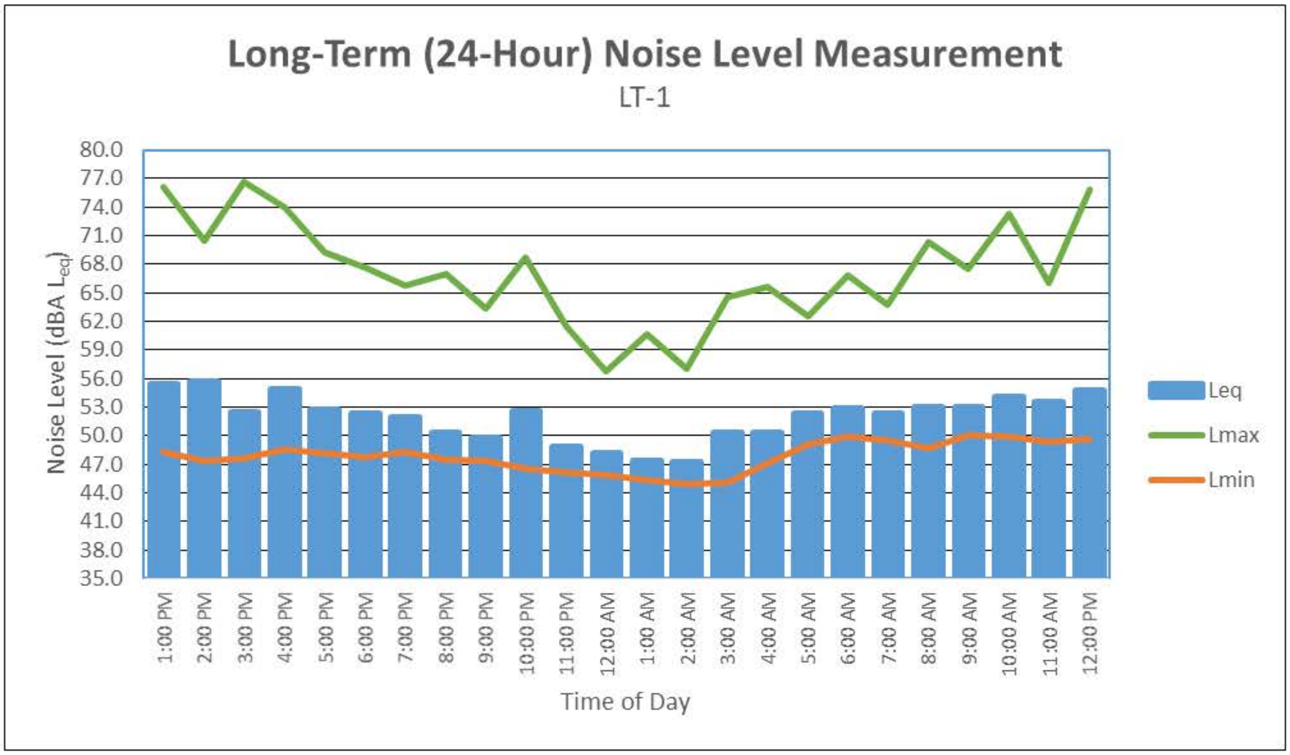
Comments: Original location moved due to limited access inside the facility.

Photo:

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

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	4/19/22	55.5	76.1	48.3
2:00 PM	4/19/22	55.8	70.5	47.4
3:00 PM	4/19/22	52.5	76.6	47.6
4:00 PM	4/19/22	54.8	74.0	48.5
5:00 PM	4/19/22	52.8	69.3	48.1
6:00 PM	4/19/22	52.4	67.7	47.8
7:00 PM	4/19/22	52.0	65.8	48.3
8:00 PM	4/19/22	50.3	67.0	47.5
9:00 PM	4/19/22	49.8	63.4	47.4
10:00 PM	4/19/22	52.6	68.7	46.5
11:00 PM	4/19/22	48.9	61.5	46.1
12:00 AM	4/20/22	48.1	56.7	45.9
1:00 AM	4/20/22	47.3	60.6	45.4
2:00 AM	4/20/22	47.2	57.0	45.0
3:00 AM	4/20/22	50.4	64.5	45.1
4:00 AM	4/20/22	50.3	65.6	47.1
5:00 AM	4/20/22	52.4	62.5	49.1
6:00 AM	4/20/22	52.8	66.8	49.9
7:00 AM	4/20/22	52.3	63.7	49.5
8:00 AM	4/20/22	53.0	70.4	48.7
9:00 AM	4/20/22	53.0	67.5	50.0
10:00 AM	4/20/22	54.1	73.3	49.9
11:00 AM	4/20/22	53.6	66.0	49.4
12:00 PM	4/20/22	54.7	75.8	49.7

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


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

Noise Measurement Survey

Project Number: ESL2201.21
Project Name: Shoemaker Industrial

Test Personnel: Kevin Nguyendo
Equipment: Larson Davis 824

Site Number: ST-1 Date: 4/19/2022 Time: From 12:40 p.m. To 1:00 p.m.

