IV. Environmental Impact Analysis

J. Noise

1. Introduction

This section of the Draft Environmental Impact Report (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 Noise and Calculation Worksheets 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.

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1 California Department of Transportation (Caltrans), Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.

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 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 and 140 dB corresponding to the thresholds of feeling and pain, respectively. 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 **Figure IV.J-1**.

(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

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

[3] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.

[4] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.

[5] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.

[6] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.

noise levels change gradually throughout the day, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume.

In an outdoor environment, sound energy attenuates through the air as a function of distance. Such attenuation is called “distance loss” or “geometric spreading” and is based on the type of source configuration (i.e., a point source or a line source). The rate of sound attenuation for a point source, such as a piece of mechanical or electrical equipment (e.g., air conditioner or bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically “hard” sites (e.g., asphalt and concrete surfaces) and 7.5 dBA per doubling of distance from the noise source to the receptor over acoustically “soft” sites (e.g., soft dirt, grass or scattered bushes and trees).[7] 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. The rate of sound attenuation for a line source, such as a constant flow of traffic on a roadway, is 3 dBA per doubling of distance from the point source to the receptor for hard sites and 4.5 dBA per doubling of distance for soft sites.[8]

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.[9] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[10]

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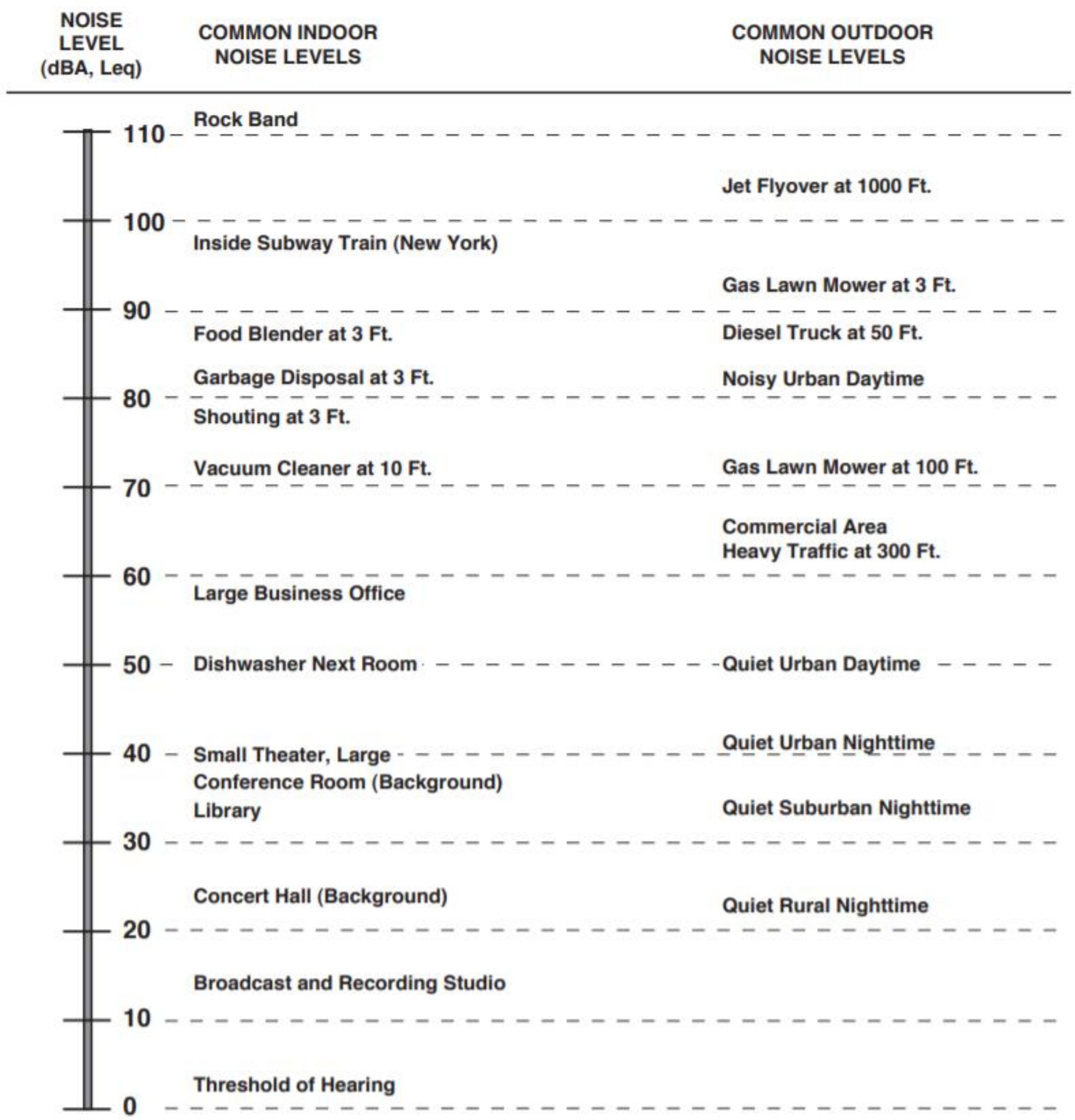
7 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, 2009.
8 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, 2009.
9 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, 2009.
10 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, 2009.

Figure IV.J-1 Decibel Scale and Common Noise Sources



Source: Caltrans, Technical Noise Supplement, September 2013.

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.[11]

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 energy-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.

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. and 7:00 A.M. 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. and 10:00 P.M. and an addition of 10 dBA to noise levels between the hours of 10:00 P.M. and 7:00 A.M. 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., startle response); and
- Physical effects (e.g., hearing loss).

[11] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.2, September 2013.

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. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.[12]

The World Health Organization's Guidelines for Community Noise details the adverse health effects of noise, 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.[13]

With regard to the subjective effects, an individuals' responses 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 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:[14]

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

12 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.
13 World Health Organization, Guidelines for Community Noise, 1999.
14 Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.

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 ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[15]

(4) Noise Attenuation

When noise propagates over a distance, the noise level reduces 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." Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate between 6 dBA for acoustically "hard" sites and 7.5 dBA for "soft" sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 dBA at 100 feet, 68 dBA at 200 feet).[16] Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water.[17] 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.[18] Soft sites are those that 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).[19]

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[15] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1.1, September 2013.

[16] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

[17] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

[18] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

[19] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

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.[20] Noise from a line source propagates over a cylindrical surface, often referred to as “cylindrical spreading.”[21] 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.[22] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

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.[23] 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.[24]

(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.[25] 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

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[20] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013.

[21] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013.

[22] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013.

[23] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013.

[24] Caltrans, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013.

[25] Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018.

rough roads, and certain construction activities, such as blasting, pile-driving, and operation of heavy earth-moving equipment.[26] Groundborne vibration generated by human-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.[27] 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.[28] 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; FTA uses a crest factor of 4. [29] 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.[30]

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.[31] 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 30 Hz to 60 Hz), the groundborne noise level will be approximately 35 dB to 37 dB lower than the velocity level.[32] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level.

