

NOISE AND VIBRATION IMPACT ANALYSIS

**COVINA SELF STORAGE PROJECT
COVINA, CALIFORNIA**



July 2024

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LIST OF ABBREVIATIONS AND ACRONYMS

CALGreen Code	California Green Building Standards Code
CEQA	California Environmental Quality Act
City	City of Covina
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
EPA	United States Environmental Protection Agency
ft	foot/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
Noise Element	City of Covina General Plan Noise Element
ONT	Ontario International Airport
PPV	peak particle velocity
project	Covina Self Storage Project
RMS	root-mean-square
SPL	sound pressure level
sq ft	square foot/feet
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 Covina Self Storage Project (project) in the City of Covina (City), California. This report is intended to satisfy the City's 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 2.55-acre project site is located at 529 Cutter Way in the City of Covina, Los Angeles County, California. The project site will be accessed via the I-10 freeway to the south and the 39 freeway to the east. The project site is currently developed with a church building on the property. The vacant portion of the property appears flat and mostly unpaved, with a moderate size paved segment containing allocated parking spaces, driveways, and landscape in the eastern portion of the site along Cutter Way. (see Figure 1, Regional and Project Location, and Figure 2, Site Plan).

The project proposes the demolition of the existing on-site building to construct a 183,584 square foot four story public storage facility with ground floor leasing office which will encompass 182,737 square foot of storage facility, and 847 square foot of office. There will be 22 standard vehicle parking spaces. The proposed project has the potential to operate 24 hours per day, seven (7) days a week.

Construction activities for the project include demolition, preparation, grading, core and shell building, tenant improvements, and concrete paving/site work/landscaping.

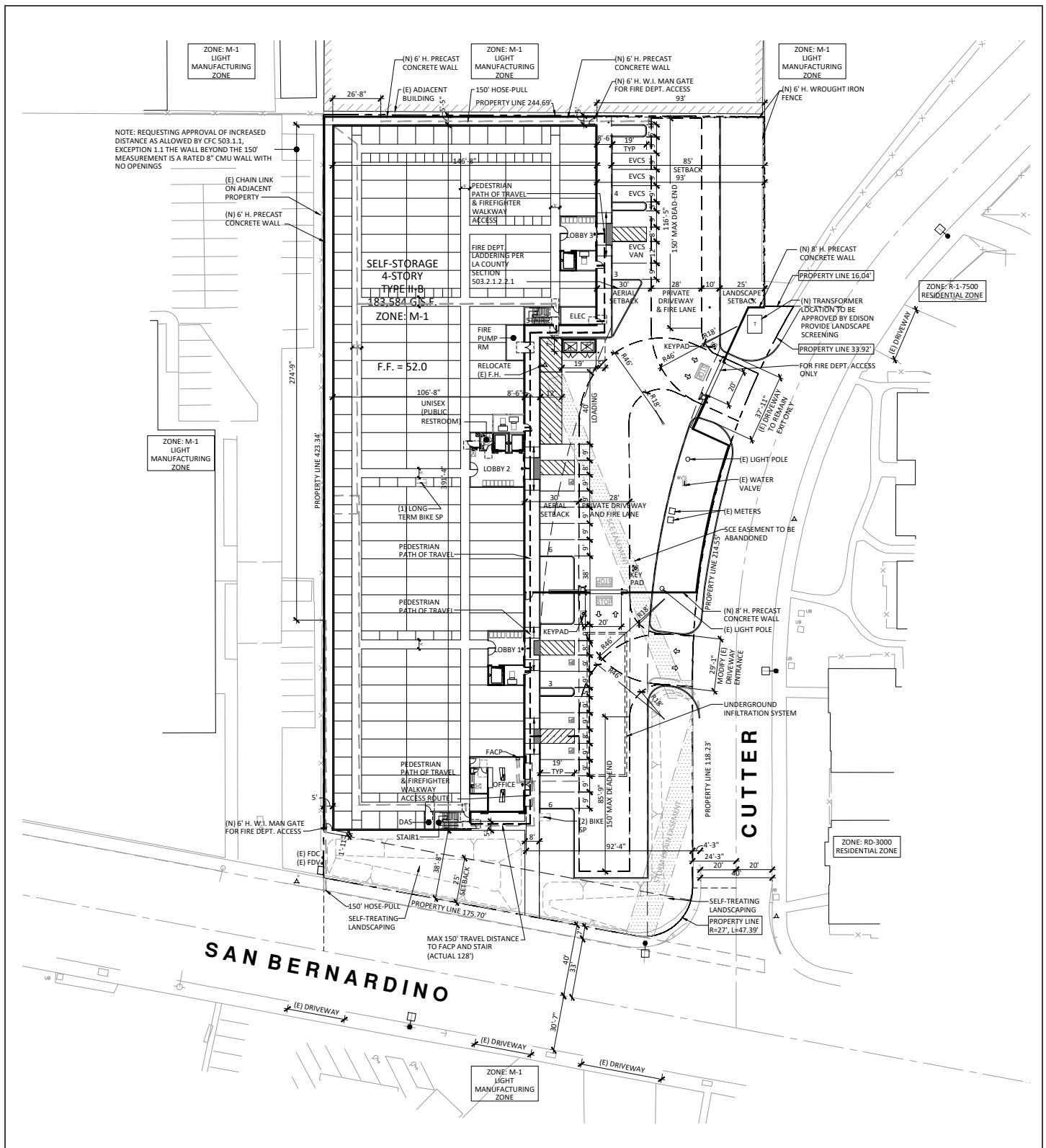
EXISTING LAND USES IN THE PROJECT AREA

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

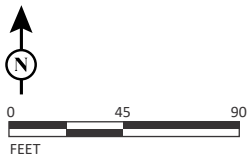
- **North:** Existing industrial uses.
- **East:** Existing multi-family residential uses across Cutter Way.
- **South:** Existing commercial uses across West San Bernardino Road.
- **West:** Existing industrial uses.

