IV. Environmental Impact Analysis

H. Noise

1. Introduction

This section of the Draft EIR analyzes potential noise and vibration impacts of the Project. Included in this section is a description of the existing noise environment within the Project Site area, an estimation of future noise and vibration levels at surrounding sensitive land uses associated with construction and operation of the Project, a description of the potential significant impacts, and the inclusion of mitigation measures to address any identified potential significant impacts. Additionally, this section of the Draft EIR evaluates the Project's incremental contribution to potential cumulative noise and vibration impacts resulting from past, present, and probable future projects. This section summarizes the noise and vibration information analyses provided in the *1100 East 5th Street Project Noise Impact Analysis, City of Los Angeles* (Noise Analysis) included in **Appendix I** of this Draft EIR.

2. Environmental Setting

Due to the technical nature of noise and vibration impacts, a brief overview of basic noise principles and descriptors is provided below.

a) Noise and Vibration Basics

(1) Noise Principles and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as undesirable (i.e., loud, unexpected, or annoying) sound. Acoustics is defined as the physics of sound and addresses its propagation and control.[1] In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement and reflects the way people perceive changes in sound amplitude.[2] The dB scale

[1] California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013. Accessed August 25, 2022.

[2] All sound levels measured in decibel (dB), as identified in the noise calculation worksheets included in Appendix of this Draft EIR and in this section of the Draft EIR, are relative to $2x10^{-5}$ N/m^2.

is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of feeling pain. Pressure waves traveling through air exert a force registered by the human ear as sound.[3]

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all of the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.[4]

The typical human ear is not equally sensitive to the frequency range from 20 to 20,000 Hz. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements.[5] Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Table IV.H-1**, **Decibel Scale and Common Noise Sources**.

Table IV.H-1
Decibel Scale and Common Noise Sources

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)

3 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013. Accessed August 25, 2022.

4 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013. Accessed August 25, 2022.

5 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013. Accessed August 25, 2022.

Table IV.H-1
Decibel Scale and Common Noise Sources

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing
Note: Colors are for illustrative purposes only. Source: Caltrans, Technical Noise Supplement, Page 2-20, September 2013.		

(2) Noise Exposure and Community Noise

Community noise exposure is typically measured over a period of time; a noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many unidentifiable individual contributors. Single-event noise sources, such as aircraft flyovers, sirens, etc., may cause sudden changes in background noise level.[6] However, generally, background noise levels change gradually throughout the day, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume.

These successive additions of sound to the community noise environment change the community noise level from moment to moment, requiring the noise exposure to be measured over periods of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. The following noise descriptors are used to characterize environmental noise levels over time.[7]

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour (L_{eq}). The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

6 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013. Accessed August 25, 2022.

7 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.2, September 2013. Accessed August 25, 2022.

L_x: The noise level exceeded a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: The average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dBA to measured noise levels between the hours of 10:00 P.M. to 7:00 A.M. the next day to account for nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL).

CNEL: The Community Noise Equivalent Level (CNEL) is the time average A-weighted noise level during a 24-hour day that includes an addition of 5 dBA to measured noise levels between the hours of 7:00 P.M. to 10:00 P.M. and an addition of 10 dBA to noise levels between the hours of 10:00 P.M. to 7:00 A.M. the next day to account for noise sensitivity in the evening and nighttime, respectively.

(3) Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startled response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep.

The World Health Organization's Guidelines for Community Noise details the adverse health effects of high noise levels, which include hearing impairment, speech intelligibility, sleep disturbance, physiological functions (e.g. hypertension and cardiovascular effects), mental illness, performance of cognitive tasks, social and behavioral effects (e.g. feelings of helplessness, aggressive behavior), and annoyance.[8]

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the

[8] World Health Organization edited by Berglund, Birgitta, Lindvall, Thomas, Schwela, Dietrich H. Guidelines for Community Noise, 1999. https://apps.who.int/iris/handle/10665/66217. Accessed August 25, 2022.

corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:[9]

- Except in carefully controlled laboratory experiments, a change of 1 dBA in ambient noise levels cannot be perceived.
- Outside of the laboratory, a change of 3 dBA in ambient noise levels is considered to be a barely perceivable difference.
- A change of 5 dBA in ambient noise levels is considered to be a readily perceivable difference; and
- A change of 10 dBA in ambient noise levels is subjectively heard as doubling of the perceived loudness.

These relationships between change in noise level and human hearing response occur in part because of the logarithmic nature of sound and the dB scale. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[10]

(4) Noise Attenuation

When noise propagates over a distance, the noise level reduces, or attenuates, with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." The rate of sound attenuation for a point source, such as a piece of mechanical or electrical equipment (e.g., air conditioner) or idling vehicle (e.g., bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically "hard" sites and 7.5 dBA per doubling of distance from the noise source to the receptor over acoustically "soft" sites.[11] Hard

9 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013. Accessed August 25, 2022.

10 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1.1, September 2013. Accessed August 25, 2022.

11 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Sections 2.1.4.1.and 2.1.4.2, September 2013. Accessed August 25, 2022.

sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[12] For example, an outdoor condenser fan that generates a sound level of 60 dBA at a distance of 50 feet from a point source at an acoustically hard site would attenuate to 54 dBA at a distance of 100 feet from the point source and attenuate to 48 dBA at 200 feet from the point source.

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources.[13] Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading."[14] Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[15] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Structures (e.g., buildings and solid walls) and natural topography (e.g., hills and berms) that obstruct the line-of-sight between a noise source and a receptor further reduce the noise level if the receptor is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receptor is located behind the wall but still has a view of the source (i.e., the line-of-sight is not fully blocked), barrier insertion loss would still occur but to a lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall can reflect noise back to the receptor, thereby compounding the noise. Noise barriers can provide noise level reductions ranging from approximately 5 dBA (where the barrier just breaks the line-of-sight between the source and receiver) to an upper range of 20 dBA with a larger barrier.[16] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[17]

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12 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Sections 2.1.4.1 and 2.1.4.2, September 2013. Accessed August 25, 2022.

13 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013. Accessed August 25, 2022.

14 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013. Accessed August 25, 2022.

15 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013. Accessed August 25, 2022.

16 Caltrans California Department of Transportation, Technical Noise Supplement (TeNS), 2009, Chapter to the Traffic Noise Analysis Protocol, Sections 2.1.4.2 and 5.1.1, September 2013. Accessed August 25, 2022.

17 Caltrans California Department of Transportation, Technical Noise Supplement (TeNS), 2009, Chapter 2.11 to the Traffic Noise Analysis Protocol, Section 7.4.2, Table 7-1, September 2013. Accessed August 25, 2022.

Receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels.[18] Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances. Other factors such as air temperature, humidity, and turbulence can, under the right conditions, also have substantial effects on noise levels.[19]

(5) Vibration Fundamentals

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Since energy is lost during its transfer from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual*, groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard.[20] In contrast to airborne noise, groundborne vibration is not a common environmental problem, as it is unusual for vibration from sources such as rubber-tired buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, heavy trucks traveling on rough roads, and certain construction activities, such as blasting, pile-driving, and operation of heavy earth-moving equipment.[21] Groundborne vibration generated by man-made activities (e.g., road traffic, construction operations) typically weakens with greater horizontal distance from the source of the vibration.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings.[22] The root mean square (RMS) amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body.[23] Decibel notation (VdB) is commonly used to express RMS vibration velocity amplitude. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity;

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18 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013. Accessed August 25, 2022.

19 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013. Accessed August 25, 2022.

20 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed August 25, 2022.

21 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018.

22 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

23 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

FTA uses a crest factor of 4.[24] The decibel notation VdB acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include buildings where vibration would interfere with operations within the building or cause damage (especially older masonry structures), locations where people sleep, and locations with vibration sensitive equipment.[25]

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[26] The relationship between groundborne vibration and groundborne noise depends on the frequency of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a groundborne noise level that is approximately 50 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is between 30 and 60 Hz), the groundborne noise level will be approximately 35 to 37 decibels lower than the velocity level.[27] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level at low frequencies.

b) Regulatory Framework

There are several plans, regulations, and programs that include policies, requirements, and guidelines regarding Noise at the federal, State, regional, and local levels. As described below, these plans, guidelines, and laws include the following:

- Noise Control Act of 1972
- Federal Transportation Administration Vibration Standards
- Occupational Safety and Health Act of 1970
- Office of Planning and Research Guidelines for Noise Compatible Land Use
- Caltrans Vibration/Groundborne Noise Standards
- Los Angeles County Airport Land Use Commission Comprehensive Land Use Plan
- City of Los Angeles Municipal Code
- City of Los Angeles General Plan Noise Element

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24 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

25 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 6.1, 6.2, and 6.3, 2018.

26 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.4, 2018.

27 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 6-3 and Table 6-14, pages 126 and 146, 2018.

(1) Federal

(a) Noise Control Act of 1972

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, USEPA issued guidance levels for the protection of public health and welfare in residential areas of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA.[28] These guidance levels are not standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project. Moreover, the federal noise standards are not reflective of urban environments that range by land use, density, proximity to commercial or industrial centers, etc. As such, for purposes of determining acceptable sound levels to determine and evaluate intrusive noise sources and increases, this document utilizes the City of Los Angeles Noise Regulations, discussed below.

(b) Federal Transit Administration Vibration Standards

There are no federal vibration standards or regulations adopted by any agency that are applicable to evaluating vibration impacts from land use development projects such as the Project. However, the FTA has adopted vibration criteria for use in evaluating vibration impacts from construction activities.[29] The vibration damage criteria adopted by the FTA are shown in **Table IV.H-2, Construction Vibration Damage Criteria.**

Table IV.H-2
Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to groundborne vibration damage	0.12
Source: FTA Transit Noise and Vibration Impact Assessment Manual, 2018.	

The FTA has also adopted standards associated with human annoyance for determining the groundborne vibration and noise impacts from ground-borne noise on the following three off-site land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional.[30] The FTA defines Category 1 as buildings where

28 United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974. https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html. Accessed August 25, 2022.
29 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 7-5, page 186, 2018.
30 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 6-1, page 124, 2018.

vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but that still potentially involve activities that could be disturbed by vibration. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table IV.H-3, Groundborne Vibration and Groundborne Noise Impact Criteria for General Assessment**. No thresholds have been adopted or recommended for commercial or office uses.

Table IV.H-3
Groundborne Vibration and Groundborne Noise Impact Criteria for General Assessment

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

a “Frequent Events” is defined as more than 70 vibration events of the same source per day.
b “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.
c “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.
d This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
Source: FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.

(c) Occupational Safety and Health Act of 1970

Under the Occupational Safety and Health Act of 1970 (29 United State Code (U.S.C.) Sections 1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers’ hearing to detect any degradation.[31]

[31] United States Department of Labor. Occupational Health and Safety Act of 1970. https://www.osha.gov/laws-regs/oshact/completeoshact. Accessed January 14, 2021.

(2) State

(a) Office of Planning and Research Guidelines for Noise Compatible Land Use

The State of California has not adopted Statewide standards for environmental noise, but the Governor's Office of Planning and Research (OPR) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as presented in **Table IV.H-4, Guidelines for Noise Compatible Land Use**.[32] The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise levels are divided into four general categories, which vary in range according to land use type: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." The City has developed its own compatibility guidelines in the Noise Element of the General Plan based in part on OPR Guidelines. California Government Code Section 65302 requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(f) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels. These requirements are collectively known as the California Noise Insulation Standards (Title 24 of the California Code of Regulations [CCR]). The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. The standards require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to exterior noise levels greater than 60 dBA CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

32 State of California, Governor's Office of Planning and Research, General Plan 2017 Guidelines, page 377. http://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf. Accessed January 14, 2021.