Site Location: Located next to property on 16604 Jeanette Ave. Cerritos, CA 90703, On the Opposite side of the gated fence along 166th street.

Primary Noise Sources: Busy traffic noise on 166th street. There is construction related Pile driving noise on the intersection of shoemaker and 166th street.

Measurement Results

	dBA
L_{eq}	64.1
L_{max}	79.1
L_{min}	48.7
L_2	72.0
L_8	68.5
L_{25}	64.6
L_{50}	58.6
L_{90}	50.9
L_{99}	49.3

Atmospheric Conditions:

Maximum Wind Velocity (mph)	4.8
Average Wind Velocity (mph)	1.3
Temperature (F)	71
Relative Humidity (%)	44
Comments:	

Location Photo:

APPENDIX B

CONSTRUCTION NOISE LEVEL CALCULATIONS

Construction Calculations

Phase: Demolition

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Concrete Saw	1	90	20	50	0.5	90	83
Excavator	3	81	40	50	0.5	81	82
Dozer	2	82	40	50	0.5	82	81
					Combined at 50 feet	**91**	**87**

Phase: Site Preparation

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Dozer	3	82	40	50	0.5	82	83
Tractor	4	84	40	50	0.5	84	86
					Combined at 50 feet	**86**	**88**
					Combined at Receptor 320 feet	**70**	**72**
					Combined at Receptor 370 feet	**69**	**70**
					Combined at Receptor 400 feet	**68**	**70**
					Combined at Receptor 420 feet	**68**	**69**
					Combined at Receptor 1045 feet	**60**	**61**

Phase: Grading

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

Phase:Building Construstion

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Crane	1	81	16	50	0.5	81	73
Man Lift	3	75	20	50	0.5	75	73
Generator	1	81	50	50	0.5	81	78
Tractor	3	84	40	50	0.5	84	85
Welder / Torch	1	74	40	50	0.5	74	70
					Combined at 50 feet	**82**	**76**

Phase:Paving

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

Phase:Architectural Coating

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

Sources: RCNM

[1]- Percentage of time that a piece of equipment is operating at full power.
dBA – A-weighted Decibels
Lmax- Maximum Level
Leq- Equivalent Level