The nearest sensitive receptor is:

- **East:** Existing multi-family residences approximately 70 feet (ft) away from the project boundary line.



LSA



SOURCE: KSP Studio (2/23/24)

I:\ESL2201.82\G\Site_Plan.ai (3/19/2024)

Cutter Way Storage Covina
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.

Sources: (1) Technical Noise Supplement (Caltrans 2013); (2) Transit Noise and Vibration Impact Assessment Manual (FTA 2018).

Caltrans = California Department of Transportation

FTA = Federal Transit Administration

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 not 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 as detailed in the Federal Transit Administration's (FTA) 2018 *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual). 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 1×10^{-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 State of California Green Building Standards Code, City of Covina's General Plan (Noise Element), and the City of Covina Municipal Code (Noise Ordinance).

State of California Green Building Standards Code

The State of California's Green Building Standards Code (CALGreen Code) contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other noise source. If the development falls within an airport or freeway 65 dBA CNEL noise contour, buildings shall be constructed to provide an interior noise level environment attributable to exterior sources that does not exceed an hourly equivalent level of 50 dBA L_{eq} in occupied areas during any hour of operation.

City of Covina

City of Covina General Plan

The City of Covina Noise Element includes several noise control programs designed to protect the City's citizens from the adverse effects of uncontrolled noise by controlling noise at its source, as well as attenuating noise between the source and the receiver. The General Plan includes the following noise control programs relevant to the proposed Town Center Specific Plan:

Policy Area 1: Transportation Noise Sources

- Policy 1.1: Examine the noise environment of proposed residential or other noise-sensitive uses located within all 60 L_{dn} noise contours to ensure compatibility and, pertaining to residential activities, adherence to applicable State noise insulation standards.
- Policy 1.2: Attempt to mitigate or eliminate the possible noise problems of proposed residential or other noise-sensitive uses located within all 65 L_{dn} noise contours to ensure compatibility and, pertaining to residential activities, adherence to applicable State noise insulation standards.
- Policy 1.3: Consider "noise-sensitive uses" to include, but not be limited to, all residential housing types, public and private primary and secondary schools, libraries, parks/recreation areas, hospitals/medical facilities, nursing homes, and churches.
- Policy 1.4: Consider establishing acceptable limits of noise levels for various land uses throughout the community, in accordance with State guidelines, as a means of determining noise-compatible land uses.

- Policy 1.6: Require noise-reduction techniques and features in site planning, architectural design, project landscaping, building materials, and/or construction, where necessary or required by law.
- Policy 1.17: Continue to permit higher than normal block walls along the rear property lines of residential parcels that back up to the Metrolink right-of-way to mitigate train-related noises, and consider other appropriate concessions.

Policy Area 2: Commercial and Industrial Noise Sources

- Policy 2.1: Consider establishing acceptable limits of noise levels for various land uses throughout the community, in accordance with State guidelines, as a means of determining noise-compatible land uses.
- Policy 2.2: Discourage the location of noise-sensitive land uses in noise environments.
- Policy 2.3: Consider “noise-sensitive uses” to include, but not be limited to, all residential housing types, public and private primary and secondary schools, libraries, parks/recreation areas, hospitals/medical facilities, nursing homes, and churches.
- Policy 2.4: Require noise-reduction techniques and features in site planning, architectural design, project landscaping, building materials, and/or construction, where necessary or required by law.
- Policy 2.13: Ensure that condominium/townhouse and apartment structures are constructed soundly to prevent adverse noise transmission onto adjacent dwelling units.
- Policy 2.19: Continue enforcing the Covina Noise Ordinance and maintaining coordination among City departments/ divisions involved in noise abatement.
- Policy 2.22: Evaluate and make recommendations on potential noise impacts of permanent developments and uses through environmental or noise-related studies or analyses and, for minor work, by observing project plans as well as the potential noise impacts of temporary activities and special events.
- Policy 2.24: Require that commercial uses developed as part of a mixed-use project (e.g., residential dwelling units situated above commercial businesses) not be noise-intensive, except where determined to be appropriate through appropriate features and mitigation.
- Policy 2.25: Require that mixed use structures be designed to prevent the transfer of noise and vibration from the commercial activity to the residential use.

Policy Area 3: Miscellaneous Stationary Noise Sources

- Policy 3.2: Encourage the installation of quiet residential air conditioners and outside appliances and devices, with proper installation procedures.

Policy Area 4: Construction Noise Sources and General Matters

- Policy 4.1: Continue implementing the Covina Noise Ordinance to regulate the hours of operation and excessive noise associated with on-site construction activities, particularly activities occurring in or near residential uses, permitting exceptions only under special circumstances.
- Policy 4.2: Where necessary, require the construction of barriers to shield noise-sensitive uses from intrusive, construction-related noise.
- Policy 4.3: Require that construction activities incorporate feasible and practical techniques, measures, and procedures that minimize the noise impacts on all adjacent uses.

City of Covina Municipal Code

The City's existing Municipal Code regulates unnecessary, excessive, and annoying noise and vibration generated by certain sources of noise. The City's code is intended to maintain quiet residential areas that exhibit low noise levels, and to implement programs that reduce noise in residential areas where noise levels are above acceptable values.

Municipal Code Title 9, Public Peace, Morals, and Safety, Chapter 9.40, Noise, includes the following standards related to noise:

Section 9.40.040, Exterior Noise Level Limits, stipulates the allowable noise level or sound level referred to in Section 9.40.030 shall be higher of the following.