Table IV.H-4
Guidelines for Noise Compatible Land Use

Land Use Category	Noise Exposure (L_{dn} or CNEL, dBA): A	C	N	U
Residential – Low Density Single-Family, Duplex, Mobile Home	50–60	55–70	70–75	75–85
Residential – Multi-Family	50–65	60–70	70–75	75–85
Transient Lodging – Motel, Hotel	50–65	60–70	70–80	80–85
School, Library, Church, Hospital, Nursing Home	50–70	60–70	70–80	80–85
Auditorium, Concert Hall, Amphitheater		50–70		65–85
Sports Arena, Outdoor Spectator Sports		50–75		70–85
Playground, Neighborhood Park	50–70		67.5–75	72.5–85
Golf Course, Riding Stable, Water Recreation, Cemetery	50–75		70–80	80–85
Office Building, Business, Commercial, Professional	50–70	67.5–77.5		75–85
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80		75–85

A Normally acceptable. Specified land use is satisfactory, based upon assumption buildings involved are conventional construction, without any special noise insulation.
C Conditionally acceptable. New construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning normally will suffice.
N Normally unacceptable. New construction or development generally should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features included in the design of a project.
U Clearly unacceptable. New construction or development generally should not be undertaken.
Source: State of California, General Plan Guidelines, Governor's Office of Planning and Research, 2003.

(b) Caltrans Vibration/Groundborne Noise Standards

The State of California has not adopted Statewide standards or regulations for evaluating vibration or groundborne noise impacts from land use development projects such as the Project. Although the State has not adopted any vibration standard, Caltrans in its *Transportation and Construction Vibration Guidance Manual* recommends the following vibration thresholds that are more practical than those provided by the FTA. The Caltrans vibration standards are shown in **Table IV.H-5, Guideline Vibration Damage Potential Threshold Criteria**.

Table IV.H-5
Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec) Transient Sources[1]	Maximum PPV (in/sec) Continuous/Frequent Intermittent Sources[2]
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

1 Transient sources create a single, isolated vibration event, such as blasting or drop balls.
2 Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: Caltrans, Transportation and Construction Vibration Guidance Manual, Table 19, April 2020.

(3) Regional

(a) Los Angeles County Airport Land Use Commission Comprehensive Land Use Plan

In Los Angeles County the Regional Planning Commission has the responsibility for acting as the Airport Land Use Commission (ALUC) and for coordinating the airport planning of public agencies within the county. The ALUC coordinates planning for the areas surrounding public use airports. The Comprehensive Land Use Plan provides for the orderly expansion of Los Angeles County's public use airports and the area surrounding them. It is intended to provide for the adoption of land use measures that will minimize the public’s exposure to excessive noise and safety hazards. In formulating the Comprehensive Land Use Plan, the ALUC has established provisions for safety, noise insulation, and the regulation of building height within areas adjacent to each of the public airports in the County.

(4) Local

(a) Los Angeles Municipal Code

The City of Los Angeles Noise Regulations are provided in Chapter XI of the Los Angeles Municipal Code (LAMC). LAMC Section 111.02 provides procedures and criteria for the measurement of the sound level of “offending” noise sources. In accordance with the LAMC, a noise source that causes a noise level increase of 5 dBA over the existing average ambient noise level as measured at an adjacent property line creates a noise violation. This standard applies to radios, television sets, air conditioning, refrigeration, heating, pumping, and filtering equipment, powered equipment intended for repetitive use in residential areas, and motor vehicles driven on-site. To account for people’s increased tolerance for short-duration noise events, the Noise Regulations provide a 5 dBA allowance for a noise source that causes noise lasting more than 5 but less than 15 minutes in any one-hour period, and an additional 5 dBA allowance (for a total of

10 dBA) for a noise source that causes noise lasting 5 minutes or less in any one-hour period.[33] The LAMC provides that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) minimum ambient noise levels as defined in LAMC Section 111.03 should be used. The presumed ambient noise levels for these areas where the actual ambient conditions are not known as set forth in the LAMC Sections 111.03 are provided in **Table IV.H-6, City of Los Angeles Presumed Ambient Noise Levels**. For example, for residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

Table IV.H-6
City of Los Angeles Presumed Ambient Noise Levels

Zone	Daytime Hours (7 A.M. to 10 P.M.) dBA (L_{eq})	Nighttime Hours (10 P.M. to 7 A.M.) dBA (L_{eq})
Residential (A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5)	50	40
Commercial (P, PB, CR, C1, C1.5, C2, C4, C5, and CM)	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65
Source: LAMC, Section 111.03.		

LAMC Section 112.02 limits increases in noise levels from air conditioning, refrigeration, heating, pumping, and filtering equipment. Such equipment may not be operated in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than 5 dB.

LAMC Section 112.05 sets a maximum noise level for construction equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. Compliance with this standard shall not apply where compliance therewith is technically infeasible.[34] LAMC Section 41.40 prohibits construction between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, 6:00 p.m. and 8:00 a.m. on Saturday, and at any time on Sunday (i.e., construction is allowed Monday through Friday between 7:00 a.m. to 9:00 p.m.; and Saturdays and National Holidays between 8:00 a.m. to 6:00 p.m.). In general, the City's Department of Building and Safety enforces Noise Ordinance provisions relative to equipment and the Los Angeles Police Department (LAPD) enforces provisions relative to noise generated by people.

LAMC Section 113.01 prohibits collecting or disposing of rubbish or garbage, operating any refuse disposal truck, or collecting, loading, picking up, transferring, unloading, dumping, discarding, or disposing of any rubbish or garbage, as such terms are defined in LAMC Section 66.00, within 200 feet of any residential building between the hours of 9:00 p.m. and 6:00 a.m. of the following

33 Los Angeles Municipal Code, Chapter XI, Article I, Section 111.02-(b). Accessed August 25, 2022.
34 In accordance with the City's Noise Ordinances, "technically feasible" means that the established noise limitations can be complied with at a project site, with the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques employed during the operation of equipment.

day, unless a permit therefore has been duly obtained beforehand from the Board of Police Commissioners.

Section 91.1207.14.2 prohibits interior noise levels attributable to exterior sources from exceeding 45 dBA in any habitable room. The noise metric shall be either the day-night average sound level (L_{dn}) or the CNEL, consistent with the noise element of the local general plan.

(b) City of Los Angeles General Plan Noise Element

The Noise Element of the City's General Plan policies include the CNEL guidelines for land use compatibility as shown in **Table IV.H-7, Guidelines for Noise Compatible Land Use,** and includes a number of goals, objectives, and policies for land use planning purposes. The overall purpose of the Noise Element is to guide policymakers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels.[35] The following policies and objectives from the Noise Element apply to the Project.

Objective 2 (Non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise sensitive uses.

Policy 2.2: Enforce and/or implement applicable city, state, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.

Objective 3 (Land Use Development): Reduce or eliminate noise impact associated with proposed development of land and changes in land use.

Policy 3.1: Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

Exhibit I of the Noise Element also contains guidelines for noise compatible land uses.[36] The following table summarizes these guidelines, which are based on OPR guidelines from 1990.

35 City of Los Angeles. General Plan, Noise Element adopted February 3, 1999. Pages 1.1-2.4. https://planning.lacity.org/odocument/b49a8631-19b2-4477-8c7f-08b48093cddd/Noise_Element.pdf. Accessed August 25, 2022.

36 City of Los Angeles. General Plan, Noise Element adopted February 3, 1999. Page I-1. https://planning.lacity.org/odocument/b49a8631-19b2-4477-8c7f-08b48093cddd/Noise_Element.pdf. Accessed August 25, 2022.

Table IV.H-7
Guidelines for Noise Compatible Land Use[1]

Land Use Category	Day-Night Average Exterior Sound Level (CNEL dB)						
	50	55	60	65	70	75	80
Residential Single Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential Multi-Family	A	A	C	C	N	U	U
Transient Lodging, Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
Auditorium, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sports Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playground, Neighborhood Park	A	A	A	A/N	N	N/U	U
Golf Course, Riding Stable, Water Recreation, Cemetery	A	A	A	A	N	A/N	U
Office Building, Business, Commercial, Professional	A	A	A	A/C	C	C/N	N
Agriculture, Industrial, Manufacturing, Utilities	A	A	A	A	A/C	C/N	N

A Normally acceptable. Specified land use is satisfactory, based upon assumption buildings involved are conventional construction, without any special noise insulation.
C Conditionally acceptable. New construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning normally will suffice.
N Normally unacceptable. New construction or development generally should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features included in the design of a project.
U Clearly unacceptable. New construction or development generally should not be undertaken.
1 Based on the Governor's Office of Planning and Research, "General Plan Guidelines," 1990. To help guide determination of appropriate land use and mitigation measures vis-à-vis existing or anticipated ambient noise levels.
Source: City of Los Angeles, L.A. CEQA Thresholds Guide, 2006.

c) Existing Conditions

As discussed in **Chapter II, Project Description**, of this Draft EIR, the Project Site is located in the Arts District area of the City and surrounded by a mix of light industrial, commercial, and residential uses. The predominant source of noise in the general vicinity of the Project Site is vehicular traffic on nearby roadways, particularly along 5th Street and Seaton Street, both adjacent to the Project Site and which have high volumes of traffic. Ambient noise sources in the vicinity of the Project Site include traffic; commercial/industrial activities; construction noise from developing properties in the area (haul trucks); and other miscellaneous noise sources associated with typical urban activities (street sweeping).

(1) Noise-Sensitive Receptors

Some land uses are considered more sensitive to intrusive noise than others based on the types of activities typically involved at the receptor location. The *L.A. CEQA Thresholds Guide* states that noise-sensitive land uses (sometimes also called "sensitive receptors") include residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks. In addition, for purposes of this analysis, groundborne vibration-sensitive uses include historical buildings or buildings that are extremely susceptible to groundborne vibration damages, and uses that may be sensitive in terms of human annoyance and operational interference resulting from groundborne vibration. As shown in **Figure IV.H-1, Noise Monitoring and Sensitive Receptor Location Map**, there are existing sensitive receptors within 500 feet that would have a direct line-of-sight to the Project Site, including:

1. Residential uses in the multi-family live/work units (1101-1129 E. 5th Street and 445 S. Colyton Street) located to the north across 5th Street (55 feet);
2. The Arts District Park (501 S. Hewitt Street) located to the east at the southwest corner of the intersection of 5th Street and Hewitt Street (365 feet); and
3. Residential uses in the multi-family buildings located to the east along Hewitt Street (590 feet).

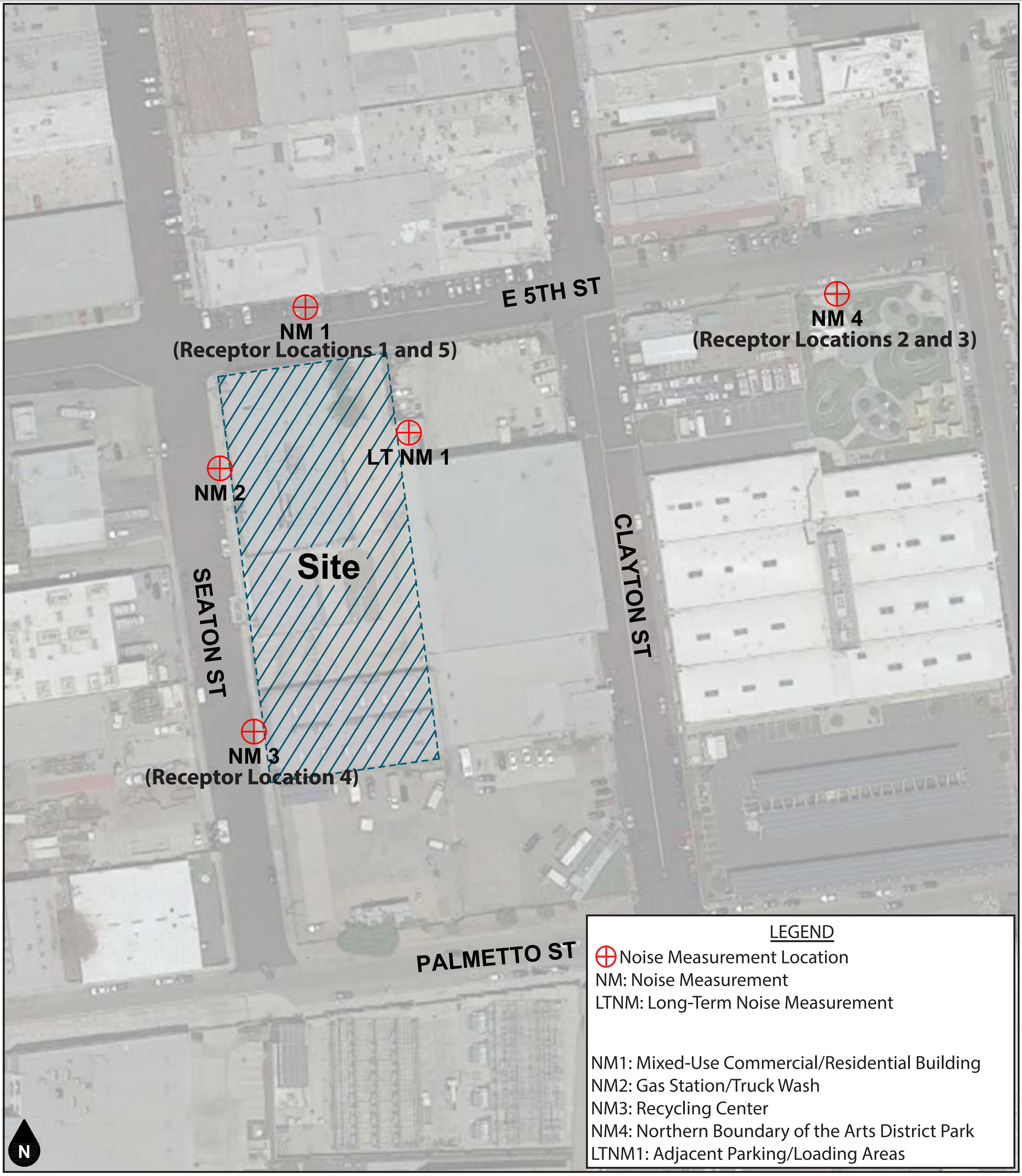
In addition, there are currently proposed land uses that could become sensitive receptors should they be approved for construction, including:

4. Residential uses in a 310-unit, 12-story, mixed-use building (527 S. Colyton Street and 1147 E. Palmetto Street) proposed for the parking area immediately adjacent to the south of the Project Site (20 feet); and
5. Residential uses in a 129-unit, 12-story, mixed-use building (1101-1129 E. 5th Street and 445 S. Colyton Street) proposed for a site located to the north across 5th Street (55 feet).

In the event that construction of proposed Sensitive Receptor Location No. 5 is approved, it would replace Sensitive Receptor No. 1. Sensitive Receptors 1, 4, and 5 are the closest sensitive receptors to the Project Site. The other noise sensitive land uses are located farther from the Project Site (365 to 590 feet) and would therefore experience lower impacts.

(2) Ambient Noise Levels

The Project Site is relatively flat and is developed with 35,445 square feet of warehouse uses and surface parking. To establish baseline noise conditions, existing noise levels were monitored at the mixed-use commercial/residential building located to the north of the Project Site (along 5th Street) (Noise Measurement [NM]1), near the northwestern Project boundary near the gas station/truck wash to the west of the Project Site (along Seaton Street) (NM2), near the southwestern Project boundary near the recycling center to the west of the Project Site (along Seaton Street) (NM3), at the northern boundary of the Arts District Park (along 5th Street) (NM4), and along the eastern project boundary near adjacent parking/loading areas to the east (Long-Term Noise Measurement [LTNM]1). The locations of the noise measurements are shown in **Figure IV.H-1, Noise Monitoring and Sensitive Receptor Location Map**.



Source: Ganddini, April 2019.

Figure IV.H-1
Noise Monitoring and Sensitive Receptor Location Map

An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area, three 15-minute daytime noise measurements were taken between 3:07 PM and 4:15 PM on March 12, 2019 at locations NM1, NM3, and NM4; one one-hour daytime noise measurement was taken between 1:50 PM and 2:50 PM on March 19, 2019 at location NM2; and one 24-hour noise measurement was taken between 6:00 PM on March 12, 2019 and 6:00 PM on March 13, 2019 at location LTNM1. Field worksheets and noise measurement output data are included in Appendix C of the Noise Technical Report included as **Appendix I** to this Draft EIR.

Table IV.H-8, Short-Term Noise Measurement Summary (dBA) provides a summary of the short-term ambient noise data. A summary of the long-term ambient noise data is presented in **Table IV.H-9, Long-Term Noise** Measurement **Summary (dBA)**. Short-term ambient noise levels were measured between 59.5 and 65.5 dBA L_{eq}. Long-term hourly noise measurement ambient noise levels ranged from 54.7 to 64.5 dBA L_{eq}. The dominant noise source in the Project area is vehicle noise from the surrounding roadways (i.e., 5th Street, Seaton Street, Alameda Street, Hewitt Street, etc.), a parked truck with engine running, and a locking car horn alarm.

Table IV.H-8
Short-Term Noise Measurement Summary (dBA) [a,b]

Daytime								
Site Location	**Time Started**	L_{eq}	L_{max}	L_{min}	**L(2)** [c]	**L(8)** [c]	**L(25)** [c]	**L(50)**[c]
NM1	3:07 PM	62.3	74.4	52.9	71.7	65.5	61.3	59.1
NM2[d]	1:50 PM	72.0	101.3	59.1	72.6	68.7	65.8	63.8
NM3	3:42 PM	62.1	77.7	53.0	71.1	66.3	59.7	58.0
NM4	4:05 PM	59.5	81.7	52.8	65.1	62.7	57.9	55.8

*a See **Figure IV.H-1** for noise measurement locations. Each noise measurement was performed over a 15-minute duration unless noted.*
b Noise measurements performed on March 12, 2019 and July 19, 2019.
c A-weighted noise levels at 2 percent, 8 percent, 25 percent, and 50 percent, respectively, of the time period.
d NM2 was one-hour in duration in order to capture truck wash and scale noise levels.
Source: Ganddini Group, Inc. July 2019.

Table IV.H-9
Long-Term Noise Measurement Summary (dBA) [a,b]

24-Hour Ambient Noise								
Hourly Measurements	**Time Started**	**Leq**	**Lmax**	**Lmin**	**L(2)** [c]	**L(8)** [c]	**L(25)** [c]	**L(50)** [c]
Overall Summary	6:00 PM	59.4	90.6	46.0	66.6	62.0	57.7	55.7
1	6:00 PM	59.1	76.8	54.7	65.8	61.8	58.1	57.0
2	7:00 PM	59.2	78.0	53.4	66.9	60.8	57.0	55.9
3	8:00 PM	62.4	86.0	52.4	70.3	62.5	57.5	55.9
4	9:00 PM	63.5	90.6	53.3	68.8	61.6	56.8	55.5
5	10:00 PM	59.5	78.2	53.0	67.9	61.6	56.2	55.4
6	11:00 PM	58.6	83.4	52.0	65.8	58.7	55.8	54.7
7	12:00 AM	56.4	79.4	52.1	61.3	56.8	54.4	53.8
8	1:00 AM	56.2	72.4	49.7	64.3	57.5	54.5	53.2
9	2:00 AM	54.7	66.2	51.7	58.8	57.1	54.5	53.9
10	3:00 AM	55.1	69.9	50.9	60.8	57.5	54.8	53.8
11	4:00 AM	55.2	65.0	51.9	59.5	57.6	55.3	54.3
12	5:00 AM	57.3	70.2	51.9	64.8	59.3	57.0	55.4
13	6:00 AM	58.7	71.5	55.5	64.5	60.6	58.7	57.4
14	7:00 AM	58.6	73.4	53.2	65.3	61.1	58.7	57.0
15	8:00 AM	59.4	76.1	51.3	66.9	63.1	58.7	56.2
16	9:00 AM	59.8	83.5	51.5	65.6	62.3	59.4	55.8
17	10:00 AM	60.1	81.4	52.0	68.1	62.7	59.1	56.4
18	11:00 AM	58.0	75.5	52.7	64.5	60.9	58.0	56.1
19	12:00 PM	64.5	86.1	50.6	69.8	67.1	66.0	61.6
20	1:00 PM	58.7	76.6	47.5	66.2	63.6	57.9	54.9
21	2:00 PM	57.5	73.6	46.0	63.7	60.7	57.7	54.8
22	3:00 PM	59.4	75.8	52.5	67.0	62.7	59.3	56.8
23	4:00 PM	58.3	71.6	51.6	65.1	61.6	58.1	56.4
24	5:00 PM	57.9	70.1	52.6	64.1	61.3	57.8	56.0

*a See **Figure IV.H-1** for noise measurement locations. Noise measurement was performed over a 24-hour duration.*
b Noise measurement performed from March 12, 2019 to March 13, 2019.
c A-weighted noise levels at 2 percent, 8 percent, 25 percent, and 50 percent, respectively, of the time period.
Source: Ganddini Group, Inc, July 2019.

(3) Groundborne Vibration-Sensitive Receptors

Typically, groundborne vibration generated by man-made activities (i.e., rail and roadway traffic, operation of mechanical equipment and typical construction equipment) diminishes rapidly with distance from the groundborne vibration source. Groundborne vibration-sensitive receptors generally include historic buildings, buildings in poor structural condition, and uses that require precision instruments (e.g., hospital operating rooms or scientific research laboratories). The FTA uses a screening distance of 100 feet for highly groundborne vibration-sensitive buildings (e.g., hospitals with groundborne vibration sensitive equipment) and 50 feet for residential uses. There are no highly groundborne vibration-sensitive buildings located within 100 feet of the Project Site. As detailed in **Section IV.C, Cultural Resources**, of this Draft EIR, there is one structure (542 S. Alameda Street) eligible for listing as an historical resource within the vicinity of the Project Site. However, this structure is located approximately 300 feet to the southeast of the Project Site and is, accordingly, outside of the FTA screening distance for highly groundborne vibration-sensitive buildings. However, residential uses in the multi-family live/work units (1101-1129 E. 5th Street and 445 S. Colyton Street) located to the north across 5th Street are located approximately 55 feet from the Project Site. Although this is outside of the FTA's 50-foot residential screening distance, these residential uses are close enough to the screening distance to be conservatively considered groundborne vibration-sensitive receptors by this analysis.

(4) Existing Groundborne Vibration Levels

The main sources of groundborne vibration near the Project Site are heavy-duty vehicle travel (e.g., refuse trucks, delivery trucks, and transit buses) on local roadways. Trucks and buses typically generate groundborne vibration velocity levels of approximately 63 VdB at a distance of 50 feet from the centerline, and these levels could reach up to 75 VdB at a distance of 10 feet from the centerline.[37] Per the FTA, rubbered-tired vehicles rarely create groundborne vibration problems unless there is a discontinuity or bump in the road that causes the groundborne vibration. As noted above, 75 VdB is the dividing line between barely perceptible (with regards to ground groundborne vibration) and distinctly perceptible. Therefore, existing ground groundborne vibration environment in the vicinity of the Project Site is generally below the perceptible level. However, ground groundborne vibration associated with heavy trucks traveling on road surfaces with irregularities, such as speed bumps and potholes, could reach the perceptible threshold. In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a groundborne vibration level of approximately 0.001 inch per second.

3. Project Impacts

a) Thresholds of Significance

In accordance with Appendix G to the State CEQA Guidelines, the Project would have a significant impact on noise if it would cause any of the following conditions to occur:

Threshold (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;***

Threshold (b): ***Generation of excessive groundborne vibration or noise levels; or***

Threshold (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, expose people residing or working in the project area to excessive noise levels.***

37 Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2018, p 137.

For this analysis, the current version of the Appendix G Thresholds listed above are relied upon. The analysis also utilizes factors and considerations identified in the 2006 L.A. CEQA Thresholds Guide, as appropriate, to assist in answering the Appendix G Threshold questions.

As set forth in the *L.A. CEQA Thresholds Guide*, a project would normally have a significant impact on noise levels from construction if:

- *Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use;*
- *Construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use; or*
- *Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, before 8:00 A.M. or after 6:00 P.M. on Saturday, or anytime on Sunday.*[38]

In addition, a project would normally have a significant impact on noise levels from project operations if:

- The Project causes the ambient noise levels measured at the property line of affected uses to increase by 3 dBA CNEL to or within the “normally unacceptable” or “clearly unacceptable” categories; or
- The Project causes the ambient noise levels measured at the property line of affected uses to increase by 5 dBA CNEL or more increase in noise level; or
- Project-related operational on-site (i.e., non-roadway) noise sources such as outdoor building mechanical/electrical equipment, outdoor activities, or parking facilities increase the ambient noise level (Leq) at noise sensitive uses by 5 dBA Leq.