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[26] FTA, Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018.
[27] FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.
[28] FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.
[29] FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.
[30] FTA, Transit Noise and Vibration Impact Assessment Manual, Sections 6.1, 6.2, and 6.3, 2018.
[31] FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.4, 2018.
[32] FTA, Transit Noise and Vibration Impact Assessment Manual, Table 6-3 and Table 6-14, pages 126 and 146, 2018.

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
- California Office of Planning and Research Guidelines for Noise Compatible Land Use
- California Department of Transportation (Caltrans) Vibration/Groundborne Noise Standards
- Los Angeles County Airport Land Use Commission Comprehensive Land Use Plan
- City of Los Angeles Municipal Code (LAMC)
- City of Los Angeles General Plan (General Plan), Noise Element
- City of Los Angeles Guidelines for Noise Compatible Land Use
- City of Los Angeles Groundborne Vibration and Noise

(1) Federal

(a) Noise Control Act of 1972

Under the authority of the Noise Control Act of 1972, the U.S. Environmental Protection Agency established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the U.S. Environmental Protection Agency 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.[33] 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

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33 U.S. Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974.

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 (City) 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 proposed Project. However, the FTA has adopted vibration criteria for use in evaluating vibration impacts from construction activities.[34] The vibration damage criteria adopted by the FTA are shown in **Table IV.J-1.**

TABLE IV.J-1
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 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.[35] The FTA defines Category 1 as buildings where 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.

34 FTA, Transit Noise and Vibration Impact Assessment Manual, Table 7-5, page 186, 2018.
35 FTA, Transit Noise and Vibration Impact Assessment Manual, Table 6-1, page 124, 2018.

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.J-2**. No thresholds have been adopted or recommended for commercial or office uses.

TABLE IV.J-2
GROUNDBORNE VIBRATION AND GROUNDBORNE NOISE IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
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

SOURCE: FTA, Transit Noise and Vibration Impact Assessment Manual, 2018.
NOTES:
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
4 This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

(c) Occupational Safety and Health Act of 1970

Under the Occupational Safety and Health Act of 1970,[36] the Occupational Safety and Health Administration 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.[37]

36 29 USC 1919 et seq.
37 U.S. Department of Labor, Occupational Safety and Health Act of 1970.

(2) State

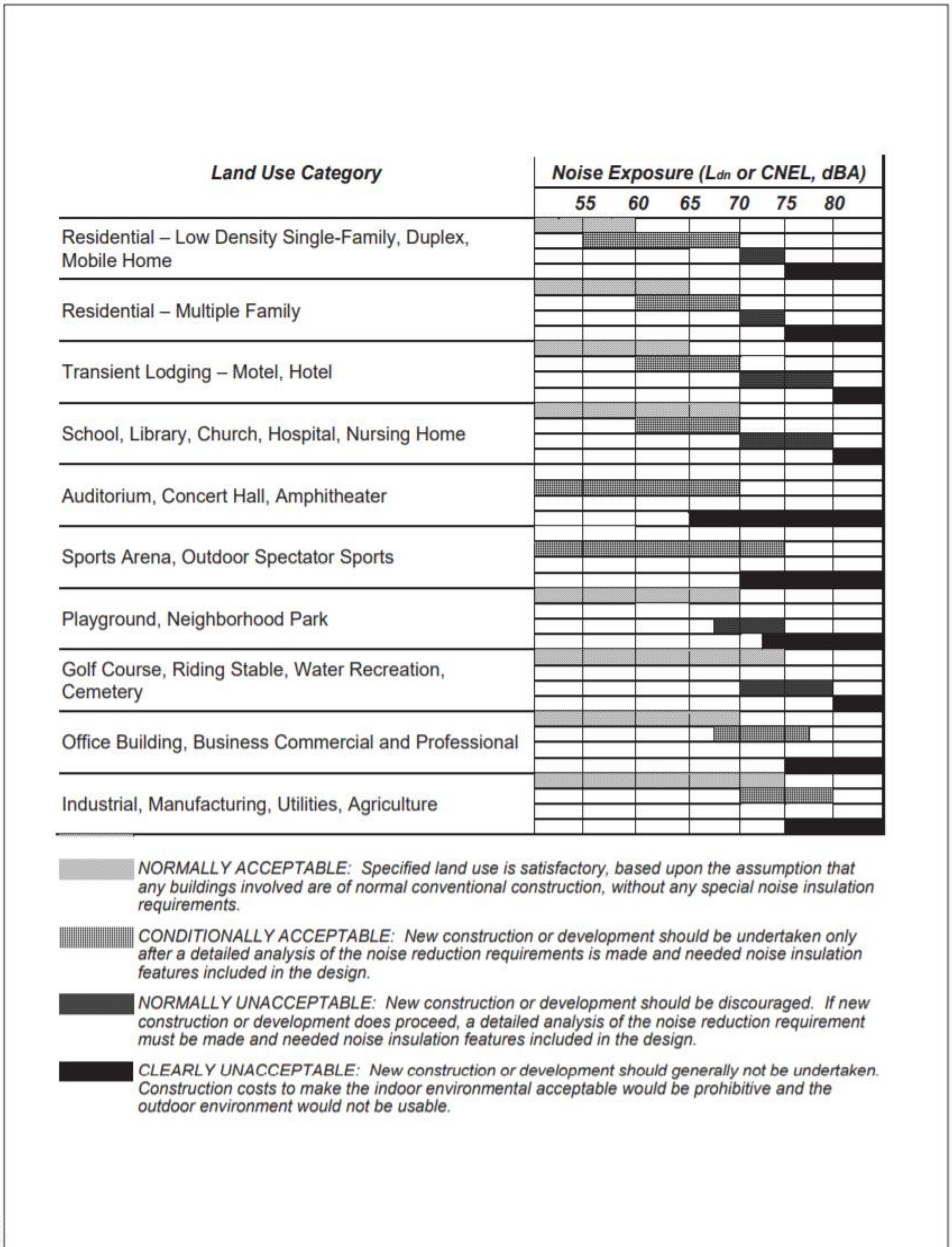
(a) Office of Planning and Research Guidelines for Noise Compatible Land Use

The State of California has not adopted statewide standards for environmental noise, but the Governor's Office of Planning and Research has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as presented in **Figure IV.J-2**.[38] 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 the Office of Planning and Research 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 multifamily residential units, hotels, and motels. These requirements are collectively known as the California Noise Insulation Standards.[39] The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. The standards require an acoustical analysis demonstrating that 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.

38 Governor's Office of Planning and Research, General Plan 2017 Guidelines, page 377, 2017.
39 24 California Code of Regulations, California Building Standards Code.

Figure IV.J-2 Guidelines for Noise Compatible Land Use



Source: Governor's Office of Planning and Research, General Plan Guidelines, October 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 proposed Project. Although the State has not adopted any vibration standard, Caltrans, in its Transportation and Construction Vibration Guidance Manual[40] recommends the vibration thresholds presented in **Table IV.J-3** that are more practical than those provided by the FTA.

TABLE IV.J-3
GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

Structure and Condition	Maximum PPV (inch/sec)	
	Transient Sources[1]	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

SOURCE: Caltrans, Transportation and Construction Vibration Guidance Manual, Table 19, 2013.
NOTES:
PPV = peak particle velocity; inch/sec = inches per second.
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.