- A) Actual measured ambient level; or
- B) The sound level limit as indicated in Table C:

Table C: Exterior Noise Level Limits

Receiving Land Use Category	Time	Sound Level (A-weighted Decibels)
Residential Estate of Agricultural	7:00 a.m. to 10:00 p.m.	50
	10:00 p.m. to 7:00 a.m.	40
Residential Low Density	7:00 a.m. to 10:00 p.m.	55
	10:00 p.m. to 7:00 a.m.	45
Residential Medium and High Density	7:00 a.m. to 10:00 p.m.	60
	10:00 p.m. to 7:00 a.m.	50
Commercial	7:00 a.m. to 10:00 p.m.	65
	10:00 p.m. to 7:00 a.m.	55
Industrial	7:00 a.m. to 10:00 p.m.	70
	10:00 p.m. to 7:00 a.m.	60

Source: Section 9.40.040 of the City of Covina's *Municipal Code*.

¹ Daytime means 7:00 a.m. to 10:00 p.m.

² Nighttime means 10:00 p.m. to 7:00 a.m.

dBA = A-weighted decibels

L_{eq} = equivalent continuous sound level

1. Noises generated shall not exceed the noise standard for that land use for any period in any hour except as provided within this chapter;
2. If the measurement location is on a boundary between a commercial or industrial land use category and a residential category, the noise level limit of the lower category plus five decibels shall apply;
3. In the event the alleged offensive noise, as judged by the enforcement officer, contains a steadily, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in the above table shall be reduced by five decibels.

Section 9.40.050, Time Correction Factors, provides the time duration allowances set forth below shall apply to those noise level limits listed in the table in CMC 9.40.040 during all hours of any day. Any noise created in a manner described in CMC 9.40.030 shall not exceed:

- A. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour; or
- B. The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour; or
- C. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour; or
- D. The noise standard plus 20 dB(A) for any period

Section 9.40.090, Controlled Hours of Operation, states that it is unlawful for any period to operate, permit, use, or cause to operate any of the following other than between the hours of 7 a.m. and 8 p.m. of any one day:

- A. Powered model vehicles;
- B. Loading and unloading vehicles such as garbage trucks, forklifts, or cranes in a residential area or within 500 feet of a residence;
- C. Domestic power tools;
- D. Lawn equipment, including, but not limited to: lawn mowers, edgers, cultivators, chainsaws, and leaf blowers in any residential area or within 500 feet of any residence;
- E. Equipment associated with the repair and maintenance of any real property.

Section 9.40.110, Construction, states that it is unlawful to operate equipment or perform outside construction or repair work within 500 feet of a residential land use between the hours of 8 p.m. of

any one day and 7 a.m. of the next day, or on Sundays or public holidays such that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless a permit has been obtained in advance.

Section 9.40.120, Loud and/or unusual noises, Subsection J, Vibration states that It is unlawful to operate or permit the operation of any device that creates a vibration that is above the vibration perception threshold of an average individual at or beyond the property boundary of the source if on private property or at 150 feet from the source if on a public space or public right-of-way.

Federal Transit Administration

Although the City does not have daytime construction noise level limits for activities that occur within the specified hours in Section 9.40.110 to determine potential California Environmental Quality Act (CEQA) noise impacts, construction noise was assessed using criteria from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) (FTA Manual). Table D shows the Federal Transit Administration's (FTA) Detailed Assessment Construction Noise Criteria based on the composite noise levels per construction phase.

**Table D: Detailed Assessment Daytime
Construction Noise Criteria**

Land Use	Daytime 8-hour L_{eq} (dBA)
Residential	80
Commercial	85
Industrial	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 E provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table F 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 E: 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 a frequency range of 8 to 80 Hertz.

FTA = Federal Transit Administration

Max = maximum

L_v = velocity in decibels

VdB = vibration velocity decibels

Table F: 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

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area include traffic on San Bernardino Road, light traffic on Cutter Way, and occasional aircraft.

AMBIENT NOISE MEASUREMENTS

Long-Term Noise Measurements

To assess existing noise levels, LSA conducted two long-term noise measurements in the vicinity of the project site. The long-term (24-hour) noise level measurements were conducted on February 13 through February 14, 2024, using two Larson Davis Spark 706RC Dosimeters. Table G provides a summary of the measured hourly noise levels from the long-term noise level measurements. Noise measurement sheets are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

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

Location		Daytime Noise Levels ¹ (dBA L _{eq})	Nighttime Noise Levels ² (dBA L _{eq})
LT-1	529 Cutter Way, Covina, CA. On a light pole at the south edge of the parking lot, approximately 140 feet north of San Bernardino Road.	59.3 – 63.5	51.7 – 59.7
LT-2	529 Cutter Way, Covina, CA. On a light pole at the north edge of the parking lot, approximately 330 feet north of San Bernardino Road.	52.1 – 57.5	42.9 – 53.8

Source: Compiled by LSA (2024).

¹ Daytime Noise Levels = noise levels during the hours from 7:00 a.m. to 10:00 p.m.

² 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

EXISTING AIRCRAFT NOISE

Aircraft flyovers may be audible on the project site due to aircraft activity in the vicinity. There are no private airstrips or municipal airports within 2 miles of the project site. The nearest commercial airport to the project is the Ontario International Airport (ONT), a commercial airport approximately 18.7 miles to the east. The project site is well outside the ONT Airport 65 dBA CNEL noise contour (Ontario International Airport 2024). Two additional, non-commercial airports, San Gabriel Valley Airport and the Brackett Field Airport are closer at distances of 6.2 miles to the west and 7.4 miles to the east, respectively. Similarly, the project is located well outside each of the 65 dBA CNEL noise contours for each airport (Los Angeles County Airport Land Use Commission 2024). Because the project site is outside the 65 dBA CNEL noise contour of all 3 airports, no further analysis associated with aircraft noise impact is necessary.