The City currently does not have significance criteria to assess vibration impacts during construction. Thus, FTA guidelines set forth in FTA’s Transit Noise and Vibration Assessment, dated September 2018, are used to evaluate potential impacts related to construction vibration for both potential building damage and human annoyance. The FTA guidelines regarding construction vibration are the most current guidelines and are commonly used in evaluating vibration impacts.

Based on this FTA guidance, impacts relative to ground-borne vibration associated with potential building damage would be considered significant if any of the following future events were to occur:

- Project construction activities cause ground-borne vibration levels to exceed 0.5 PPV at the nearest off-site reinforced-concrete, steel, or timber building.

[38] City of Los Angeles L.A. CEQA Thresholds Guide, 2006, page I.1-3.

- Project construction activities cause ground-borne vibration levels to exceed 0.3 PPV at the nearest off-site engineered concrete and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.2 PPV at the nearest off-site non-engineered timber and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.12 PPV at buildings extremely susceptible to vibration damage, such as historic buildings.

Based on FTA guidance, construction vibration impacts associated with human annoyance would be significant if the following were to occur (applicable to frequent events; 70 or more vibration events per day):

- Project construction activities cause ground-borne vibration levels to exceed 72 VdB at off-site residential and hotel uses

b) Methodology

The noise and groundborne vibration impacts associated with both the Project's and the Increased Commercial Flexibility Option's (Flexibility Option) on-site construction equipment were evaluated in the Noise Analysis provided in **Appendix I** of this Draft EIR. The methodology used in that assessment is incorporated herein. The methodology for evaluating off-site construction noise and groundborne vibration and on-site and off-site operational noise and groundborne vibration is also discussed below and the calculation assumptions and results are also provided in **Appendix I** of this Draft EIR.

(1) On-Site Construction Activities

Construction noise impacts due to on-site construction activities associated with the Project were evaluated by calculating the construction-related noise levels at representative sensitive receptor locations and comparing these estimated construction-related noise levels associated with construction of the Project to the existing ambient noise levels (i.e., noise levels without construction noise from the Project). Construction noise associated with the Project was analyzed based on the Project's potential construction equipment inventory, construction durations, and construction schedule. The construction noise model for the Project is based on construction equipment noise levels as published by the FHWA's 'Roadway Construction Noise Model.[39] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see **Tables IV.H-8** and **IV.H-9** above). The construction noise levels were then calculated for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance (as described above in Subsection 2.a)(1)(a), Fundamentals of Sound and Environmental Noise). Additional noise attenuation was

39 The reference noise levels for construction equipment from the FHWA are based on measurements of newer construction equipment (published in 2006), rather than the noise levels from the Environmental Protection Agency report referenced in the L.A. CEQA Thresholds Guide (published in 1971).

assigned to receptor locations where the line-of-sight to the Project Site was interrupted by the presence of intervening structures.

(2) On-Site Stationary Operational Noise Sources

On-site stationary point-source noise impacts were evaluated by: (1) identifying the noise levels that would be generated by the Project's stationary noise sources, such as rooftop mechanical equipment, outdoor activities (e.g., use of the swimming pool and spa deck), parking facilities, and trash compactor; (2) calculating the noise level from each noise source at surrounding sensitive receptor property line locations; and (3) comparing such noise levels to ambient noise levels to determine significance. The on-site stationary noise sources were calculated using the SoundPLAN (version 8.0) computer noise prediction model.[40] SoundPLAN is widely used by acoustical engineers as a noise modeling tool for environmental noise analysis.

(3) Off-Site Roadway Operational Noise

Operational Off-Site Traffic: Existing and Existing Plus Project noise levels were modeled for roadways affected by project generated trips utilizing the FHWA Traffic Noise Prediction Model FHWA-RD-77-108 in order to quantify the Project's contribution to increases in ambient noise levels.

The FHWA Traffic Noise Prediction Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: total average daily trip (ADT) volumes, roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). Surfaces adjacent to all modeled roadways were assumed to have a "hard site" to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Possible reductions in noise levels due to intervening topography and buildings were not accounted for in this analysis.

Existing and Existing Plus Project ADTs were calculated from the existing and Project traffic volumes and Project trip the Project's Transportation Assessment, included as **Appendix L.1** of this Draft EIR. Existing Plus Project vehicle mixes were calculated by adding the Project trips to existing conditions. FHWA spreadsheets are included in Appendix E of the Noise Analysis, available in **Appendix I** of this Draft EIR.

(4) Construction Groundborne Vibration

Groundborne vibration impacts due to the Project's construction activities were evaluated by identifying potential groundborne vibration sources (i.e., construction equipment), estimating the groundborne vibration levels at the potentially affected receptor, and comparing the Project's activities to the applicable groundborne vibration significance thresholds, as described below.

40 SoundPLAN GmbH, SoundPLAN version 8.0, https://soundplan.com.au/news/soundplannoise-80-released, 2017.

(5) Operational Groundborne Vibration

The primary source of groundborne vibration related to operation of the Project would include vehicle circulation within the proposed subterranean parking garage and off-site vehicular trips. However, as discussed above, vehicular-induced groundborne vibration is unlikely to be perceptible by people. The Project would also include typical commercial-grade stationary mechanical equipment, such as air-condenser units (mounted at the roof level), that would include groundborne vibration-attenuation mounts to reduce the groundborne vibration transmission. The Project does not include land uses that would generate high levels of groundborne vibration. In addition, groundborne vibration attenuates rapidly as a function of distance from the groundborne vibration source.

c) Project Design Features

Construction and operation of the Project would be implemented in accordance with applicable regulatory and code requirements related to noise and groundborne vibration. No specific design elements related to noise or groundborne vibration are included in the Project.

d) Analysis of Project Impacts

The primary sources of noise associated with the Project would be construction activities at the Project Site, Project-related traffic, and new stationary sources such as heating, ventilation, and air conditioning units (HVAC) associated with operation of the Project. The net increase in Project Site noise generated by these activities and other sources has been quantitatively and qualitatively analyzed and compared to applicable noise standards and thresholds of significance.

In addition to noise, groundborne vibration would also be generated during the construction of the Project by various activities and equipment. The groundborne vibration levels generated during construction have also been quantitatively analyzed and compared to the thresholds of significance. Groundborne vibration during operation has also been discussed.

As compared to the Project, the Flexibility Option would change a portion of the use of the second floor from residential to commercial, and would not otherwise change the Project's land uses or size. The overall commercial square footage provided would be increased by 17,765 square feet to 64,313 square feet and, in turn, there would be a reduction in the number of live/work units from 220 to 200 units. The overall building parameters would remain unchanged and the design, configuration, and operation of the Flexibility Option would be comparable to the Project. Furthermore, with regard to construction noise and groundborne vibration, the construction schedule, equipment, distances to sensitive receptors, and haul truck route and intensity proposed for the Project would remain the same under the Flexibility Option. With regard to operational noise, although the Flexibility Option would result in a slight increase in net daily operational trips (2,797 daily weekday trips under the Flexibility Option versus 2,750 daily weekday trips under the Project), the difference would result in approximately 47 additional daily trips under the Flexibility Option, an increase of 1.7 percent. The design of the parking levels and outdoor space and the design, function, and locations of outdoor noise sources would also be similar under the Flexibility Option and the Project, and the Project and the Flexibility Option would have essentially the same ground level operational design features and characteristics, such that there would be no material change to the operational analyses under the Flexibility Option as compared to the Project. Therefore, the conclusions regarding the impact analysis and impact significance determination presented below for the Project would be the same under the Flexibility Option. Further, as discussed below, for certain thresholds, the impacts of the Project were addressed in the Initial Study (see **Appendix A.2** of this Draft EIR) and were determined to be less than significant, with no further analysis required. However, since the Flexibility Option was not specifically addressed in the Initial Study, the analysis of the Flexibility Option is presented in this section for those thresholds.

Threshold (a): Would the project generate 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?

(1) Impact Analysis

(a) Construction

As discussed in Section II, Project Description of this Draft EIR, the Project would be constructed over approximately 24 months. Construction activities would include the demolition of the existing warehouses and surface parking lot and grading, excavation, and building construction. Demolition activities are anticipated to start in 2023, and construction completion and occupancy is anticipated in 2025.

The Project is estimated to require a net export of approximately 81,000 cubic yards of soil, and thus, would require a haul route permit. Exported materials would likely be disposed at Sunshine Canyon Landfill in Sylmar. The anticipated outbound haul route from the Project Site would be west on 5th Street, north on Alameda Street, and east on 4th Street to the Golden State Freeway (I-5) northbound on-ramp. The anticipated inbound haul route to the Project Site would be from the I-5 south to the I-10 west, exiting on Exit 15B for Alameda Street, merging onto 14th Street, heading north on Alameda Street, and east on 5th Street. The anticipated inbound and outbound haul route for the Project is shown on **Figure II-29, Anticipated Haul Route**.

(i) On-Site Construction Noise

Noise impacts from Project-related construction activities occurring within or adjacent to the Project Site would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Construction and demolition noise will vary depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work. The FHWA Roadway Construction Noise Model has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities. The data pertaining to the types of construction equipment and activities that would occur at the Project Site are presented in **Table IV.H-10, Noise Range of Project Construction Equipment**.

Table IV.H-10
Noise Range of Project Construction Equipment

Equipment	Estimated Usage Factor (%) [a]	Typical Noise Level at 50 Feet (dBA Lmax)
Air Compressor	40	78
Backhoe	40	78
Concrete Saw	20	90
Crane	16	81
Dozer	40	82
Excavator	40	81
Forklift [b,c]	50	61
Haul/Dump Truck	40	76
Tractor	40	84
Welders	40	74

a Usage factor represents the percentage of time the equipment would be operating at full speed.
b Warehouse & Forklift Noise Exposure - NoiseTesting.info Carl Stautins, November 4, 2014.
c Data provided L_{eq} as measured at the operator. Sound Level at 50 feet is estimated.
Source: FHWA Roadway Construction Noise Model User's Guide, 2006 unless otherwise noted.

Construction activities for the Project would generally include demolition, site grading and excavation for the subterranean parking garage, and building construction. Each stage of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Demolition generally involves the use of backhoes, front-end loaders, and heavy-duty trucks. Grading and excavation typically require the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of cranes, forklifts, concrete trucks, pumps, and delivery trucks. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Project Site. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings.

Construction noise associated with the Project was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to the closest sensitive receptor, equipment usage, percent usage factor, and baseline parameters for the Project Site. Distances to receptors were based on the acoustical center of the proposed construction activity. Construction noise levels were calculated for each phase.

The nearest sensitive receptor located north or south from the Project Site is the residential uses in the multi-family live/work units (1101-1129 E. 5th Street and 445 S. Colyton Street) located to the north across 5th Street (Sensitive Receptor 1), which corresponds to monitoring location NM1 as shown in **Figure IV.H-1** above**.** The nearest sensitive receptor located east or west from the Project Site is the Arts District Park (501 S. Hewitt Street) located to the east at the southwest corner of the intersection of 5th Street and Hewitt Street (Sensitive Receptor 2), which corresponds to monitoring location NM4 as shown in **Figure IV.H-1** above**.** The measured ambient noise levels at these locations were 62.3 dBA and 59.5 dBA, respectively (see **Table IV.H-8** above).

Anticipated noise levels during each construction phase are presented in **Table IV.H-11, Construction Noise by Phase - Receptors North and South of the Project Site** and **Table IV.H-12, Construction Noise by Phase - Receptors East of the Project Site**. The Worksheets are included as Appendix D of the Noise Technical Report included as Appendix I to this Draft EIR.