40 Caltrans, Transportation and Construction Vibration Guidance Manual, Table 19, page 38, 2013.

(3) Regional

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

In Los Angeles County (County) the Regional Planning Commission has the responsibility for acting as the Airport Land Use Commission and for coordinating the airport planning of public agencies within the County. The Airport Land Use Commission 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 Los Angeles County Airport Land Use Commission 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's Noise Regulations are set forth in Chapter XI of the 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 minutes but less than 15 minutes in any 1-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.[41]

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 and provided in **Table IV.J-4** should be used. For example, in residential zones, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

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41 Los Angeles Municipal Code, Chapter XI, Article I, Section 111.02-(b). Accessed December 17,2020.

TABLE IV.J-4
CITY OF LOS ANGELES PRESUMED AMBIENT NOISE LEVELS

Zone	Daytime Hours (7:00 a.m. to 10:00 p.m.) dBA (L_{eq})	Nighttime Hours (10:00 p.m. to 7:00 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.
NOTES: dBA = A-weighted decibels; L_{eq} = equivalent sound level.

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.[42] 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 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

[42] 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.

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

LAMC 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.J-5**, and a number of noise-related 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.[43] 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.[44] The following table summarizes these guidelines, which are based on Governor's Office of Planning and Research OPR guidelines from 1990.

---

43 City of Los Angeles, Noise Element of the Los Angeles City General Plan, pages 1.1–2.4, adopted February 3, 1999.

44 City of Los Angeles, Noise Element of the Los Angeles City General Plan, page I-1, adopted February 3, 1999.

TABLE IV.J-5
CITY OF LOS ANGELES CNEL GUIDELINES FOR NOISE COMPATIBILITY

Exhibit I: Guidelines for Noise Compatible Land Use

(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-a-vis existing or anticipated ambient noise levels)

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, Ampitheater	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.

c) Existing Conditions

The Project area is subject to typical urban noises, such as noise generated by traffic, transit and trucks, commercial activities, surface parking, construction noise, and other sources associated with typical urban activities. Noise around the Project Site is the cumulative effect of noise from transportation activities and stationary sources. “Transportation noise” typically refers to noise from automobile use, trucking, airport operations, and rail operations. “Stationary noise” typically refers to noise from non-transportation sources, such as heating, ventilation, and air conditioning (HVAC) systems, compressors, landscape maintenance equipment, or machinery associated with local industrial or commercial activities. In the Project area, stationary sources consisted of HVAC systems, distant conversations, distant sirens and distant construction noise. The surrounding roadways generate traffic noise, which is the primary noise source in the Project area. **Table IV.J-6** provides the existing PM peak-hour traffic volumes[45] along the roadway segments that are primarily subject to Project-related traffic noise impacts and that have adjacent noise-sensitive land uses.

TABLE IV.J-6
EXISTING PM PEAK-HOUR TRAFFIC VOLUMES

Key Roadway Segment	Existing Peak-Hour Traffic Volume
Normandy Avenue north of Sunset Boulevard	737
Normandy Avenue south of Sunset Boulevard	901
Sunset Boulevard east of Normandy Avenue	2263
Sunset Boulevard west of Normandy Avenue	2419
Vermont Avenue north of Franklin Avenue	1421
Vermont Avenue north of Sunset Boulevard	2536
Vermont Avenue south of Sunset Boulevard	2921
Sunset Boulevard west of Vermont Avenue	2482
Vermont Avenue south of Fountain Avenue	3018
North Edgemont Street north of Sunset Boulevard	542

SOURCE: Linscott, Law & Greenspan, Traffic Impact Study Kaiser Permanente Los Angeles Medical Center Project. August 8, 2018, provided as Appendix L-1 of this Draft EIR.

45 Based upon an examination of the traffic volumes provided in the Project’s Traffic Impact Study (Linscott, Law & Greenspan 2018, provided as Appendix L-1 of this Draft EIR), the PM peak-hour volumes were typically higher than the AM peak-hour traffic volumes. Therefore, the PM peak-hour volumes were used for the modeling of traffic noise.

(1) Sensitive Receptor Locations

Typical noise- and vibration-sensitive land uses consist of residential dwellings (including mobile homes), schools, hospitals, convalescent homes, and houses of worship.[46] In the Project area, sensitive land uses exist in the form of single- and multifamily residences, motels, and medical facilities. Additionally, the nearby Barnsdall Art Park is considered a noise- and vibration-sensitive land use, and the nearby Metro B Line subway tunnel is also considered a potentially vibration-sensitive land use, particularly with regard to potential vibration impacts on subway operations during Project construction.

(2) Ambient Noise Measurements

Noise measurements were conducted on and near the Project Site in August 2018 to determine the existing daytime noise levels. The noise measurements were taken using a Soft dB Piccolo integrating sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier which conforms to American National Standards Institute (ANSI) standards for a Type 2 (General Purpose) sound level meter. The sound level meter was calibrated before and after the measurements were taken, and the measurements were conducted with the microphone positioned approximately 5 feet above the ground.

Short-term (15-minute duration) noise measurements were taken at 11 locations that represented sensitive receptors or sensitive land uses at and near the Project Site; these locations are depicted as receptors ST1–ST11 on **Figure IV.J-3**. Location ST1 is located just southeast of Site 2 (as depicted in **Figure II-4** in Chapter II), adjacent to residences along New Hampshire Avenue. ST2 is located at a motel north of Site 1 (and southwest of Site 2), located adjacent to Vermont Avenue. ST3 is located east of the Site 1 at the Hollywood Presbyterian Medical Center and adjacent to Vermont Avenue. ST4 is located east of the Metro B Line Vermont/Sunset Station entrance on the northeast corner of Sunset Boulevard and Vermont Avenue and southeast of Site 5. ST5 is located adjacent to a residential property on Maubert Avenue, east of Vermont Avenue and east of Site 5. ST6 is located near the Kaiser Permanente Hospital's Sunset Boulevard entrance, southeast of Site 4. ST7 is located at the southern boundary of Barnsdall Art Park, northwest of Site 5. ST8 is located adjacent to residential uses along North Edgemont Street, north of Site 4. ST9 is located adjacent to residential uses along North Kenmore Avenue, northwest of Site 3. ST10 is located adjacent to residential uses along North Edgemont Street, south of Sunset Boulevard and Site 3. ST11 is located adjacent to a residence at North Mariposa Avenue and Sunset Boulevard, west of Site 6. These monitoring locations are representative of the ambient noise levels in the vicinity of the

[46] City of Los Angeles, Noise Element of the Los Angeles City General Plan, adopted February 3, 1999.

Project Site adjacent to the surrounding sensitive receptors. The measured average noise levels at these locations are provided in **Table IV.J-7**. As reflected in Table IV.J-7, the primary noise source at the receptors/short term measurement sites was from traffic along the adjacent roadways, as well as from nearby mechanical equipment and other typical urban noise sources.