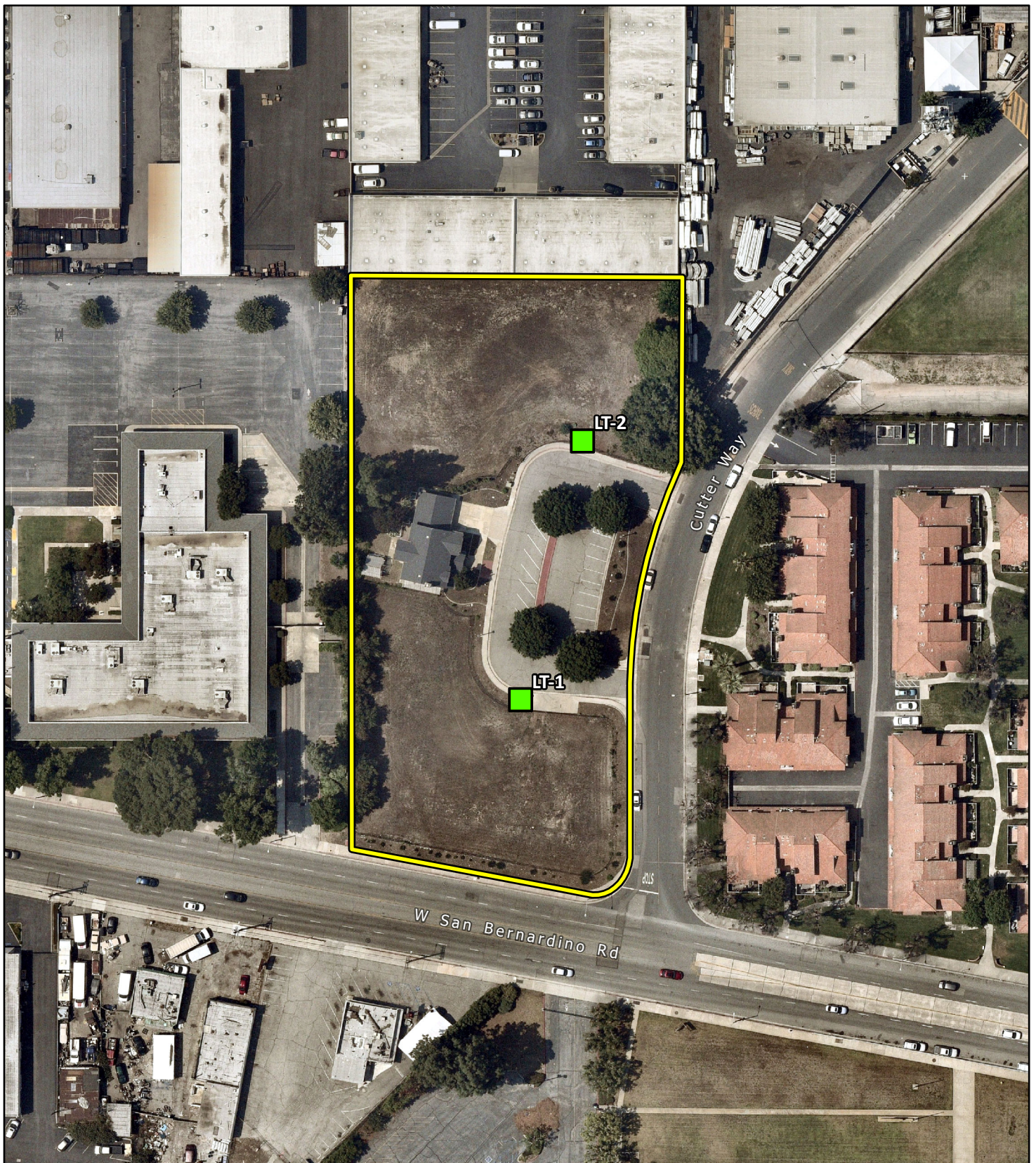


FIGURE 3

LSA

- Project Location
- Long-Term Noise Monitoring Locations



0 50 100
FEET

SOURCE: Nearmap (6/2023)

J:\ESL2201.82\GIS\Pro\Cutter Way Storage Covina\Cutter Way Storage Covina.aprx (3/15/2024)

Cutter Way Storage Covina
Noise Monitoring Locations

PROJECT IMPACTS

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance, the effect on longer-term ambient noise levels would be small when compared to existing daily traffic volumes on San Bernardino Road. During the building construction phase, approximately 335 trips would occur during an average day from worker and hauling activities. Because construction-related vehicle trips would not approach existing daily traffic volumes, traffic noise would not increase by 3 dBA CNEL. A noise level increase of 0.09 dBA, as compared to the existing volume of 15,160 (Urban, 2020), would not be perceptible to the human ear in an outdoor environment. Therefore, short-term construction-related impacts associated with worker commutes 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 of the existing structures and other site improvements, 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 H 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 Federal Highway Administration's *FHWA Roadway Construction Noise Model* (FHWA 2006).

In addition to the reference maximum noise level, the usage factor provided in Table H 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 H: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%) ¹	Maximum Noise Level (L _{max}) at 50 Ft ²
Auger Drill Rig	20	84
Backhoes	40	80
Compactor (ground)	20	80
Compressor	40	80
Concrete Saw	20	90
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

ft = foot/feet

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 H, and the construction equipment list provided, the composite noise levels of each construction phase were

calculated. The project construction composite noise levels at a distance of 50 ft would range from 74 dBA L_{eq} to 88 dBA L_{eq} , with the highest noise levels occurring during the demolition phase.

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

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

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 I 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 consider intervening topography or barriers. Construction equipment calculations are provided in Appendix B.

Table I: Potential Construction Noise Impacts at Nearest Receptor

Receptor (Location)	Composite Noise Level (dBA L_{eq}) at 50 ft ¹	Distance (ft)	Composite Noise Level (dBA L_{eq})
Industrial (West)	88	170	77
Residential Uses (East)		195	76
Industrial (North)		205	75
Commercial (South)		340	71

Source: Compiled by LSA (2024).