Table IV.H-11
Construction Noise by Phase - Receptors North and South of the Project Site

Equipment Item	# of Items	Item Lmax at 50 feet, dBA [a,b]	Distance to Receptor [c]	Item Usage Percent	Receptor Item Leq, dBA
Demolition					
Concrete /Industrial Saw	1	76	55	20	68.2
Rubber Tired Dozers	1	85	55	40	80.2
Tractors/Loaders/Backhoes	3	80	55	40	80.0
					83.2
Site Preparation					
Tractors/Loaders/Backhoes	1	80	55	40	75.2
					75.2
Grading					
Graders	1	85	55	40	80.2
Rubber Tired Dozers	1	85	55	40	80.2
Tractors/Loaders/Backhoes	1	80	55	40	75.2
					83.8
Building Construction					
Cranes	1	83	55	16	74.2
Forklifts	2	64	55	50	63.2
Generator Sets	1	82	55	40	77.2
Welders	3	64	55	40	64.0
Tractors/Loaders/Backhoes	1	80	55	40	75.2
					77.9
Architectural Coating					
Air Compressors	1	80	238	40	75.2
					75.2

a Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).
b Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtw_KO977Em1A
c Sensitive Receptor 1 (residential uses in the multi-family live/work units (1101-1129 E. 5th Street and 445 S. Colyton Street). Distance to receptor calculated from southern edge of site. Construction noise projected from the edge of the Project Site to nearest sensitive use (structure).
Source: Ganddini Group, 2022.

Table IV.H-12
Construction Noise by Phase - Receptors East of the Project Site

Equipment Item	# of Items	Item Lmax at 50 feet, dBA [a,b]	Distance to Receptor [c]	Item Usage Percent	Receptor Item Leq, dBA
Demolition					
Concrete/Industrial Saw	1	76	365	20	51.7
Rubber Tired Dozers	1	85	365	40	63.8
Tractors/Loaders/Backhoes	3	80	365	40	63.5
					66.8
Site Preparation					
Tractors/Loaders/Backhoes	1	80	365	40	58.8
					58.8
Grading					
Graders	1	85	365	40	63.8
Rubber Tired Dozers	1	85	365	40	63.9
Tractors/Loaders/Backhoes	1	80	365	40	58.8
					67.4
Building Construction					
Cranes	1	83	365	16	57.8
Forklifts	2	64	365	50	46.7
Generator Sets	1	82	365	40	60.8
Welders	3	64	365	40	47.5
Tractors/Loaders/Backhoes	1	80	365	40	58.8
					61.5
Architectural Coating					
Air Compressors	1	80	365	40	58.8
					58.8

a Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).
b Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtwKO977Em1A
c Sensitive Receptor 2 (Arts District Park). Distance to receptor calculated from eastern edge of site. Construction noise projected from the edge of the Project Site to nearest sensitive use.
Source: Ganddini Group, 2022

As defined in the *L.A. CEQA Thresholds Guide,* since construction activities would occur over a period of longer than 10 days for all phases combined, a project would normally have a significant impact on noise levels from construction if construction-related noise exceeds the ambient Leq noise level of 5 dBA at a noise-sensitive use.

Project construction noise at adjacent/nearby sensitive receptors presented by construction phase is shown in **Tables IV.H-11 and IV.H-12**. Construction noise levels at sensitive receptors located north and south of the Project Site may reach up to 83.8 dBA L_{eq} and construction noise at sensitive receptors located east of the Project Site may reach up to 67.4 dBA. The noise levels experienced at Receptor Location 1, north of the Project Site, would represent an increase over ambient noise levels (62.3 dBA) of greater than 5dBA that would result from construction activities lasting more than 10 days in a three-month period. Moreover, Receptor Locations 4 (potential future residential uses at 527 S. Coylton Street and 1147 E. Palmetto Street) and 5 (potential future residential uses at 1101-1129 E. 5th Street and 445 S. Coylton Street) would experience similar increases in noise levels, should these uses be constructed and occupied before Project construction occurs. Receptor Location 5 would replace the existing building at Receptor Location 1. Receptor Location 4 is located to the south of the Project Site, which corresponds to monitoring location NM3 as shown in **Figure IV.H-1** above, and has an ambient noise level of 62.1 dBA. Additionally, the noise levels experienced at Receptor Location 2, east of the Project Site, would represent an increase over ambient noise levels (59.5 dBA) of greater than 5dBA. Receptor Location 3 is located approximately 200 feet east of Receptor Location 2 and would experience lower levels of construction noise from the Project and the resulting noise level increase would not be greater than 5 dBA. Impacts at Receptor Location 3 would be less than significant. **As such, the Project's and the Flexibility Option's temporary noise impacts related to on-site construction activities would be significant without mitigation measures at Sensitive Receptor Locations 1, 2, 4 and 5. Mitigation Measure MM NOI-1 is required as listed below.**

(ii) Off-Site Construction Noise

In addition to on-site construction activities, the Project would also generate off-site construction activities and noise during the demolition and grading phases in the form of haul trips. The Project would demolish 35,445 SF of existing warehouse which will require a total of 161 haul trips (approximately 4 trips per day) to transport the debris over the demolition duration of 47 days. The Project will also export a total of 81,000 cubic yards of material over the grading duration of 12 days, which would generate a total of 380 haul truck trips (approximately 32 trips per day) travelling to and from the Project Site. The anticipated outbound haul route from the Project Site would be west on 5th Street, north on Alameda Street, and east on 4th Street to the Golden State Freeway (I-5) northbound on-ramp. The anticipated inbound haul route to the Project Site would be from the I-5 south to the I-10 west, exiting on Exit 15B for Alameda Street, merging onto 14th Street, heading north on Alameda Street, and east on 5th Street. Exported materials would likely be disposed at Sunshine Canyon Landfill in Sylmar. Building frontages along the haul route are located at least 40 feet from the roadway center line. Moreover, mixed use and commercial receptors are located along the anticipated haul route. As shown in **Table IV.H-10** above, typical noise from haul trucks driving by can reach up to 76 dBA Lmax at a distance of 50 feet. At a distance of 30 feet, the instantaneous noise level generated by a haul truck would be approximately 79 dBA.

As shown in **Table IV.H-9**, the existing daytime maximum noise level on 5th Street is 81.7 dBA Lmax and the existing daytime maximum noise level on Seaton Street is 77.7 to 101.3 dBA Lmax. Therefore, the noise level of a Project haul truck passing by would be lower than the existing ambient noise levels at receptor locations along haul route roadway segments.

As such, Project and Flexibility Option noise impacts from off-site construction activities would be less than significant and no mitigation measures would be required.

(b) Operation

This section provides a discussion of potential operational noise impacts on nearby noise-sensitive receptors. Specific operational noise sources addressed herein include: on-site operational noise sources, and off-site mobile (roadway traffic) noise sources.

(i) On-Site Operational Noise

a. Parking Noise

The proposed parking areas have the potential to generate noise due to cars entering and exiting, engines accelerating, braking, car alarms, squealing tires, and other general activities associated with people using the parking areas (i.e., talking, opening/closing doors, etc.). Noise levels within the parking areas would fluctuate with the amount of automobile and human activity. Activity levels would be highest in the early morning and evening when the largest number of people would enter and exit. However, these events would occur at low exiting and entering speeds, which would not generate high noise levels. During these times, the noise levels would range from 60 to 70 dBA Leq. As the parking area would be subterranean and fully enclosed on all sides except the driveway areas, noise generated from within the parking area would not adversely affect off-site sensitive receptors. Furthermore, operational noise generated by motor vehicles within the Project Site is regulated under the LAMC. Specifically, Section 114.02 of the LAMC prohibits the operation of any motor vehicles upon any property within the City such that the created noise would cause the noise level on the premises of the property to exceed the ambient noise level by more than five decibels. LAMC Section 114.06 prohibits any person to install, operate or use any vehicle theft alarm system that emits or causes the emission of an audible sound, which is not, or does not become, automatically and completely silenced within five minutes. LAMC Section 114.03 prohibits loading or unloading of any vehicle, operating any dollies, carts, forklifts, or other wheeled equipment, which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building between the hours of 10:00 P.M. and 7:00 A.M. of the following day. As noted above, the proposed parking would be contained within a fully enclosed subterranean parking structure, which would further serve to reduce any parking related noise levels at off-site locations. **Therefore, through undergrounding of parking and compliance with existing LAMC regulations, noise impacts associated with parking would be less than significant and no mitigation measures are required.**

b. Stationary Noise Sources

As part of the Project, new mechanical equipment, HVAC units, and exhaust fans would be installed for the proposed uses. Although the operation of this equipment would generate noise, the design of all mechanical equipment would be required to comply with the regulations under Section 112.02 of the LAMC, which prohibits noise from air conditioning, refrigeration, heating, pumping, and filtering equipment from exceeding the ambient noise level on the premises of other occupied properties by more than 5 decibels. In addition, nighttime noise limits would apply to any equipment required to operate between the hours of 10:00 P.M. and 7:00 A.M (e.g., HVAC units, exhaust fans, refrigeration, heating, pumping, and filtering equipment, etc.). **With compliance with LAMC Section 112.02, impacts related to stationary noise sources would be less than significant and no mitigation measures are required.**

c. Operational Noise on Sensitive Receptors

Mixed use developments tend to have noise/land use conflicts associated with mechanical equipment, early morning delivery noise, loading and unloading of delivery vehicles, heavy truck backup beepers, and refrigeration equipment. Other noise sources may include:

- Noise from gas powered leaf blowers, especially when operated in the early morning
- Back up beepers on delivery trucks and garbage trucks
- Automobile car alarms
- Idling cars/trucks, trucks, doors closing, and starting engine noise
- Loud activities (i.e., loud music, banging, etc. associated with retail uses).
- Exterior restaurant/bar patron conversations that occur on outdoor patios.

As discussed in Section II, Project Description, of this Draft EIR, the Project would include outdoor spaces including a plaza at Level 1 and an outdoor lounge on Level 2. Both of these spaces are internal to the Project building as they are located on the east side of the Project and surrounded by the walls of the Project building. Noise sources associated with outdoor uses typically include noise from people gathering and conversing. For this operational noise analysis, reference noise levels of 65 dBA for a male and 62 dBA for a female speaking in a raised voice were used for analyzing potential noise impacts from people gathering at the outdoor spaces. In order to analyze a typical noise scenario, it was assumed that up to 50 percent of the people (half of which would be male and the other half female) would be talking at the same time. In addition, the hours of operation for use of the outdoor areas were assumed to be from 7:00 A. M. to 2:00 A. M. Because these areas are located approximately 100 feet from the nearest sensitive receptor (Receptor 1), the resulting noise level would be reduced to at least 59 dBA, which would be below the measured ambient of 62.1 dBA at this location. This assessment conservatively does not take into account that both outdoor spaces would be surrounded by the Project building. As such, noise impacts from the use of the outdoor spaces would be less than significant

The Project will be required to comply with Section 113.01 of the City's Municipal Code which prohibits the operation of any refuse disposal truck, parking lot sweeper, or vacuum truck within 200 feet of any residential building between the hours of 9:00 PM and 6:00 AM of the following day, unless a permit therefore has been duly obtained beforehand from the Board of Police Commissioners.

The Project will also be required to comply with Section 114.03 of the Municipal Code which prohibits loading or unloading any vehicle and operation of any dollies, carts, forklifts, or other wheeled equipment which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building between the hours of 10:00 PM and 7:00 AM of the following day.

Further, as per Title 24 California Building Code the project must comply with Section 1207 of the California Building Code (CBC) noise insulation standards. The following outlines the minimum building requirements for multi-family attached residential dwelling units as it relates to noise isolation for common separating assemblies:

1. Walls, partitions, and floor/ceiling assembly designs must provide a minimum STC of 50, based on lab tests. Field tested assemblies must provide a minimum noise isolation class (NIC) of 45.
2. Floor/ceiling assembly designs must provide for a minimum impact insulation class (IIC) of 50, based on lab tests. Field tested assemblies must provide a minimum FIIC of 45.
3. Penetrations or openings in sound rated assemblies must be sealed, lined, insulated, or otherwise treated to maintain required ratings.
4. Interior noise levels due to exterior sources must not exceed a community noise equivalent level (CNEL) or a day-night level (LDN) of 45 dBA in any habitable room.