TABLE IV.J-7
EXISTING AMBIENT NOISE LEVELS

Receptors	Location/Address	Date	Time	L_{eq} (dBA)	L_{max} (dBA)
ST1	Single-family residential; 1422 North New Hampshire Avenue	August 8, 2018	9:58 a.m.–10:13 a.m.	62.1	75
ST2	Motel, adjacent to pool area; 1401 N Vermont Avenue	August 8, 2018	10:21 a.m.–10:36 a.m.	63.4	73.9
ST3	Hollywood Presbyterian Hospital; 1300 Vermont Avenue	August 16, 2018	11:03 a.m. – 11:18 a.m.	74.3	87.8
ST4	East of Metro Station; 4661 Sunset Boulevard	August 16, 2018	11:26 a.m. – 11:41 a.m.	72.3	87.6
ST5	Multifamily residential; 4645 Maubert Avenue	August 8, 2018	12:02 p.m. – 12:17 p.m.	67.8	85.2
ST6	Kaiser Permanente Medical Center; 4867 Sunset Boulevard	August 16, 2018	11:51 a.m. – 12:06 p.m.	67.4	79.4
ST7	Barnsdall Art Park, overlooking Kaiser Permanente Medical Center; 4800 Hollywood Boulevard	August 8, 2018	1:50 p.m. – 2:05 p.m.	59.4	69.9
ST8	Multifamily residential; 1517 North Edgemont Street	August 16, 2018	12:15 p.m. – 12:30 p.m.	69.4	85.1
ST9	Multifamily residential; 1525 North Kenmore Avenue	August 8, 2018	2:57 p.m. – 3:12 p.m.	65.1	76.7
ST10	Multifamily residential; 1415 North Edgemont Street	August 8, 2018	3:19 p.m. – 3:34 p.m.	66.3	77.4
ST11	Single-family residential; 1442 North Mariposa Avenue	August 8, 2018	3:53 p.m. – 4:08 p.m.	65	72.9

NOTES: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval.

(3) Existing Groundborne Vibration Levels

Aside from periodic construction work occurring throughout the City, other sources of groundborne vibration in the Project Site vicinity are primarily limited to heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks) on local roadways. Trucks traveling at a distance of 50 feet typically generate groundborne vibration velocity levels of 65 VdB (approximately 0.0068 in/sec PPV).[47]

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

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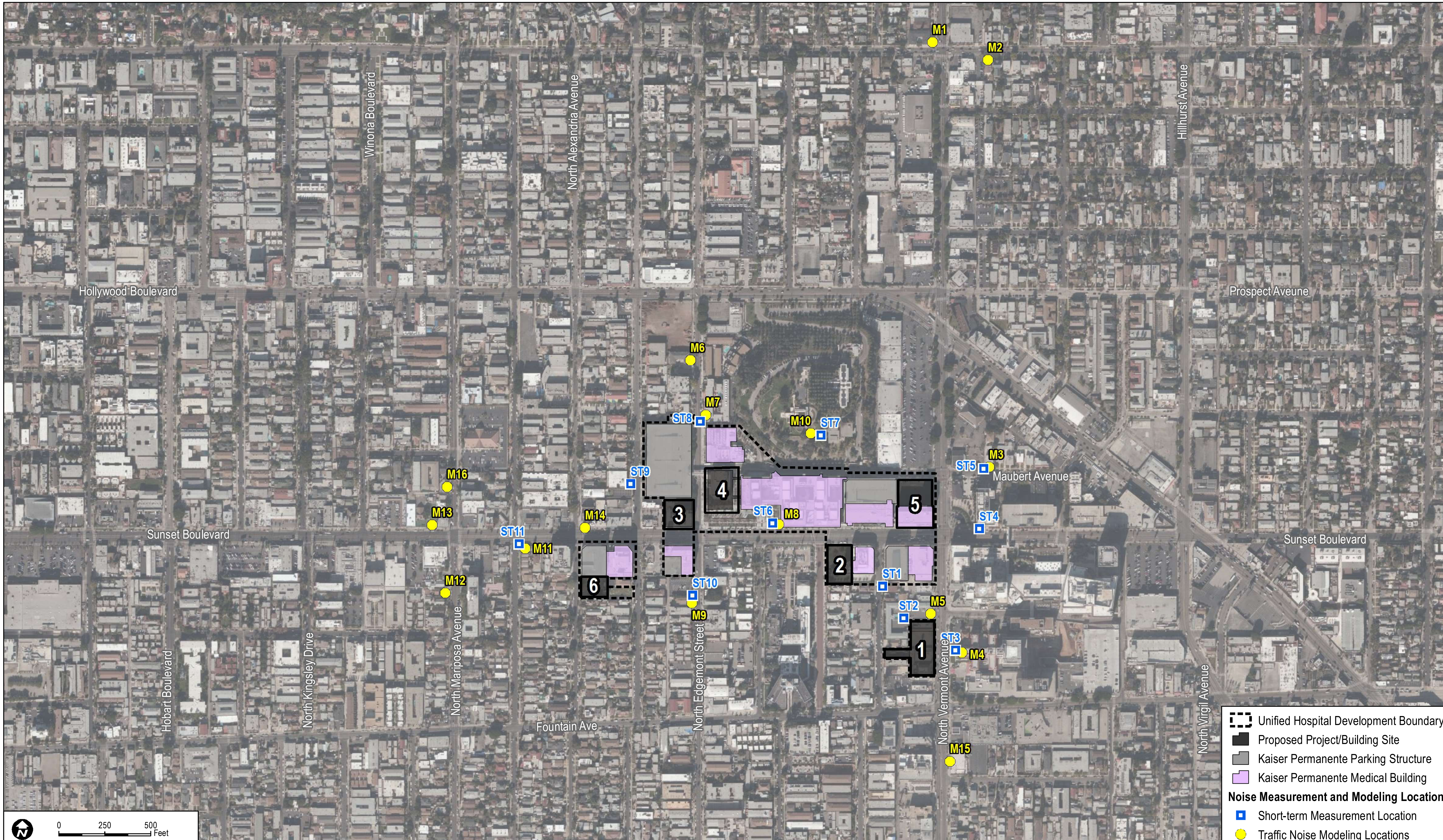

SOURCE: Perkins and Will, 2017; Bing Maps 2017

FIGURE IV.J-3

Noise Measurement Modeling Locations

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3. Project Impacts

a) Thresholds of Significance

In accordance with the State California Environmental Quality Act (CEQA) Guidelines Appendix G (Appendix G), the Project would have a significant impact related to noise if it would result in:

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 groundborne noise level.***

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, exposure of people residing or working in the Project area to excessive noise levels.***

This analysis relies on the Appendix G Thresholds. The analysis uses factors and considerations identified in the 2006 L.A. CEQA Thresholds Guide and the FTA's groundborne vibration and noise criteria for assessing potential impacts relating to building damage and human annoyance, as appropriate, to assist in answering the Appendix G Threshold questions.

(1) Construction

The 2006 L.A. CEQA Thresholds Guide identifies the following criteria to evaluate construction noise:

- Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA L_{eq} 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 L_{eq} or more at a noise sensitive use; or
- Construction activities that would exceed the ambient noise level by 5 dBA L_{eq} 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 at anytime on Sunday.