¹ The composite construction noise level represents the demolition 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

ft = foot/feet

While construction noise will vary, it is expected that composite noise levels during construction at the nearest off-site industrial uses to the west would reach 77 dBA L_{eq} while construction noise levels would approach 76 dBA L_{eq} at the nearest sensitive residential use to the east during daytime hours. 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 it relates to off-site uses, construction-related noise impacts would remain below the 80 dBA L_{eq} , 85 dBA L_{eq} , and 90 dBA L_{eq} 1-hour construction noise level criteria for daytime construction noise level criteria as established by the FTA for residential, commercial, and industrial land uses, respectively; therefore, the impact would be considered less than significant.

SHORT-TERM CONSTRUCTION VIBRATION IMPACTS

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in RMS (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. Because vibration annoyance assesses an average condition, the distance from the center of construction activities to surrounding land uses was utilized. When assessing potential vibration damage, the appropriate distance to assess a peak or maximum vibration condition is perimeter of construction to surrounding buildings.

Table J shows the PPV and VdB values at 25 ft from the construction vibration source. As shown in Table J, 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 J: 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 Bulldozer²	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks²	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 K and L below provide a summary of off-site construction vibration levels.

$$L_{\text{v}}(\text{D}) = L_{\text{v}}(25 \text{ ft}) - 30 \log (\text{D}/25)$$

$$\text{PPV}_{\text{equip}} = \text{PPV}_{\text{ref}} \times (25/\text{D})^{1.5}$$

As previously shown in Table E, the threshold at which vibration levels would result in annoyance would be 90 VdB for workshop type uses and 78 VdB for daytime residential uses. As shown in Table

F, 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 K: Potential Construction Vibration Annoyance Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (VdB) at 25 ft ¹	Distance (ft)	Vibration Level (VdB)
Industrial (West)	87	170	62
Residential Uses (East)		195	60
Industrial (North)		205	60
Commercial (South)		340	53

Source: Compiled by LSA (2024).

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 assessment 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 L: Potential Construction Vibration Damage Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (PPV) at 25 ft ¹	Distance (ft)	Vibration Level (PPV)
Industrial (West)	0.089	55	0.027
Residential Uses (East)		70	0.019
Industrial (North)		10	0.352
Commercial (South)		115	0.009

Source: Compiled by LSA (2024).

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 assessment distance is associated with the peak condition, identified by the distance from the perimeter of construction activities to surrounding structures.

ft = foot/feet

PPV = peak particle velocity

Based on the information provided in Table K, vibration levels are expected to approach 62 VdB at the closest industrial uses to the west, 60 VdB at the closest residential uses to the east, and 53 VdB at the closest commercial uses to the south and would not exceed the annoyance thresholds.

Based on the information provided in Table L, the closest structure to external construction activities is the industrial use to the north, less than 10 feet from the northern project construction boundary. Using the reference data from Table J and the equation above, it is expected that vibration levels generated by dump trucks and other large equipment would generate ground-borne vibration levels of 0.352 PPV (in/sec) or higher at the closest structures to the project site. This vibration level would exceed the 0.2 in/sec PPV threshold considered safe for non-engineered timber and masonry buildings, which would result in a potentially significant impact. The distance

from large construction equipment with a reference vibration level of 0.089 in/sec PPV at 25 feet for which the 0.2 in/sec threshold would no longer be exceeded is 15 feet. Vibration levels at all other buildings would be lower. Therefore, construction would not result in any vibration damage, and impacts would be less than significant with the incorporation of Mitigation Measure NOI-1, as detailed below.

Mitigation Measure NOI-1

Construction Vibration Damage. Due to the close proximity to surrounding structures, the City of Covina (City) Director of Community Development, or designee, shall verify prior to issuance of demolition or grading permits, that the approved plans require that the construction contractor shall implement the following reduction measures during project construction activities to ensure that damage does not occur at surrounding structures:

- Identify structures that are located within 15 feet (ft) of heavy construction activities and that have the potential to be affected by ground-borne vibration. This task shall be conducted by a qualified structural engineer as approved by the City's Director of Community Development, or designee.
- Once the construction equipment list finalized, a comparison of the proposed equipment to be used and the assumed equipment vibration levels presented in Table 7-4 of the Federal Transit Administration Noise and Vibration Impact Assessment Manual – FTA Report No. .0123 shall be completed. If it is determined that the proposed equipment would generate lower vibration levels than assumed, further vibration reduction would not be necessary. However, if levels would potentially exceed the FTA Damage Criteria presented in Table 7-5 of the Federal Transit Administration Noise and Vibration Impact Assessment Manual – FTA Report No. .0123, the applicant shall develop a vibration monitoring and construction contingency plan for approval by the City Director of Community Development, or designee, to identify structures where monitoring would be conducted; set up a vibration monitoring schedule; define structure-specific vibration limits; and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies would be identified for when vibration levels approached the limits.
- If a vibration monitoring and construction contingency plan is deemed necessary, monitor vibration during initial construction activities would be required. Monitoring results may indicate the need for more or less intensive measurements.

- When vibration levels approach limits, suspend construction and implement contingencies as identified in the approved vibration monitoring and construction contingency plan to either lower vibration levels or secure the affected structures.

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 would generate 266 daily trips including 17 trips during the AM peak hour and 28 trips during the PM peak hour according to the *Level of Service (LOS) and Vehicle Miles Traveled (VMT) Screening Analysis* (EPD Solutions, Inc. 2024).

Because vehicle trips generated by the project would not approach existing daily traffic volumes on San Bernardino Road, volume of 15,160 (Urban, 2020), traffic noise would increase by 0.08 dBA CNEL. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, the traffic noise increase resulting from the proposed project would be less than significant. No mitigation is required.