Thus, the design of partition walls and floor/ceiling assemblies for multi-family attached residential dwelling units must be based on laboratory tested assemblies which test at a sound transmission class of 50 STC, or better. **Through compliance with existing LAMC and Title 24 regulations, noise impacts associated with Project operations would be less than significant and no mitigation measures are required.**

(ii) Off-Site Traffic Noise

As detailed in **Section IV.K, Transportation**, of this Draft EIR, the Project with incorporation of the Transportation Demand Management (TDM), is projected to generate a net total of 2,750 vehicle trips per day and the Flexibility Option, with incorporation of the TDM, is projected to generate a net total of 2,797 vehicle trips per day, an increase of less than two percent. Since a doubling of traffic is required to produce an audible (i.e., 3 dBA) increase in traffic noise levels,[41] a two percent increase in traffic would not be expected to result in an audible increase in noise and the additional vehicle trips associated with the Flexibility Option would result in a negligible increase in traffic noise compared to the Project. Therefore, the below analysis was completed through the use of the vehicular volumes supplied in **Section IV.K, Transportation**, for the Project and represents the anticipated noise level impacts from both the Project and the Flexibility Option.

Existing and project generated trips noise levels were modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 at the right-of-way of each analyzed roadway. The FHWA worksheets are included in Appendix E of the Noise Technical Report included as Appendix G to this Draft EIR. The modeling does not account for any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in with and without Project conditions. Roadway input parameters including average daily traffic volumes (ADTs), speeds, and vehicle distribution data are shown in **Table IV.H-13, Project Average Daily Traffic Volumes and Roadway Parameters**. The potential off-site noise impacts caused by an increase of traffic

41 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, page 210.

volumes from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

Existing Year (Without project): This scenario refers to existing year traffic noise conditions and is demonstrated in **Table IV.H-14, Change in Existing Noise Levels Along Roadways as a Result of Project**.

Existing Year (With project): This scenario refers to existing year plus project traffic noise conditions and is demonstrated in **Table IV.H-14**.

As shown in **Table IV.H-14**, the modeled Existing traffic noise levels range from 61.7 to 74.7 dBA CNEL and the modeled Existing Plus Project. Traffic noise levels range from 61.8 to 74.8 dBA CNEL at the right-of-way of each modeled road segment.

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Table IV.H-13
Project Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volume [a]		Posted Travel Speeds (MPH)	Site Conditions
		Existing	Existing Plus Project		
2nd Street	West of Alameda Street	8,300	8,400	25	Hard
3rd Street/4th Place/4th Street	West of Central Avenue	14,500	14,600	25	Hard
	Central Avenue to Alameda Street	13,100	13,200	25	Hard
	East of Alameda Street	6,800	6,900	25	Hard
	West of Merrick Street	22,100	22,300	25	Hard
	East of Merrick Street	22,100	22,300	25	Hard
4th Street	West of Central Avenue	16,900	17,000	35	Hard
	Central Avenue to Alameda Street	18,700	18,900	35	Hard
	Alameda Street to Seaton Street [2]	5,900	6,000	35	Hard
	Seaton Street to 4th Place/4th Street [2]	5,900	6,100	35	Hard
5th Street [b]	Alameda Street to Seaton Street	5,900	6,900	25	Hard
Palmetto Street [b]	Alameda Street to Seaton Street	5,600	6,800	25	Hard
	Seaton Street to Mateo Street	5,600	5,700	25	Hard
6th Street	West of Central Avenue	11,800	11,900	35	Hard
	Central Avenue to Alameda Street	14,500	14,700	35	Hard
	Alameda Street to Mateo Street	12,600	12,800	35	Hard
	East of Mateo Street	11,000	11,200	35	Hard
7th Street	West of Central Avenue	15,800	15,900	35	Hard
	Central Avenue to Alameda Street	16,300	16,600	35	Hard
	Alameda Street to Mateo Street	16,200	16,300	35	Hard
	East of Mateo Street	14,000	14,100	35	Hard
Central Avenue	North of 3rd Street	13,100	13,200	35	Hard
	3rd Street to 4th Street	15,000	15,100	35	Hard
	6th Street to 7th Street	16,300	16,400	35	Hard
	South of 7th Street	17,400	17,600	35	Hard
Alameda Street	North of 2nd Street	19,700	20,100	35	Hard
	2nd Street to 3rd Street/4th Place	20,100	20,500	35	Hard
	3rd Street/4th Place to 4th Street	21,500	22,200	35	Hard
	South of 4th Street	18,100	18,900	35	Hard
	North of 6th Street	18,800	19,900	35	Hard
	6th Street to 7th Street	18,600	19,300	35	Hard
	South of 7th Street	19,100	19,400	35	Hard
Seaton Street [b]	4th Street to 5th Street	5,600	5,800	25	Hard
	5th Street to Palmetto Street	5,600	6,900	25	Hard

Table IV.H-13
Project Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volume [a] Existing	Average Daily Traffic Volume [a] Existing Plus Project	Posted Travel Speeds (MPH)	Site Conditions
Mateo Street	North of 6th Street	4,100	4,200	25	Hard
	6th Street to 7th Street	4,600	4,700	25	Hard
	South of 7th Street	5,600	5,700	25	Hard

Vehicle Distribution (Light Mix) [c]			
Motor-Vehicle Type	**Daytime % (7 AM - 7 PM)**	**Evening % (7 PM - 10 PM)**	**Night % (10 PM - 7 AM)**
Automobiles	75.56	13.96	10.49
Medium Trucks	48.91	2.17	48.91
Heavy Trucks	47.30	5.41	47.30

Vehicle Distribution (Heavy Mix) [c]			
Motor-Vehicle Type	**Daytime % (7 AM - 7 PM)**	**Evening % (7 PM - 10 PM)**	**Night % (10 PM - 7 AM)**
Automobiles	75.54	14.02	10.43
Medium Trucks	48.00	2.00	50.00
Heavy Trucks	48.00	2.00	50.00

a *Existing and project average daily traffic volumes calculated from the traffic volumes obtained from the 1100 East 5th Street Traffic Impact Study, Linscott Law & Greenspan Engineers (April 2019).*

b *Existing average daily traffic volumes calculated per the measured ambient noise levels and project average daily traffic volumes calculated per the project trip distribution obtained from the 1100 East 5th Street Traffic Impact Study, Linscott, Law, & Greenspan Engineers (April 2019.*

c *Existing vehicle percentages are based on the Riverside County Industrial Hygiene Letter for Traffic Noise.*

Source: Ganddini Group, Inc. April 2019.

Table IV.H-14
Change in Existing Noise Levels Along Roadways as a Result of Project (dBA CNEL) [a]

Roadway	Segment	Distance from roadway centerline to right-of-way (feet) [b]	Modeled Noise Levels (dBA CNEL)			
			Existing Without Project at right-of-way	Existing Plus Project at right-of-way	Change in Noise Level	Increase of 3 dB or More[c]
2nd Street	West of Alameda Street	33	65.1	65.1	0.0	No
3rd Street/4th Place/4th Street	West of Central Avenue	43	66.4	66.4	0.0	No
	Central Avenue to Alameda Street	43	65.9	66.0	0.1	No
	East of Alameda Street	43	63.1	63.1	0.0	No
	West of Merrick Street	43	68.2	68.2	0.0	No
	East of Merrick Street	43	68.2	68.2	0.0	No
4th Street	West of Central Avenue	43	69.8	69.9	0.1	No
	Central Avenue to Alameda Street	43	70.3	70.3	0.0	No
	Alameda Street to Seaton Street	36	66.0	66.1	0.1	No
	Seaton Street to 4th Place/4th Street	36	66.0	66.2	0.2	No
5th Street	Alameda Street to Seaton Street	33	63.6	64.3	0.7	No
Palmetto Street	Alameda Street to Seaton Street	33	63.4	64.2	0.8	No
	Seaton Street to Mateo Street	33	63.4	63.5	0.1	No
6th Street	West of Central Avenue	43	68.3	68.3	0.0	No
	Central Avenue to Alameda Street	43	69.2	69.2	0.0	No
	Alameda Street to Mateo Street	43	68.6	68.6	0.0	No
	East of Mateo Street	43	68.0	68.0	0.0	No
7th Street	West of Central Avenue	43	69.5	69.6	0.1	No
	Central Avenue to Alameda Street	43	69.7	69.7	0.0	No
	Alameda Street to Mateo Street	43	69.6	69.7	0.1	No
	East of Mateo Street	43	69.0	69.0	0.0	No
Central Avenue	North of 3rd Street	50	72.5	72.6	0.1	No
	3rd Street to 4th Street	50	73.1	73.2	0.1	No
	6th Street to 7th Street	50	73.5	73.5	0.0	No
	South of 7th Street	50	73.8	73.8	0.0	No
Alameda Street	North of 2nd Street	50	74.3	74.4	0.1	No
	2nd Street to 3rd Street/4th Place	50	74.4	74.5	0.1	No

Table IV.H-14
Change in Existing Noise Levels Along Roadways as a Result of Project (dBA CNEL) [a]

Roadway	Segment	Distance from roadway centerline to right-of-way (feet) [b]	Modeled Noise Levels (dBA CNEL)			
			Existing Without Project at right-of-way	Existing Plus Project at right-of-way	Change in Noise Level	Increase of 3 dB or More[c]
	3rd Street/4th Place to 4th Street	50	74.7	74.8	0.1	No
	South of 4th Street	50	74.0	74.1	0.1	No
	North of 6th Street	50	74.1	74.4	0.3	No
	6th Street to 7th Street	50	74.1	74.2	0.1	No
	South of 7th Street	50	74.2	74.3	0.1	No
Seaton Street	4th Street to 5th Street	33	63.4	63.5	0.1	No
	5th Street to Palmetto Street	33	63.4	64.3	0.9	No
Mateo Street	North of 6th Street	36	61.7	61.8	0.1	No
	6th Street to 7th Street	36	62.2	62.2	0.0	No
	South of 7th Street	36	63.0	63.1	0.1	No

a Exterior noise levels calculated 5-feet above pad elevation, perpendicular to subject roadway.
b Right-of-way per the City of Los Angeles Mobility Plan 2035 (September 2016).
c Resulting noise levels on Central Avenue and Alameda Street exceed the California Department of Health Services (DHS) normally unacceptable standard of 70 dBA CNEL for multi-family residential uses (see Table IV.H-7), therefore the more conservative threshold of a 3-dBA increase as a result of the Project was used for all roadway segments.
Source: Ganddini Group, Inc., April 2019.

As defined in the *L.A. CEQA Thresholds Guide,* a project would normally have a significant impact on noise levels from operations if the ambient noise level measured at the property line of affected uses were to increase by 3 dBA in CNEL to within the “normally unacceptable” or "clearly unacceptable” category (as shown in **Table IV.H-7**), or any 5 dBA or greater noise increase.

As shown in **Table IV.H-14**, **Change in Existing Noise Levels Along Roadways as a Result of Project**, the addition of the Project generated vehicular trips along affected roadway segments will result in nominal increases in ambient noise levels (between 0.0 to 0.9 dB) over the Existing Without Project scenario and would not exceed the City of Los Angeles CEQA Threshold presented above. **Therefore, traffic noise impacts for all scenarios would be less than significant and no mitigation measures are required.**

(2) Mitigation Measures

Under both the Project and the Flexibility Option, impacts related to construction noise would require the following mitigation measure:

MM NOI-1 During all Project Site demolition and excavation/grading, construction contractors shall install a temporary, continuous and impermeable sound barrier along the perimeter along the north and east boundaries of the Project Site. The barrier shall also be provided along the southern boundary of the Project Site in the event that the potential residential uses at 527 S. Coylton Street and 1147 E. Palmetto Street are constructed and occupied at the time of Project construction. The barrier shall be at least 8 feet in height and constructed of materials achieving a Transmission Loss (TL) value of at least 10 dBA, such as ½ inch plywood.[42] The supporting structure shall be engineered and erected according to applicable codes. At plan check, building plans shall include documentation prepared by a noise consultant verifying compliance with this measure.