As discussed in Chapter III, Project Description, of the Draft EIR, construction of the Project is anticipated to commence as early as 2020 at the Phase 1 sites and be completed as early as 2030. Therefore, since construction activities would occur over a period longer than 10 days for all phases, the corresponding criteria used in the construction noise analysis presented in this section of the Draft EIR is an increase in ambient exterior noise levels of 5 dBA L_{eq} or more at a noise sensitive use.

(2) Operation

As specified in the 2006 L.A. CEQA Thresholds Guide, Project operations would have a significant impact on noise levels 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 greater noise increase, as specified in **Table IV.J-8**; 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 (L_{eq}) at noise sensitive uses by 5 dBA L_{eq}.

TABLE IV.J-8
COMMUNITY NOISE EXPOSURE CNEL, DB

Land Use	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	Above 70
Multifamily Homes	50–65	60–70	70–75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	Above 80
Transient Lodging – Motels, Hotels	50–65	60–70	70–80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50–70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50–75	—	Above 70
Playgrounds, Neighborhood Parks	50–70	—	67–75	Above 72

TABLE IV.J-8
COMMUNITY NOISE EXPOSURE CNEL, dB

Land Use	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	—	70–80	Above 80
Office Buildings, Business and Professional Commercial	50–70	67–77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	Above 75	—

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

In summary, for operational noise, the criterion for on-site operational noise is an increase in the ambient noise level of 5 dBA L_{eq} at an adjacent property line, in accordance with the LAMC. The LAMC does not apply to off-site traffic (i.e., vehicle traveling on public roadways) noise levels. Therefore, the criteria for off-site traffic noise associated with Project operations is based on the 2006 L.A. CEQA Thresholds Guide. In addition, the criteria for composite noise levels (on-site and off-site sources) are also based on the 2006 L.A CEQA Thresholds Guide, as again, the LAMC does not apply to off-site traffic noise. Therefore, the criteria used for determining impacts related to off-site operational noises and composite operational noise are an increase in the ambient noise level of 5 dBA CNEL or 3 dBA CNEL to or within the “normally unacceptable” or “clearly unacceptable” categories, respectively, depending on the existing noise conditions at the affected noise-sensitive land use.

(3) Groundborne Vibration

The City has not adopted criteria to assess vibration impacts during construction. Thus, for this Project, the City has determined to use the FTA's criteria for structural damage and human annoyance, as described in Tables IV.J-1 and IV.J-2, respectively, to evaluate potential impacts related to Project construction and operation.

- Potential Building Damage – Project construction activities that cause groundborne vibration levels to exceed the potential structural damage threshold of 0.5 in/sec PPV at the nearest off-site buildings or structures of Building Category I, Reinforced-concrete, steel, or timber (no plaster).

- Potential Building Damage – Project construction activities that cause groundborne vibration levels to exceed the potential structural damage threshold of 0.3 in/sec PPV at the nearest off-site buildings of Building Category II, Engineered concrete and masonry (no plaster).

- Potential Building Damage – Project construction activities that cause groundborne vibration levels to exceed the potential structural damage threshold of 0.2 in/sec PPV at the nearest off-site buildings of Building Category III, Non-engineered timber and masonry buildings.

- Potential Building Damage – Project construction activities that cause groundborne vibration levels to exceed the potential structural damage threshold of 0.12 in/sec PPV at the nearest off-site buildings of Building Category IV, Buildings extremely susceptible to building damage.

Based on FTA guidelines, construction and operational 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 and operational activities cause groundborne vibration levels to exceed 72 VdB at off-site sensitive uses, including residential and theater uses.

- Project construction and operational activities cause groundborne vibration levels to exceed 75 VdB at off-site institutional uses.

b) Methodology

(1) Construction Noise (On-Site)

For analysis of construction noise, the Federal Highway Administration's Roadway Construction Noise Model (RCNM)[48] was used to estimate construction noise levels at adjacent noise-sensitive land uses for each of the six proposed building sites. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two excavators, a loader, a dump truck), the duty cycle for each piece of equipment (i.e., percentage of hours the equipment typically works per day), and the distance from the sensitive noise receptor. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis. The same construction equipment assumptions as used for the air quality and greenhouse gas analyses were used for the RCNM construction noise model.

(2) Roadway Noise (Off-Site)

Noise from operations-related traffic was assessed using the information in the Traffic Impact Analysis prepared for the Project.[49] FHWA's Traffic Noise Model[50] (TNM version 2.5) was used to model changes in traffic noise levels associated with Project-related traffic.

Noise from construction-related traffic was assessed by comparing the incremental increase from estimated daily and hourly average construction worker and truck trips to existing volumes along the local roadways. As noted in the Effects of Noise on People section above, a doubling of sound energy corresponds to a 3 dBA increase, which is a barely perceptible change.

(3) Stationary Noise (On-Site)

Operational on-site noise was assessed by using the measured noise level data from the primary noise-generating activities (parking structures, mechanical equipment, emergency vehicles, and trash and loading/unloading areas) as they occur in the present location and analyzing the effects of the same noise levels ensuing from the proposed location at the proposed location. As described in the Effects of Noise on People section above, "the rate of sound attenuation for a point source, such as a piece of mechanical

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48 Federal Highway Administration (FHWA), Roadway Construction Noise Model (RCNM), Software Version 1.1, December 8, 2008.

49 Linscott, Law & Greenspan, Traffic Impact Study Kaiser Permanente Los Angeles Medical Center Project. August 8, 2018, provided as Appendix L-1 of this Draft EIR.

50 FHWA, FHWA Traffic Noise Model, Version 2.5, February 2004.

or electrical equipment (e.g., air conditioner or bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically “hard” sites (e.g., asphalt and concrete surfaces).” The corresponding equation used to calculate the sound attenuation is the following:

$$\text{Delta} = 20 * \text{Log}(D_{ref}/D)$$

Where Delta is the change in noise level, in decibels; D is the distance from the noise source to the receptor of interest; and D_{ref} is the distance from the noise source to the reference measurement.

(4) Groundborne Vibration

Groundborne vibration impacts due to the Project’s construction activities were evaluated by identifying potential vibration sources (i.e., construction equipment), estimating the vibration levels at the potentially affected receptor, and comparing the Project’s activities to the applicable vibration significance thresholds, as described below. Vibration levels were calculated based on the FTA published standard velocities for various construction equipment operations. In addition, vibration impacts are evaluated based on the maximum peak vibration levels generated by each type of construction, per FTA guidance.[51]

Groundborne vibration impacts due to the Project’s operation were addressed qualitatively by identifying the anticipated primary sources of such vibration and the potential for perceptible or otherwise significant vibration levels from these sources.

c) Project Design Features

The following project design features (PDFs) are applicable to the Project.

PDF-NOI-1: The following Project characteristics pertaining to construction noise will be implemented and adhered to:

- All construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers and silencers, consistent with manufacturing standards.
- Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of electric air compressors and similar power tools, rather than diesel equipment, will be used.

51 FTA, Transit Noise and Vibration Impact Assessment, p, 12-11, May 2006.

- Noise attenuation measures, which may include temporary noise barriers or noise blankets around stationary construction noise sources, will be implemented.