LONG-TERM OPERATIONAL AND TRAFFIC-RELATED VIBRATION IMPACTS

The proposed project would not generate noticeable vibration levels related to on-site operations. Trucks traveling to and from the project site as well as loading and unloading activities may generate vibration levels. However, the closest off-site uses are greater than 25 ft away and vibration levels generated from trucks would not be perceptible. 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. Based on a reference vibration level of 0.089 in/sec PPV, structures greater than 25 ft from the roadways that contain project trips would experience vibration levels below the most conservative standard of 0.12 in/sec PPV; therefore, vibration levels generated from project-related traffic on the adjacent roadways would be less than significant, and no mitigation measures are required.

LONG-TERM STATIONARY NOISE IMPACTS TO OFF-SITE RECEPTORS

Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from rooftop heating, ventilation, and air conditioning (HVAC) equipment and proposed truck loading and unloading activities. The potential noise impacts to off-site sensitive land uses from the proposed operations are discussed below. To provide a conservative analysis, it is assumed that within any given peak hour, seven heavy trucks would maneuver to park near the loading zones east of the proposed building. During non-peak hours, it is assumed two trucks would operate per hour.

Heating, Ventilation, and Air Conditioning Equipment

The project would have various rooftop mechanical equipment including HVAC units on the proposed building. Based on the project site plan, the project is assumed to have two (2) rooftop HVAC units and assumed to operate 24 hours per day. The HVAC equipment could operate 24 hours per day and would generate sound pressure levels (SPL) of up to 87 dBA SPL or 72 dBA L_{eq} at 5 ft, based on manufacturer data (Trane n.d.). This level is used as a reference level and is not indicative

of the level at surrounding receptors. Additionally, rooftop parapet walls will further reduce HVAC noise levels.

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 loading dock. These noise levels would occur for a shorter period of time (less than 5 minutes). It is assumed that 1 heavy truck would arrive on site during off-peak hour and 3 heavy trucks during peak hour.

Cumulative Operations Noise Assessment

Tables M and N below show the combined hourly noise levels generated by HVAC equipment and truck delivery activities at the closest off-site land uses. The results indicated that operational noise levels would be below the daytime and nighttime hourly noise level standards of 60 dBA L_{eq} and 50 dBA L_{eq} , respectively. Additionally, ambient noise levels would not increase by 5 dBA or more. Operations of the proposed project would be less than significant. No mitigation is required. Appendix C presents the operational noise source calculations.

Table M: Daytime Exterior Noise Level Impacts

Receptor	Direction	Existing Quietest Daytime Noise Level (dBA L_{eq})	Project Generated Noise Levels (dBA L_{eq})	Potential Operational Noise Impact? ¹
Residential (Cutter Way)	East	52.1	49.3	No

Source: Compiled by LSA (2024).

¹ A potential operational noise impact would occur if (1) the quietest daytime ambient hour is less than 60 dBA L_{eq} and project noise impacts are greater than 60 dBA L_{eq} , OR (2) the quietest daytime ambient hour is greater than 60 dBA L_{eq} and project noise impacts are 3 dBA greater than the quietest daytime ambient hour.

dBA = A-weighted decibels

L_{eq} = equivalent noise level

Table N: Nighttime Exterior Noise Level Impacts

Receptor	Direction	Existing Quietest Nighttime Noise Level (dBA L_{eq})	Project Generated Noise Levels (dBA L_{eq})	Potential Operational Noise Impact? ¹
Residential (Cutter Way)	East	42.9	46.3	No

Source: Compiled by LSA (2024).

¹ A potential operational noise impact would occur if (1) the quietest nighttime ambient hour is less than 50 dBA L_{eq} and project noise impacts are greater than 50 dBA L_{eq} , OR (2) the quietest nighttime ambient hour is greater than 50 dBA L_{eq} and project noise impacts are 3 dBA greater than the quietest nighttime ambient hour.

dBA = A-weighted decibels

L_{eq} = equivalent noise level

In conclusion, the proposed project would not generate noise levels from operations resulting in noise levels above the quietest ambient noise levels during daytime and nighttime. Furthermore, due to the substantially higher ambient noise levels, the project would not contribute to the overall ambient noise levels. The project is also not anticipated to generate vibration levels above the FTA limits to off-site receptors due to the implementation of the vibration reduction features in NOI-1 above. Therefore, the proposed project would comply with the City's noise and vibration standards and no noise reduction features are required.

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APPENDIX A

NOISE MONITORING DATA

Noise Measurement Survey – 24 HR

Project Number: ESL2201.82

Project Name: Covina Self Storage

Test Personnel: Corey Knips

Equipment: Spark 706RC (SN:18907)

Site Number: LT-1 Date: 2/13/2024

Time: From 11:00 a.m. To 11:00 a.m.

Site Location: 529 Cutter Way, on the light pole at the south edge of the parking lot,
approximately 140 ft north of San Bernardino Road.

Primary Noise Sources: Light traffic on San Bernardino Road, very light traffic on Cutter
Way, and occasional aircraft.

Comments: _____

Photo:



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

Start Time	Date	Noise Level (dBA)		
		L _{eq}	L _{max}	L _{min}
11:00 AM	2/13/2024	60.0	70.5	42.7
12:00 PM	2/13/2024	61.4	81.3	41.9
1:00 PM	2/13/2024	60.2	71.8	43.2
2:00 PM	2/13/2024	61.4	82.7	43.9
3:00 PM	2/13/2024	63.0	84.9	44.7
4:00 PM	2/13/2024	62.7	72.5	47.3
5:00 PM	2/13/2024	63.5	79.4	48.5
6:00 PM	2/13/2024	62.1	70.3	49.3
7:00 PM	2/13/2024	61.3	82.4	48.9
8:00 PM	2/13/2024	60.1	75.5	49.5
9:00 PM	2/13/2024	59.3	78.8	49.2
10:00 PM	2/13/2024	57.7	70.0	49.0
11:00 PM	2/13/2024	55.7	76.4	48.9
12:00 AM	2/14/2024	53.1	64.0	49.1
1:00 AM	2/14/2024	51.7	64.2	49.4
2:00 AM	2/14/2024	52.1	67.7	49.3
3:00 AM	2/14/2024	52.7	65.7	49.5
4:00 AM	2/14/2024	53.7	66.7	37.1
5:00 AM	2/14/2024	56.4	69.5	37.9
6:00 AM	2/14/2024	59.7	72.7	41.0
7:00 AM	2/14/2024	63.2	72.2	46.7
8:00 AM	2/14/2024	62.5	73.9	42.5
9:00 AM	2/14/2024	60.1	68.0	40.5
10:00 AM	2/14/2024	59.8	68.4	40.6