(3) Level of Significance After Mitigation

With the implementation of MM NOI-1, construction noise levels at the significantly impacted Receptor Locations 1, 2, 4 and 5 would be reduced by at least 10 dBA at the ground level. The maximum attenuated noise level at Receptor Location 1 of 73.8 dBA would be approximately 11.5 dBA above the ambient noise level of 62.3 dBA. The maximum, attenuated noise level at Receptor Location 2 of 57.4 dBA would be below the ambient noise level of 59.5 dBA. Therefore, MM NOI-1 would reduce the increase in noise levels at Location 2 below the impact threshold of an increase over ambient noise levels of greater than 5 dBA that would result from construction activities lasting more than 10 days in a three-month period. Accordingly, construction noise levels during the noisiest phase of construction (paving and concrete) under both the Project and the Flexibility Option at its nearest point would be reduced to less than significant levels at Receptor Location 2. Because Receptor Location 2 is a park located entirely at ground level, MM

[42] Based on the FHWA Noise Barrier Design Handbook (July 14, 2011), see Table 3, Approximate sound transmission loss values for common materials. Plywood (0.5”) has a transmission loss of 20 dBA.

NOI-1 would reduce the impact at Receptor Location 2 to less than significant. Construction noise levels at the ground level during the noisiest phase of construction (paving and concrete) under both the Project and the Flexibility Option at the nearest point to Receptor Location 1 would still exceed the significance threshold after implementation of MM-NOI-1.

Moreover, the temporary noise barrier would only be effective at the ground level of the Receptor Locations because the barriers would only block the line of sight to these receptors. Receptor Location 1 presently contains a two-story building, and Receptor Locations 4 and 5 would consist of 12-story buildings in the event these buildings are built and occupied at the time of Project construction. Other residential uses in the area of the Project are also contained in multi-story high-rise buildings. The line of sight from the upper floors at these receptors to the Project Site would remain unobstructed because it is not feasible to construct temporary noise barriers that would extend to the height of the buildings at these receptor locations. Thus, the construction-related noise levels at the above-ground levels of Receptor Location 1, and potentially at Receptor Locations 4 and 5 would still exceed the significance thresholds.

Accordingly, temporary construction noise impacts under the Project and Flexibility Option associated with on-site noise sources would be less than significant after mitigation at Receptor Location 2 and would be significant and unavoidable at Receptor Location 1, and at Receptor Locations 4 and 5 in the event that these projects are built and occupied at the time of Project construction.

Threshold (b): Would the project generate excessive groundborne vibration or groundborne noise levels?

(a) Project Construction

(i) Structural Damage

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

Construction of the Project would generate groundborne vibration during site clearing, grading, and shoring activities. The PPV for the construction equipment anticipated to be used during Project construction are listed in **Table IV.H-15, Typical Groundborne Vibration Levels for Potential Project Construction Equipment (PPV)**.

Table IV.H-15
Groundborne Vibration Source Levels for Construction Equipment (PPV)

Equipment	Approximate PPV (in/sec)				Significance Threshold	Significant Impact?
	25 Feet	50 Feet	75 Feet	100 Feet		
Large Bulldozer	0.089	0.031	0.017	0.011	0.12 in/sec PPV	No
Caisson Drilling	0.089	0.031	0.017	0.011		No
Loaded Trucks	0.076	0.027	0.015	0.010		No
Jackhammer	0.035	0.012	0.007	0.004		No
Small Bulldozer	0.003	0.001	0.0006	0.0004		No

Note: in/sec = inches per second.
Source: FTA, Transit Noise and Vibration Impact Assessment, 2018. Derived from Equation 12.

Per the FTA's damage criteria previously presented in **Table IV.H-2**, buildings considered to be the most susceptible to groundborne vibration-related damage (Category IV buildings) could undergo damage should they experience construction groundborne vibration at a level of 0.12 inches per second PPV. The nearest Category IV building to the Project Site is the 542 S. Alameda Street building, which, as detailed in **Section IV.C, Cultural Resources**, of this Draft EIR, has been evaluated as eligible for listing as a historical resource and is located approximately 300 feet southwest from the Project Site. As shown in **Table IV.H-15**, the highest groundborne vibration levels that would be anticipated during construction of the Project would be 0.089 inches per second PPV at a distance of 25 feet. Therefore, construction of the Project would not be capable of producing groundborne vibration that would result in damage to even the most groundborne vibration-sensitive buildings at a distance of 25 feet or greater, and accordingly, would not be capable of producing groundborne vibration that would result in damage to the 542 S. Alameda Street building located 300 feet away.

Furthermore, the nearest non-Category IV sensitive receptor for groundborne vibration damage, the residential uses in the multi-family live/work units (1101-1129 E. 5th Street and 445 S. Colyton Street) to the north across 5th Street is located approximately 55 feet from the Project Site. While the specific construction materials of this structure are not known, as shown in **Table IV.H-15** above, worst-case construction groundborne vibration levels at sensitive receptors located 50 feet or further would be 0.031 inches per second PPV. Accordingly, groundborne vibration associated with Project construction activities would not have the potential to exceed the FTA's 0.12 inches per second PPV standard for Category IV buildings, 0.20 inches per second PPV standard for Category III buildings, 0.30 inches per second PPV standard for Category II buildings, or 0.50 inches per second PPV standard for Category I buildings at the location of this receptor. As such, no damage from groundborne vibration would occur as a result of Project construction.

In addition, the Project would be subject to compliance with Section 91.3307 of the LAMC (Protection of Adjoining Property). Specifically, Section 91.3307.1 (Protection Required) states adjoining public and private property shall be protected from damage during construction, remodeling, and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights, and roofs. For excavations, adjacent property shall be protected as set forth in Section 832 of the Civil Code of California. Prior to the issuance of any permit, which authorizes an excavation where the excavation is to be of a greater depth than are the walls or foundation of any adjoining building or structure and located closer to the property line than the depth of the excavation, the owner of the site shall provide the Department of Building and Safety with evidence that the adjacent property owner or owners have been given a 30-day written notice of the intent to excavate. This notice shall state the depth to which the excavation is intended to be made and when the excavation will commence.

Therefore, impacts with respect to potential building damage resulting from construction-generated groundborne vibration under the Project and the Flexibility Option would be less than significant.

(ii) Human Annoyance

During construction, the sensitive receptors near the Project Site could be exposed to increased groundborne vibration levels with the potential to result in human annoyance. The nearest existing sensitive receptors for groundborne vibration annoyance are: Receptor Location 1 (residential uses located 55 feet to the north of the Project Site); Receptor Location 2 (Arts District Park located 365 feet to the east); and Receptor Location 3 (residential uses located 560 feet to the east). In addition, two currently proposed land uses in the vicinity of the Project Site could become sensitive receptors should they be constructed and occupied prior to the construction of the Project and are: Receptor Location 4 (residential uses proposed adjacent to the southern boundary of the Project Site); and Receptor Location 5 (residential uses proposed for 55 feet to the north). As shown in **Table IV.H-16, Groundborne Vibration Source Levels for Construction Equipment (RMS),** the highest groundborne vibration levels that would be anticipated during construction of the Project would be 78 VdB at a distance of 50 feet. Residential uses are considered to be Category 2 with regard to groundborne vibration land categories and park uses are considered to be Category 3. As previously presented in **Table IV.H-3**, the groundborne vibration impact threshold for Category 2 uses ranges from 72 VdB for frequent events (over 70 events per day) to 80 Vdb for infrequent events (fewer than 30 events per day); the threshold for Category 3 uses ranges from 75 VdB for frequent events to 83 VdB for infrequent events. Because the greatest amount of groundborne vibration would occur during demolition, grading/excavation, and shoring activities and these activities are considered to be frequent during these phases, this analysis conservatively utilizes the 72 VdB threshold for human annoyance at residential receptors and the 75 VdB threshold for human annoyance at park uses.

Table IV.H-16
Groundborne Vibration Source Levels for Construction Equipment (RMS)

Equipment	Approximate RMS (VdB)				Significance Threshold	Significant Impact?[a]
	25 Feet	50 Feet	75 Feet	100 Feet		
Large Bulldozer	87	78	73	69	72 VdB	Yes
Caisson Drilling	87	78	73	69		Yes
Loaded Trucks	86	77	72	68		Yes
Jackhammer	79	70	65	61		No
Small Bulldozer	58	49	44	40		No

Note: in/sec = inches per second.
[a] For Sensitive Receptor 1 located 50 feet from source.
Source: FTA, Transit Noise and Vibration Impact Assessment, 2018. Derived from Equation 12.

Based on the worst-case construction groundborne vibration levels at 100 feet presented in **Table IV.H-16** above, groundborne vibration levels at existing Receptor Nos. 2 and 3 would be less than 69 VdB and would not have the potential to exceed the human annoyance thresholds for Category 2 and Category 3 land uses. However, based on the worst-case construction groundborne vibration levels at 50 feet, groundborne vibration levels of 78 VdB at existing Receptor Location 1 could exceed the 72 VdB annoyance threshold for Category 2 land uses. In addition, should they be approved, constructed, and occupied prior to the start of construction of the Project, based on the worst-case construction groundborne vibration levels at 25 feet (87 VdB) presented in **Table IV.H-15** above, groundborne vibration levels at Sensitive Receptor 4 could exceed the 72 VdB annoyance threshold for Category 2 land uses and based on the worst-case construction groundborne vibration levels at 50 feet, groundborne vibration levels at Sensitive Receptor 5 could exceed the 72 VdB annoyance threshold for Category 2 land uses.

As such, impacts with respect to human annoyance resulting from construction-generated groundborne vibration under the Project and the Flexibility Option would be potentially significant at Sensitive Receptor Nos. 1, 4, and 5. It should be noted that because the proposed land uses associated with Sensitive Receptor No. 5 would replace the existing land uses associated with Sensitive Receptor No. 1, potentially significant impacts with respect to human annoyance would occur to one or the other Receptor, not to both.

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to groundborne vibration of floors and walls and is perceptible only inside buildings.[43] For typical buildings, groundborne vibration results in groundborne noise levels approximately 35 to 37 decibels lower than the velocity level as the groundborne vibration would need to propagate through the ground and through a building structure before it would be perceptible inside a building as an increased noise level.[44] As such, since the peak construction noise levels at Receptor Locations 1, 4 and 5 would be approximately 72.6 dBA as shown in **Table IV.H-11 above,** groundborne noise levels associated with project construction would be less than 40 dBA and imperceptible at these receptors. According the FTA *Transit Noise and Vibration Impact Assessment Manual*, groundborne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio.[45] Project construction would not create on-going and continuous groundborne vibration and noise like that of an urban rail transit system and there are no recording studios or other special buildings types such as concert halls or auditoriums in proximity to the Project Site.

As such, impacts related to groundborne noise would be less than significant during construction of the Project and the Flexibility Option and no mitigation measures would be required.

43 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 117.
44 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, Table 6-3, page 126.
45 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 124.

(b) Operation

(i) Structural Damage

The Project's day-to-day operations would include typical commercial-grade stationary mechanical and electrical equipment, such as air handling units, condenser units, and exhaust fans, which would produce groundborne vibration at low levels that would not cause damage or annoyance impacts to the Project buildings or onsite occupants and would not cause groundborne vibration impacts to the off-site environment. According to the American Society of Heating, Refrigeration, and Air Conditioning Engineering (ASHRAE), pumps or compressors would generate groundborne vibration levels of 0.5 inches per second PPV at a distance of 1-foot from the source.[46] The Project's mechanical equipment, including air handling units, condenser units, and exhaust fans, would be located on the building rooftop and would not be located in direct contact with the ground. As such, it would not generate groundborne vibration at off-site locations, including groundborne vibration-sensitive receptors.

The primary sources of transient groundborne vibration from the Site would be from delivery trucks and passenger vehicle circulation within the proposed parking area. According to the FTA, delivery trucks rarely generate groundborne vibration that exceeds 70 VdB,[47] which is equivalent to approximately 0.013 inches per second PPV, which would be less than the significance threshold of 0.2 inches per second PPV for potential residential building damage. As passenger vehicles are much smaller than delivery trucks, the groundborne vibration from passenger vehicles would be lower.

Therefore, impacts with respect to potential building damages resulting from operation-generated groundborne vibration under the Project and the Flexibility Option would be less than significant and no mitigation would be required.

(ii) Human Annoyance

As discussed above, the Project mechanical equipment, including air handling units, condenser units, and exhaust fans, would be located on Project building rooftops and would, therefore, not generate groundborne vibration at off-site locations, including groundborne vibration-sensitive receptors.