- During construction, stationary construction equipment will be placed such that emitted noise is directed away from or shielded from sensitive receptors.

- During construction, stockpiling and vehicle staging areas will be located away from noise sensitive receptors, while being located on the building sites or on existing developed areas.

- Where power poles are available, electricity from power poles and/or solar powered generators rather than temporary diesel of gasoline powered generators will be used during construction.

- If diesel- or gasoline- powered generators are used, such equipment will be located at least 100 feet away from off-site sensitive land uses (e.g., residences, schools, childcare centers, hospitals, parks, or similar uses), and flexible sound control curtains will be placed around the equipment when in use.

- Construction hours, allowable workdays, and the phone number of the job superintendent will be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent if necessary. In the event the City receives a complaint, appropriate corrective actions will be implemented and a report of the action provided to the reporting party.

PDF-NOI-2: The following Project characteristics pertaining to vibration during construction will be implemented and adhered to:

- When vibration intensive activities, such as excavation, drilling, shoring, etc., occur within 100 feet of vibration-sensitive structures, the contractor will install and maintain at least one continuously operational automated vibrational monitor on or immediately adjacent to the sensitive structure. The monitors must be capable of being programmed with predetermined vibratory velocity levels and transmitting an alarm to on-site personnel with authorization to halt work in the vicinity so that strategies to reduce vibratory impacts can be implemented. It is recommended that a level of 90 percent of the structure damage threshold (0.12 inches/second peak particle velocity [in/sec PPV]) be utilized (0.108 in/sec PPV).

- Strategies to reduce vibratory impacts will include, but not limited to, halting/staggering concurrent activities, creating a larger set back distance, or utilizing lower-vibratory (typically smaller) equipment or techniques.

d) Analysis of Project Impacts

Threshold (a): Would the Project result in the 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?

(1) Impact Analysis

The noise levels used to determine significance associated with on-site activities are shown in Table IV.J-8. As set forth in Table IV.J-8, the City's conditionally acceptable noise level for hospitals is 60–70 dBA CNEL; therefore, this threshold is used for this analysis.

On-site noise-generating activities associated with all phases of the Project would include short-term construction and long-term noise associated with hospital operations, such as noise from emergency vehicles (e.g., ambulance sirens), emergency standby generators and HVAC equipment, proposed parking structures and surface parking, and other on-site noise sources. All phases of Project construction and operation would also generate off-site traffic noise along various roadways in the area.

(a) Construction Impacts

(i) On-Site Construction Noise

Development activities for Project construction would generally involve the following sequence for all phases of the Project: (1) site grading, (2) trenching, (3) building construction, (4) architectural coating, and (5) paving. Although Project-specific construction details and equipment fleet specifications are not available at this time, the following are typical types of construction equipment that are expected to be used:

Concrete/industrial saws	Trenching equipment	Air compressors
Dozers	Off-highway water trucks	Pavers
Tractors/loaders/backhoes	Materials delivery trucks	Scrapers
Forklifts	Pneumatic tools	Rollers
Welders	Graders	Concrete trucks
Cement and mortar mixers	Cranes	Asphalt trucks
Paving equipment	Generator sets	

As demonstrated by this list, construction equipment anticipated to be used for all phases of Project development would primarily include standard equipment that would be employed for any routine construction of a project of this scale. Construction equipment with substantially higher noise-generation characteristics (such as rock drills or blasting) is not anticipated to be used for development of any phase of the proposed Project. Additionally, pile driving will not be conducted as part of this Project. Instead, piles will be drilled as part of the building construction phase.

Construction noise is difficult to quantify because of the many variables involved, including the specific equipment types, size of equipment used, percentage of time used, condition of each piece of equipment, and number of pieces of equipment that would actually be operated on the building site(s). The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is provided in **Table IV.J-9**. The noise values represent maximum noise generation or full-power operation of the equipment. As an example, a loader and two dozers, all operating at full power and relatively close together, would generate a maximum sound level of approximately 90 dBA at 50 feet from their operations. As one increases the distance between equipment, or separation of areas with simultaneous construction activity, dispersion and distance attenuation reduce the effects of separate noise sources added together. In addition, typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes at lower levels. The average noise level during construction activities is generally lower (typical levels of approximately 88 dBA L_{eq} at a distance of 50 feet), since maximum noise generation may only occur up to 50 percent of the time.

TABLE IV.J-9
CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85

TABLE IV.J-9
CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74
Saw	76
Truck	88

SOURCE: FTA, Transit Noise and Vibration Impact Assessment Manual, 2018.

The nearest off-site sensitive receptors to the Project's construction work would be residential land uses adjacent to Sites 1 and 6. The nearest of these residential land uses would be within approximately 10 feet to 15 feet of the closest construction activities. More typically, other residential and nonresidential land uses (such as the Barnsdall Art Park) would be located approximately 45 to 450 feet away from Project construction. Noise levels generated by construction equipment (or by any point source) decrease at a rate of approximately 6 dBA per doubling of distance from the source.[52] Therefore, if a particular construction activity generated average noise levels of 88 dBA at 50 feet, the L_{eq} would be 82 dBA at 100 feet, 76 dBA at 200 feet, 70 dBA at 400 feet, and so on. Intervening structures that block the line-of-sight, such as buildings, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would reduce the noise level from construction activities at more distant locations at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively.

The closest point of construction activities to the nearest noise-sensitive receivers (during construction of Site 1, 1345 North Vermont MOB) would be approximately 10 feet southeast, and the furthest would be approximately 200 feet southeast. RCNM and Project-specific construction equipment were used to estimate construction noise levels at the nearest noise-sensitive land uses for each of the six proposed building sites. The results are summarized in **Table IV.J-10**, and the complete results are presented in Appendix I.

52 C.M. Harris, ed., Handbook of Acoustical Measurements and Noise Control, page 3.2, 1991.

Predicted construction noise levels at the nearest residences (Site 1) range from approximately 84 dBA L_{eq} during the architectural coatings phase to 98 dBA L_{eq} during demolition. At other sites, such as Site 6, construction noise levels would be nearly as loud at adjacent residential uses. At the western side of Barnsdall Art Park and at residences to the west, construction noise levels from Site 4 would be approximately 60 dBA L_{eq} to 72 dBA L_{eq} when construction takes place along the northern side of the Project Site. At the eastern side of Barnsdall Art Park and at residences to the east, construction noise levels from Site 5 would be approximately 57 dBA L_{eq} to 69 dBA L_{eq} when construction takes place along the northern side of the Project Site.