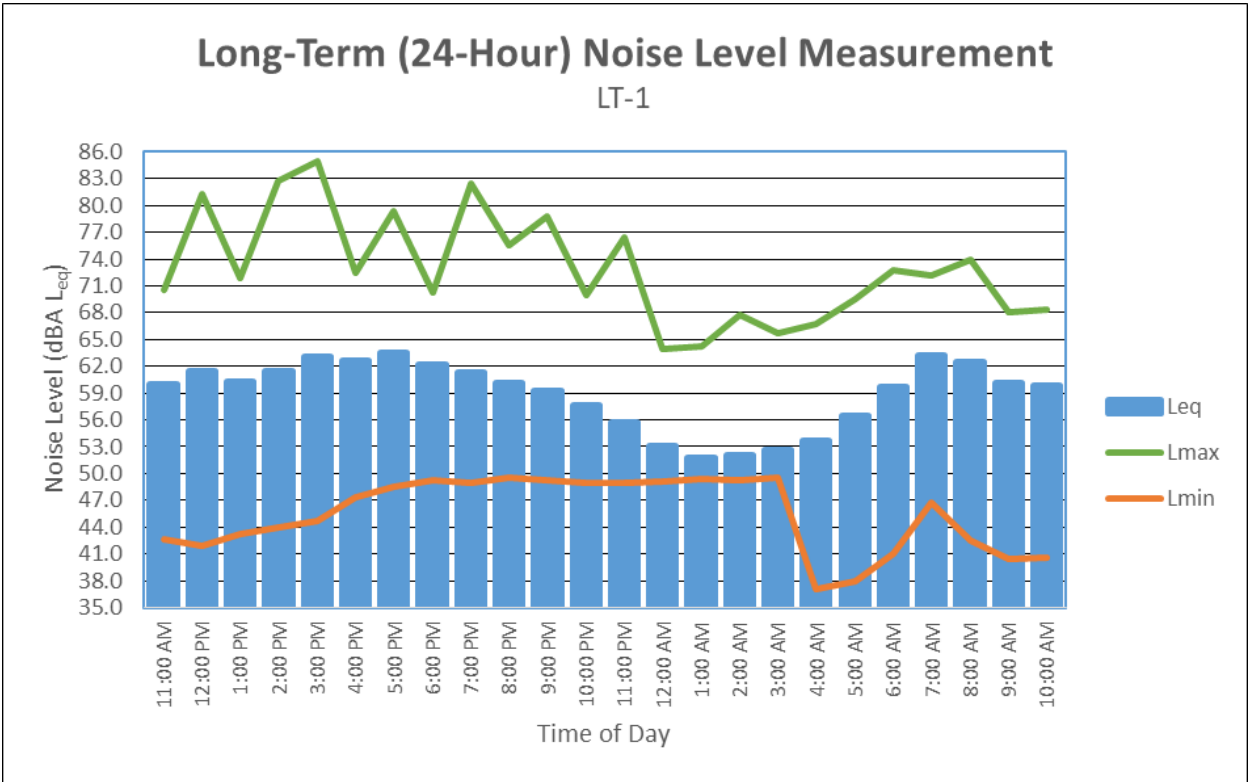
Source: Compiled by LSA Associates, Inc. (2024).

dBA = A-weighted decibel

L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level

L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: ESL2201.82
Project Name: Covina Self Storage

Test Personnel: Corey Knips
Equipment: Spark 706RC (SN:18907)

Site Number: LT-2 Date: 2/13/2024

Time: From 11:00 a.m. To 11:00 a.m.

Site Location: 529 Cutter Way, on the light pole at the north edge of the parking lot,
approximately 330 ft north of San Bernardino Road.

Primary Noise Sources: Light traffic on San Bernardino Road, very light traffic on Cutter
Way, and occasional aircraft.

Comments: _____

Photo:

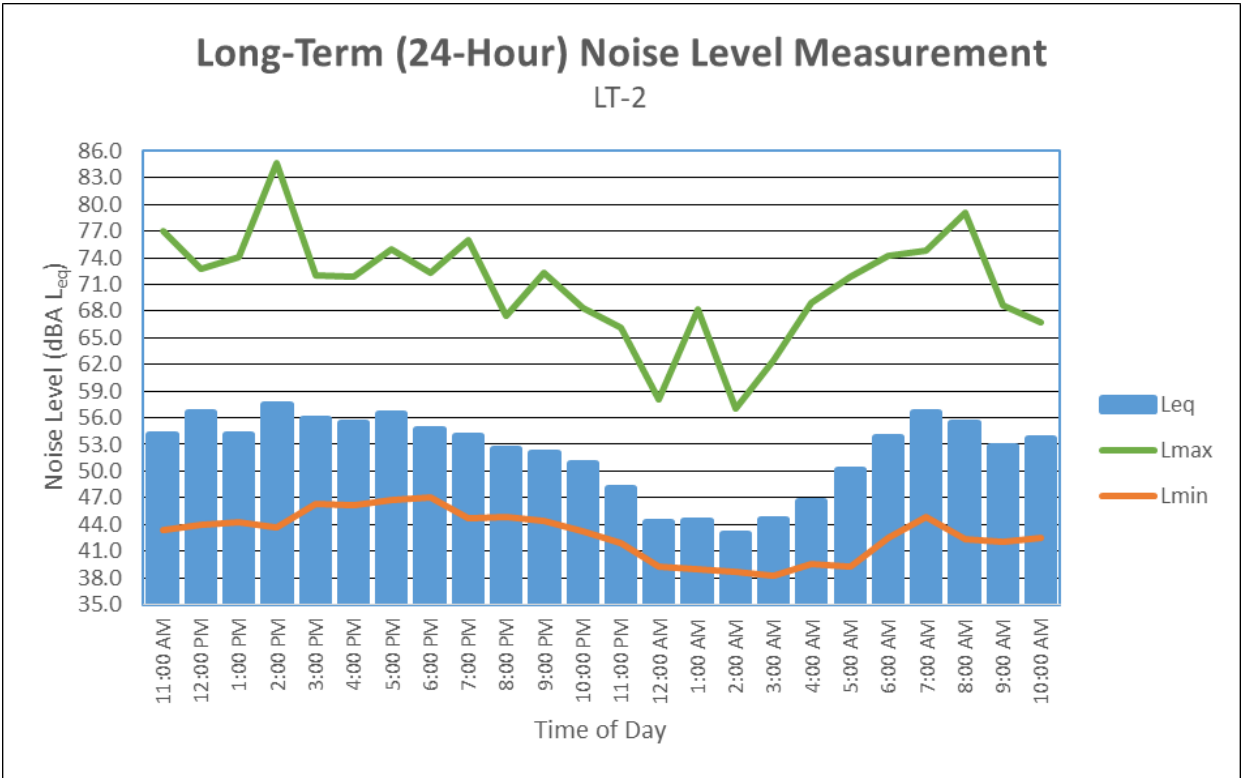


Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L _{eq}	L _{max}	L _{min}
11:00 AM	2/13/2024	54.1	77.0	43.4
12:00 PM	2/13/2024	56.5	72.8	44.0
1:00 PM	2/13/2024	54.1	74.1	44.3
2:00 PM	2/13/2024	57.5	84.6	43.7
3:00 PM	2/13/2024	55.9	72.0	46.3
4:00 PM	2/13/2024	55.4	71.9	46.2
5:00 PM	2/13/2024	56.5	75.0	46.7
6:00 PM	2/13/2024	54.7	72.3	47.1
7:00 PM	2/13/2024	53.9	76.0	44.7
8:00 PM	2/13/2024	52.4	67.5	44.9
9:00 PM	2/13/2024	52.1	72.3	44.4
10:00 PM	2/13/2024	50.9	68.3	43.2
11:00 PM	2/13/2024	48.1	66.1	41.9
12:00 AM	2/14/2024	44.2	58.1	39.3
1:00 AM	2/14/2024	44.5	68.2	38.9
2:00 AM	2/14/2024	42.9	57.0	38.7
3:00 AM	2/14/2024	44.6	62.5	38.2
4:00 AM	2/14/2024	46.7	68.9	39.6
5:00 AM	2/14/2024	50.1	71.8	39.3
6:00 AM	2/14/2024	53.8	74.2	42.5
7:00 AM	2/14/2024	56.6	74.8	44.9
8:00 AM	2/14/2024	55.5	79.0	42.3
9:00 AM	2/14/2024	52.7	68.6	42.1
10:00 AM	2/14/2024	53.7	66.8	42.5

Source: Compiled by LSA Associates, Inc. (2024).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



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
Dozer	1	82	40	50	0.5	82	78
Tractor	3	84	40	50	0.5	84	85
Combined at 50 feet						91	88
Combined at Receptor 170 feet						81	77
Combined at Receptor 195 feet						80	76
Combined at Receptor 205 feet						79	75
Combined at Receptor 340 feet						75	71

Phase: Site Preparation

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor ¹	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Grader	1	85	40	50	0.5	85	81
Scraper	1	84	40	50	0.5	84	80
Tractor	1	84	40	50	0.5	84	80
Combined at 50 feet						89	85
Combined at Receptor 170 feet						79	75

Phase: Grading

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor ¹	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Grader	1	85	40	50	0.5	85	81
Dozer	1	82	40	50	0.5	82	78
Tractor	2	84	40	50	0.5	84	83
Combined at 50 feet						89	86
Combined at Receptor 170 feet						78	75

Phase: Building Construction

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	2	75	20	50	0.5	75	71
Generator	1	81	50	50	0.5	81	78
Tractor	1	84	40	50	0.5	84	80
Welder / Torch	3	74	40	50	0.5	74	75
Combined at 50 feet						87	84
Combined at Receptor 170 feet						77	73

Phase: Paving

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor ¹	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA)	
						Lmax	Leq
Drum Mixer	1	80	50	50	0.5	80	77
Paver	1	77	50	50	0.5	77	74
All Other Equipment > 5 HP	1	85	50	50	0.5	85	82
Tractor	1	84	40	50	0.5	84	80
Roller	2	80	20	50	0.5	80	76
Combined at 50 feet						89	86
Combined at Receptor 110 feet						82	79

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
Combined at Receptor 170 feet						67	63

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

OPERATIONAL NOISE LEVEL CALCULATIONS

Stationary Noise

	Land Use	Direction	Noise Source	Peak Hour	Off-Peak	Reference	Distance (ft)	Distance Attenuation (dBA)	Peak Hour Daytime	Off-Peak Nighttime
				Daytime	Nighttime				Reference Noise	Reference Noise
				Reference Noise Level at 50 ft (dBA Leq)	Reference Noise Level at 50 ft (dBA Leq)				Level at Receptor (dBA Leq)	Level at Receptor (dBA Leq)
1	Residential	East	Truck Load/Unload Activity	69.0	64.2	20	225	21.0	48.0	43.2
			HVAC 1	72.0	72.0	5	190	31.6	40.4	40.4
			HVAC 2	72.0	72.0	5	190	31.6	40.4	40.4
								Combined	49.3	46.3

*Assuming 1 heavy truck during off-peak hour and 3 trucks during peak hour