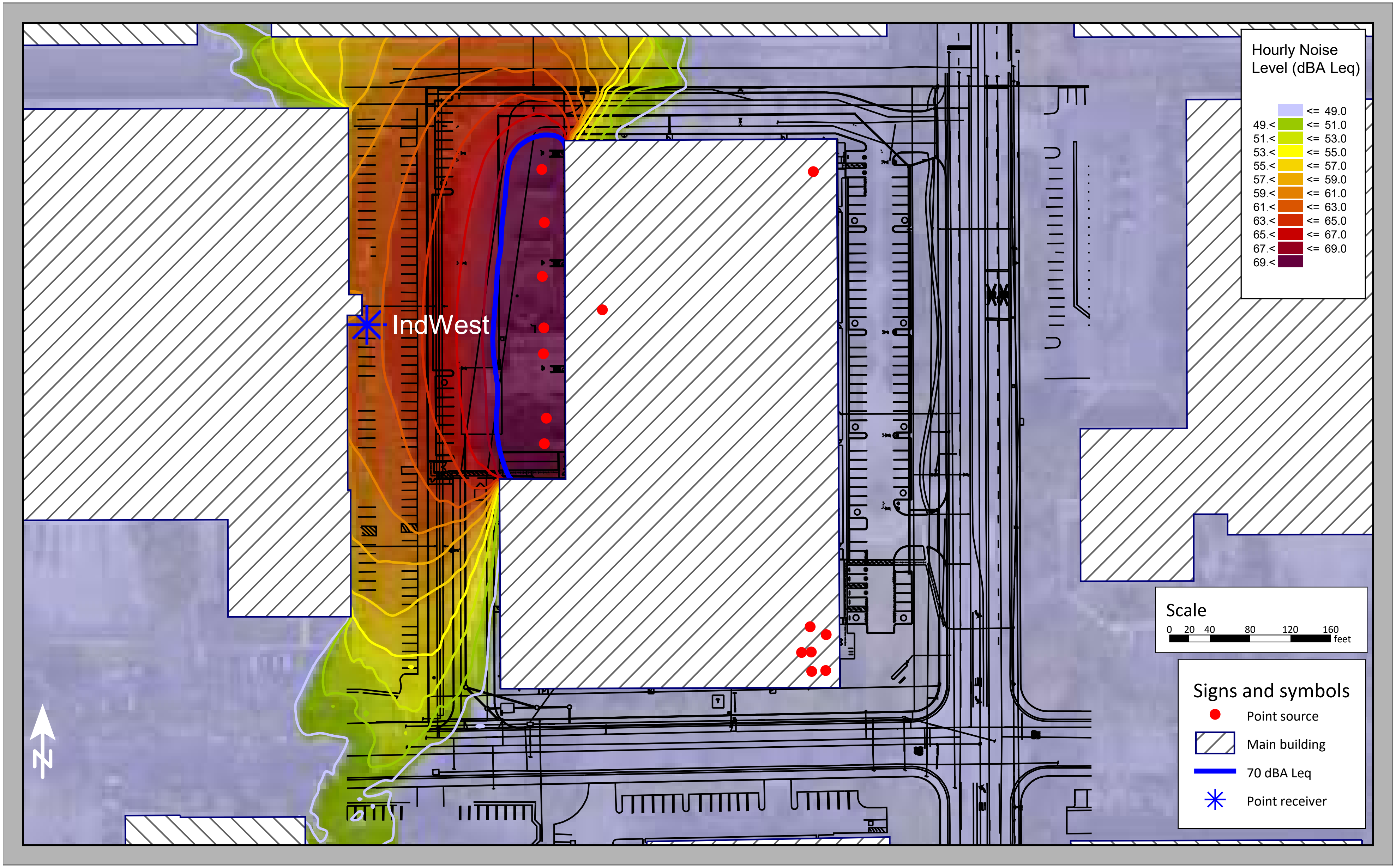
APPENDIX C

SOUNDPLAN NOISE MODEL PRINTOUTS

Shoemaker Cerritos

Project No. ESL2201.21

Project Operational Noise Levels - Close



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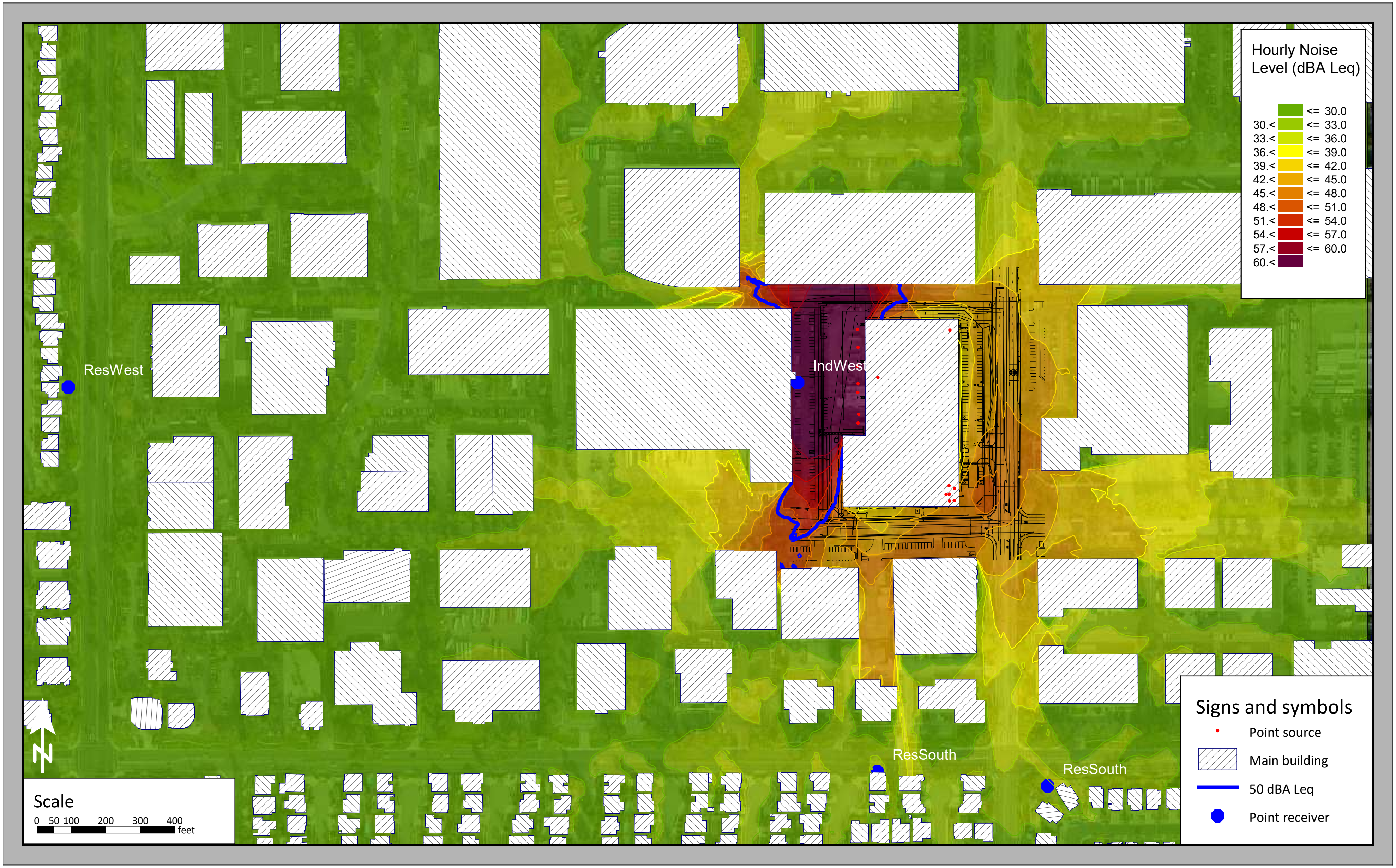
Shoemaker Cerritos

Project No. ESL2201.21

Project Operational Noise Levels



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