Construction noise levels would exceed the applicable significance thresholds for construction in the L.A. CEQA Thresholds Guide (i.e., construction activities lasting more than 10 days in a 3-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise-sensitive use) at all of the modeled sites. The temporary noise levels from construction would represent a substantial increase above existing ambient levels. Additionally, the estimated noise levels would exceed the noise standard in LAMC Section 112.05 of 75 dBA at a distance of 50 feet for construction within 500 feet of any residential zone. **Therefore, temporary noise impacts associated with the Project's on-site construction would be significant and unavoidable.**

(ii) Off-Site Construction Noise

The proposed Project would result in temporary increases in traffic from worker vehicles and construction-related trucks. The increase in vehicles along local arterials would correspond with an increase in traffic noise. Based on the Construction Traffic Analysis Memorandum prepared for the Project,[53] the Project would result in as many as 102 daily truck trips (51 round trips) and 186 daily one-way worker trips during the peak phase of construction related to the proposed Project, as shown in **Table IV.J-11**. Assuming a total of only 6 hours of hauling activities each day, it is estimated that approximately nine truck loads (i.e., resulting in nine inbound trucks and nine outbound trucks) would occur per hour. Haul trucks would be using permitted truck routes, to whatever freeway make sense based on the destination. Based upon information provided by the applicant, the following roadways could potentially be included as part of the haul route as the proposed haul route would require review and approval by the City of Los Angeles:

- Loaded Truck Route: North on Vermont Avenue to Los Feliz Boulevard, east on Los Feliz Boulevard to Northbound Interstate (I-) 5, north on Northbound I-5

53 Linscott, Law & Greenspan, Traffic Analysis Memorandum Kaiser Permanente Los Angeles Medical Center Project. August 8, 2018, provided as Appendix L-3 of this Draft EIR.

Freeway to yet to be determined receptor site/s (outside of City of Los Angeles limits). Alternatively, Sunset Boulevard to U.S. 101 could be utilized.

- Empty Truck Route: South on I-5 to Los Feliz Boulevard, west on Los Feliz Boulevard to Vermont Avenue, south on Vermont Avenue to the Project Site. Alternatively, U.S. 101 to Sunset Boulevard could be utilized.

The contractor would get approval from Los Angeles Department of Transportation if an additional haul route is considered for the Project in addition to the one described above. Table IV.J-11 presents the estimated peak phase construction traffic, in the context of the nearest streets along the potential haul route. Vermont Avenue north of Sunset Boulevard presently carries approximately 26,712 vehicles on a daily basis. Because of the relatively small number of vehicles added by the Project during construction (an increase of approximately 1.1 percent), average traffic noise levels are not anticipated to increase as a result of the Project.[54] Similarly, average daily volumes along Los Feliz Boulevard at Vermont Avenue would temporarily increase by approximately 1 percent and, thus, would not result in a measurable or perceptible increase in traffic noise. **Therefore, temporary noise impacts from off-site construction traffic would be less than significant**.

[54] All other things being equal, a doubling (a 100 percent increase) would be needed to result in a 3 dB increase in noise levels, which is the level that is considered to be an audible change to the typical human listener.

TABLE IV.J-10
CONSTRUCTION NOISE LEVELS AT NOISE-SENSITIVE USES

Project Site Location	Existing Ambient Noise Level	Distance from Construction Activity to Noise Receptor (feet)	Estimated Construction Noise Levels (dBA L_{eq})						Significance Threshold (Ambient + 5 dB)	Exceed existing ambient exterior noise levels by 5 dBA?
			Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating		
Site 1 – 1345 N. Vermont MOB & Parking Structure	63	Nearest Construction Activity / Receiver Distance (10)	98	96	96	91	94	84	**68**	**Yes**
		Typical Construction Activity / Receiver Distance (45)	87	86	87	84	86	75		**Yes**
Site 2 – 4760 Sunset Procedure Center Addition	62	Nearest Construction Activity / Receiver Distance (60)	83	81	84	80	81	71	**67**	**Yes**
		Typical Construction Activity /Receiver Distance (130)	76	75	78	75	76	65		**Yes**
Site 3 – 1505 Edgemont MOB	66	Nearest Construction Activity /Receiver Distance (250)	71	69	72	68	70	60	**71**	**Yes**
		Typical Construction Activity /Receiver Distance (310)	69	68	71	68	68	58		**Yes**
Site 4 – 1526 Edgemont MOB	67	Nearest Construction Activity / Receiver Distance (250)	72	71	71	68	71	60	**72**	**Yes**
		Typical Construction Activity / Receiver Distance (375)	69	68	68	66	68	56		**Yes**
Site 5 – 1517 Vermont Parking Structure	59	Nearest Construction Activity / Receiver Distance (350)	68	67	69	66	67	57	**64**	**Yes**
		Typical Construction Activity / Receiver Distance (450)	66	65	67	64	65	55		**Yes**
Site 6 – 4950 Sunset Parking Structure Expansion	65	Nearest Construction Activity / Receiver Distance (15)	94	93	94	90	91	84	**70**	**Yes**
		Typical Construction Activity / Receiver Distance (45)	86	85	87	84	85	75		**Yes**

SOURCE: Construction Noise Model Input / Output (Appendix I).
NOTES: L_{eq} dBA = Average noise energy level; MOB = medical office building.
Noise levels from construction activities do not take into account attenuation provided by intervening structures.

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TABLE IV.J-11
CONSTRUCTION RELATED TRAFFIC – AVERAGE DAILY TRIPS

Roadway Segment	Existing ADT	Project Traffic	Workers	Trucks	Existing + Project	Construction Traffic-Related Percentage Increase
Vermont Avenue at Prospect Avenue (north of Sunset Boulevard)	26,712	288	186	102	27,003	1.1%
Los Feliz Boulevard at Vermont Avenue	34,842	288	186	102	35,130	1.0%

SOURCES:
Existing ADTs: City of Los Angeles, Bureau of Engineering, Navigate LA, 2020.
Project-Related Construction Traffic: Appendix L-3.
NOTE: ADT = average daily trips.

As discussed above, temporary noise impacts associated with the Project's on-site construction would be significant at all the nearest noise-sensitive receptors locations. The temporary noise impacts from off-site construction traffic would be less than significant. Therefore, Project construction would result in the exposure of persons to or generation of noise levels in excess of standards established by the City.

(b) Operational Impacts

Long-term operational noise sources associated with hospital operations include emergency vehicles (e.g., ambulance sirens), proposed parking structures, and other on-site noise generators (such as emergency standby generators and HVAC equipment). Long-term operational noise sources also include Project-generated traffic.

(i) On-Site Operational Noise

(a) Parking Structure Noise

As detailed in **Table III-1** in Chapter III, Project Description, of this Draft EIR, construction of the proposed parking structures (at Sites 1, 2, 5, and 6) would result in a combined net increase of 1,068 parking spaces (319 spaces removed and 1,387 spaces added). Parking structure noise sources include vehicles entering and leaving the structure, vehicles entering and exiting parking spots, vehicle doors opening and closing, remote locking system noises, car alarms, engines, and people walking and talking. Based on noise measurements taken at a similar existing parking structure for another project[55] (five stories, with open sides), noise levels from the proposed facilities during peak commute hours (early morning and early evening hours) are anticipated to be approximately 63 dBA L_{eq}, with instantaneous maximum noise levels (L_{max}) of approximately 72 dBA at 30 feet occurring periodically from remote locking system "chirps," horn beeps, etc. The parking structures at Sites 1 and 2 would be located in proximity (within 10 to 20 feet) to adjacent residences. The estimated noise level from parking structure noise at the nearest residential uses would be approximately 64 dBA L_{eq} during periods of high usage. The measured noise level at the nearby residence represented by noise measurement location ST1 was 62 dBA L_{eq}, and at location ST2 the measured noise level was 63 dBA L_{eq}. The noise from the proposed parking structure would not result in a 5-dBA increase, on either an L_{eq} or a CNEL basis. The noise-sensitive receivers closest to Sites 5 and 6 would be further away, and thus the noise levels from parking structure noise would be less than this worst-case assessment. **Therefore, noise impacts from parking structure noise would be less than significant.**