With regard to transient groundborne vibration from delivery trucks and on-site passenger car circulation, because delivery trucks rarely generate groundborne vibration that exceeds 70 VdB,[48] which is below the conservative threshold of 72 VdB for human annoyance, and because passenger vehicles are much smaller than delivery trucks, the groundborne vibration from delivery trucks and passenger vehicles would not exceed the human annoyance threshold.

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46 American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc., Heating, Ventilation, and Air-Conditioning Applications, 1999.

47 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 113.

48 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 113.

Therefore, impacts with respect to human annoyance resulting from operation-generated groundborne vibration under the Project and the Flexibility Option would be less than significant and no mitigation would be required.

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to groundborne vibration of floors and walls and is perceptible only inside buildings.[49] As discussed above, operation of the Project would result in groundborne vibration levels substantially less than the threshold for groundborne vibration at groundborne vibration-sensitive receptors. For typical buildings, groundborne vibration results in groundborne noise levels approximately 35 to 37 decibels lower than the velocity level.[50] Given that the groundborne vibration level would be much lower than the threshold for groundborne vibration-sensitive uses, and given that the groundborne noise would be approximately 35 to 37 decibels lower than the velocity level, operational groundborne noise would also not exceed the human annoyance threshold.

According the FTA *Transit Noise and Vibration Impact Assessment Manual*, groundborne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio.[51] The Project would not include operation of a subway or tunnel and there are no recording studios or other special buildings types such as concert halls or auditoriums in proximity to the Project Site.

As such, impacts related to groundborne noise would be less than significant during operation of the Project and the Flexibility Option and no mitigation measures would be required.

(4) Mitigation Measures

Under both the Project and the Flexibility Option, construction groundborne vibration impacts with regard to human annoyance to existing Sensitive Receptor 1 and proposed Sensitive Receptors 4 and 5 could exceed the applicable thresholds. Potential groundborne vibration-reducing mitigation measures include eliminating groundborne vibration-producing construction equipment and increasing the distance between the source of groundborne vibration and the receptor. However, the Project cannot be constructed without employing equipment that generates the highest groundborne vibration levels, including the use of bulldozers, caisson drilling, and haul truck movement separately. Moreover, when these activities are occurring at the Project Site boundary, the distance between the Project Site and the sensitive receptors would be approximately 55 feet. This distance cannot be increased because it is not possible to move either the construction activity or the sensitive receptor. An additional measure that could potentially reduce groundborne vibration impacts on sensitive receptors would be installation of a wave barrier, which is typically a trench or a thin wall made of sheet piles installed in the ground (essentially a subterranean sound barrier to reduce noise). However, wave barriers must be very

49 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 117.
50 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, Table 6-3, page 126.
51 FTA, Transit Noise and Vibration Impact Assessment Manual, 2018, page 124.

long and very deep to be effective.[52] In addition, constructing a wave barrier to reduce the Project's construction related groundborne vibration impacts would, in and of itself, generate groundborne vibration from the excavation equipment, and could potentially result in traffic disruptions or be infeasible due to soil conditions, therefore, no feasible mitigation measures are available to address this impact.

(5) Level of Significance After Mitigation

The Project and the Flexibility Option would generate groundborne vibration levels during construction that could exceed the human annoyance thresholds at the adjacent sensitive receptors. No feasible mitigation measures are available to address this impact. However, this impact would be limited to times when the construction activities that generate the highest groundborne vibration level are taking place, would be limited to site clearing, grading, and shoring activities, and would only occur during allowable construction hours 7:00 A.M to 9:00 P.M. Monday through Friday, and 8:00 A.M. to 6:00 P.M. on Saturday. Nonetheless, this impact would be significant and unavoidable.

Therefore, the impacts of the Project and Flexibility Option with respect to groundborne vibration that could result in human annoyance would be significant and unavoidable.

Threshold (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 airstrip, would the project expose people residing or working in the project area to excessive noise levels?***

(1) Impact Analysis

(a) Project

As discussed in the Initial Study (see **Appendix A.2** of this Draft EIR), the Project Site is not located with any airport's influence area nor within the vicinity of a private airstrip or an airport land use plan, or within two miles of a public use airport or public use airstrip. **Therefore, the Project would have no impact with respect to Threshold c).**

(b) Flexibility Option

The Flexibility Option would be located on the same site as the Project. The Project Site is not located within any airport's influence area nor within two miles of an existing airport. The Project Site is also not located in the vicinity of a private airstrip. The Flexibility Option would not alter the location of the Project Site. **Therefore, the Flexibility Option would have no impacts related to the potential exposure of persons to airport or airstrip noise and no mitigation measures are required.**

[52] Caltrans, Transportation and Construction Related Groundborne vibration Guidance Manual, June 2004.

(2) Mitigation Measures

Under both the Project and the Flexibility Option, no impacts related to the potential exposure of persons to airport or airstrip noise would occur. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

The Project and the Flexibility Option would have no impacts related to the potential exposure of persons to airport or airstrip noise without mitigation.

4. Cumulative Impacts

Because the Flexibility Option would be located on the same Project Site with the same distance to sensitive receptors as the Project, would require the same construction schedule and equipment, and the increase in daily operational traffic as compared to the Project would have a negligible effect on the increase in ambient noise levels at receptor locations, the conclusions regarding the cumulative impact analysis and impact significance determination presented below for the Project would be the same under the Flexibility Option.

a) Impact Analysis

This cumulative impact analysis considers development of the Project in combination with ambient growth and other development projects (Related Projects) within the vicinity. As noise is a localized phenomenon and decreases in magnitude as distance from the source increases, only projects and ambient growth within 500 feet and having a direct line-of-sight to the Project Site could combine with the Project to result in cumulatively considerable noise impacts.

(1) Construction Noise

Existing nearby land uses may be temporarily affected by short-term noise impacts associated with Project construction during daytime hours. Ambient noise levels in the Project vicinity range between 59.5 and 65.5 dBA L_{eq}. Without mitigation, Project construction noise may range between 58.8 and 83.8 dBA L_{eq} at nearby sensitive receptors. Point noise sources typically drop-off quickly, at a rate of 6 dB per doubling of distance.

In addition to the Project, there are two other Related Projects proposed in close proximity. The first is Related Project No. 2 located adjacent to the south of the Project Site at 527 S. Colyton Street and 1147 E. Palmetto Street and the second is Related Project No. 5 located north of the Project Site (across E 5th Street) at 1101-1129 E. 5th Street and 445 S. Colyton Street. All other Related Projects in the Project vicinity would not contribute to potential cumulatively considerable impacts due to distance and intervening buildings.

A worst-case cumulative construction noise scenario assumes construction of two of the three projects mentioned above (including the Project) while the third project is occupied. For the purposes of this discussion, it is assumed that Related Project No. 5 will be occupied while the other two projects are under construction. With construction of the Project alone, mitigated construction noise levels could range between 74.0 and 82.6 dBA L_{eq} at the nearest sensitive receptor. With simultaneous construction of the Project and Related Project No. 2, construction noise levels could range between 77.0-85.61 dBA L_{eq}.[53] This analysis is worst-case and assumes that both projects will be undergoing the same construction phase at the same time. The cumulative noise levels would be greater than 5dBA over the ambient level of 62.3 dBA at the upper levels of Receptor Location 1. While implementation of the Project's mitigation measure of a ground-level noise barrier would reduce this impact to less than significant, no mitigation measures are available to address the impact at the above ground levels of Receptor Location 1.

Therefore, cumulative construction noise impacts under the Project and the Flexibility Option would be significant and unavoidable.

(2) Construction Groundborne Vibration

Regarding cumulative construction-related groundborne vibration, due to the rapid attenuation characteristics of groundborne vibration, only those Related Projects located within close proximity to Receptor Locations 1, 4 and 5 would have the potential to result in cumulative groundborne vibration from on-site construction activities. The closest Related Projects to these receptors include Related Project No. 2, located at 527 S. Colyton Street / 1147 E. Palmetto Street, Related Project No. 5, located at 1101-1129 E. 5th Street / 445 S. Colyton Street, and Related Project No. 26, located at 431 S. Colyton Street. Because Related Project No. 2 is also potential Receptor Location 4, it would not have the potential to create a cumulative groundborne vibration impact at this location as no operational uses would occur at the site during construction. In addition, based on the distance between Related Project No. 2 and the location of Receptor Locations 1 and 5 (approximately 500 feet) and the worst-case construction groundborne vibration levels at various distances presented in **Table IV.H-15**, there would be no potential for cumulative construction-period impacts with respect to groundborne vibration at these locations. Furthermore, because Related Project No. 5 is potential Receptor Location 5, which would replace existing Receptor Location 1, it would not have the potential to create a cumulative groundborne vibration impact at these locations as no operational uses would occur at the site during construction. In addition, based on the distance between Related Project No. 5 and Receptor Location 4 (approximately 500 feet) and the worst-case construction groundborne vibration levels at various distances, there would be no potential for cumulative construction-period impacts with respect to groundborne vibration at this location. Related Project No. 26 would also be located too far away from Receptor Locations 1 and 5 (approximately 200 feet) and Receptor Location 4 (approximately 700 feet) to contribute to a cumulative groundborne vibration impact at these sensitive receptors.

However, as the related projects would be anticipated to use similar trucks as the Project, it is expected that construction trucks from the related projects would generate similar groundborne vibration levels along the anticipated haul routes. The timing and location of haul trucks used by the Related Projects would be speculative at best. It is likely that large rubber-tired vehicles (trucks, buses, haul trucks etc.) already occasionally pass-by each other along these routes;

[53] *74.0 dBA + 74.0 dBA = 77.0 dBA; 82.6 dBA + 82.6 dBA = 85.61 dBA.*

therefore, the groundborne vibrational activity generated by this type of infrequent event would be considered part of the existing environment. Furthermore, as detailed in PDF TR-1 presented in **Section IV.K, Transportation**, of this Draft EIR, the Project would prepare a Construction Staging and Traffic Management Plan (CSTMP). The CSTMP would include regular meetings between City staff and representatives of other surrounding related construction in order to coordinate simultaneous construction activities to reduce effects on the surrounding communities, and includes consideration of haul routes. **As such, cumulative impacts with respect to groundborne vibration during construction of the Project and the Flexibility Option would be less than significant.**

(3) Operational Noise

Operational noise associated with the Proposed Project will be consistent with the other land uses in the Project area. A mitigation measure limiting amplified music and speech has been required to ensure that the existing nighttime noise environment is not substantially increased. The incremental contribution of on-site project operational noise would not be cumulatively considerable.

The Noise Technical Report prepared for the Project quantified the increase in ambient noise levels that can be expected with Project buildout along roadways affected by project generated vehicle traffic. As shown in **Table IV.H, 13, Change in Existing Noise Levels Along Roadways as a Result of Project**, new vehicle trips associated with the Proposed Project are expected to result in a nominal increase in ambient noise levels along affected road segments (up to 0.9 dBA CNEL). These increases would nominally add to ambient noise levels as the area and would be consistent with what has been planned for and analyzed in the City's General Plan and General Plan Environmental Impact Report. Project generated vehicle traffic would not contribute to cumulative noise impacts to sensitive receptors along affected roadways. **Therefore, cumulative operational noise impacts under the Project and the Flexibility Option would be less than significant.**

(4) Operational Groundborne vibration

Due to the rapid attenuation characteristics of groundborne vibration and distance from each of the related projects to the Project Site, there is no potential for cumulative operational-period impacts with respect to groundborne vibration. **Therefore, cumulative groundborne vibration impacts under the Project and the Flexibility Option would be less than significant.**

b) Mitigation Measures

Under both the Project and the Flexibility Option, cumulative impacts to construction noise would be significant. While the Project mitigation measure of a ground-level noise barrier would reduce this impact to less than significant at the ground level, no mitigation measures are available to address this potential cumulative impact at the above ground levels at Receptor Location 1.

Under both the Project and the Flexibility Option, cumulative impacts to operational noise and construction and operational groundborne vibration would be less than significant; no additional mitigation would be required.

c) Level of Significance After Mitigation

Under both the Project and the Flexibility Option, cumulative impacts from construction noise would be significant and unavoidable even with implementation of Project-level mitigation measure MM NOI-1. Under both the Project and Flexibility Option, cumulative impacts to operational noise and construction and operational groundborne vibration would be less than significant.