(b) Stationary Equipment Noise

On-site stationary equipment, such as emergency standby generators, chillers, cooling towers, boilers, and air-handling equipment, would generate noise. However, with the exception of the cooling towers, mechanical equipment would be within soundproof enclosures or sound-proof mechanical rooms, and/or be blocked from a direct view of noise-sensitive receivers by rooftop parapet walls. As discussed in the Noise Attenuation section above, noise levels are reduced when the direct line-of-sight between the noise source and the receiver is blocked by intervening structures, terrain, or other solid materials. Cooling towers would be fitted with low-noise fans. Furthermore, all mechanical equipment would be subject to LAMC Section 112.02, which, as detailed previously, establishes maximum permitted noise levels for powered equipment or powered hand tools. Thus, the equipment would not exceed the maximum permitted noise levels.

The specific details (sizes, manufacturers, and models) of the equipment and their locations have not yet been determined. As such, compliance with the City's code requirement would ensure that stationary equipment would not result in a substantial noise increase over ambient levels. **Therefore, noise impacts from stationary equipment would be less than significant.**

55 Dudek, Covina Transit-Oriented Mixed-Use Development Project EIR, page 3.12-6, September 2016.

(c) Emergency Vehicle Noise

Increases in visits to the hospital of emergency vehicles using their sirens would create a source of additional noise. Based upon information from Kaiser Permanente, it was assumed that the additional bed count at Site 4 (1526 North Edgemont hospital expansion scenario) would, to some extent, increase siren use, either in emergency department throughput or emergency patient transfers. The addition of 105 beds under this scenario to the 460 existing patient beds (using 2009 license information) is an approximate 24-percent increase in beds. Assuming that siren usage would increase by 24 percent, the overall increase in noise level on an average hourly (or daily) basis would increase by approximately 0.9 dB, both during daytime and nighttime hours, which is not an audible increase. Furthermore, noise from emergency vehicle sirens would be relatively brief and periodic in nature and would cease once the emergency vehicles either enter or exit the area. Because siren exposure at any one location would remain relatively brief, and because the potential increase in siren usage by the Project (over existing siren usage) would be negligible, the Project would not result in the exceedance of applicable noise standards and would not result in a substantial noise increase. **Therefore, impacts from increased emergency vehicle use would be less than significant.**

(d) Refuse and Loading/Unloading Areas

Loading docks and refuse collection areas would be completely enclosed at all sides and would shield the surrounding sensitive receptors from any noise from loading/unloading and refuse operations. **Therefore, noise from the loading docks and refuse collection would not result in excess noise levels at the surrounding sensitive receptors, and impacts would be less than significant.**

Based on the above, on-site operational noise impacts would not result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards or other agencies. Impacts would be less than significant.

(ii) Off-Site Operational Noise

The Project would generate traffic along adjacent roadways, including Sunset Boulevard, Vermont Avenue, and North Edgemont Street. Potential noise effects from vehicular traffic associated with a variety of Project-related operational scenarios were assessed using the Federal Highway Administration's Traffic Noise Model (TNM Version 2.5). Data used to model noise from vehicular traffic was derived from the Project-specific Transportation Impact Study[56]. Information used in the model consisted of Project

[56] Linscott, Law & Greenspan, Transportation Impact Study Kaiser Permanente Los Angeles Medical Center Project. August 8, 2018, provided as Appendix L-1 of this Draft EIR.

geometry, traffic volumes (aggregated turn movements), and speeds (posted speed limits) for the following scenarios:

- Existing Weekday PM Peak Hour
- Existing plus Project Weekday PM Peak Hour
- Future without Project Buildout Weekday PM Peak Hour
- Future with Project Buildout Weekday PM Peak Hour

Noise levels were modeled at representative noise-sensitive receivers (ST1 though ST11, as well as additional traffic modeling receivers M1 through M16, as shown in Figure IV.J-3). The receivers were modeled to be 5 feet above the local ground elevation. TNM modeling input and output files are provided in Appendix I. Traffic noise impacts were calculated by comparing the existing and future modeled noise results with the Existing with Project and Future with Project results, respectively. The traffic volumes used in the TNM model are summarized in Appendix I.

The noise modeling results are presented in **Table IV.J-12**. As shown in Table IV.J-12, typical existing and future noise levels would increase by 1 dB or less as a result of implementing the proposed Project. This is because additional trips associated with the proposed Project would be relatively few in number compared to existing traffic along Sunset Boulevard and the other nearby arterial roadways. Changes in noise level of this order would not be audible and would not exceed the threshold of either a 3 dBA (i.e., the Project causes the ambient noise levels to increase by 3 dBA CNEL to or within the "normally unacceptable" or "clearly unacceptable" categories) or 5 dBA (i.e., the Project causes the ambient noise levels to increase by 5 dBA CNEL or greater noise increase*)* CNEL noise increase. Therefore, the off-site traffic noise level increase associated with Project operation is considered less than significant.

TABLE IV.J-12
OFF-SITE TRAFFIC NOISE MODELING RESULTS

Modeled Receptor	Existing Noise Level (dBA CNEL)	Existing with Project Noise Level (dBA CNEL)	Noise Level Increase (dB)	Future Noise Level (dBA CNEL)	Future with Project Noise Level (dBA CNEL)	Noise Level Increase (dB)
ST1	56	56	0	57	57	0
ST2	59	59	0	60	60	0
ST3	66	66	0	67	67	0
ST4	64	65	1	65	65	0

TABLE IV.J-12
OFF-SITE TRAFFIC NOISE MODELING RESULTS

Modeled Receptor	Existing Noise Level (dBA CNEL)	Existing with Project Noise Level (dBA CNEL)	Noise Level Increase (dB)	Future Noise Level (dBA CNEL)	Future with Project Noise Level (dBA CNEL)	Noise Level Increase (dB)
ST5	58	58	0	58	59	1
ST6	48	48	0	49	49	0
ST7	51	51	0	52	52	0
ST8	67	67	0	68	68	0
ST9	47	47	0	48	48	0
ST10	62	62	0	63	63	0
ST11	50	50	0	50	50	0
M1	68	68	0	69	69	0
M2	64	64	0	65	65	0
M3	57	58	1	58	59	1
M4	64	64	0	65	65	0
M5	68	68	0	68	68	0
M6	59	59	0	60	60	0
M7	61	61	0	62	62	0
M8	48	48	0	49	49	0
M9	61	61	0	62	62	0
M10	50	50	0	51	51	0
M11	50	50	0	50	50	0
M12	63	63	0	63	63	0
M13	63	63	0	63	63	0
M14	45	45	0	46	46	0
M15	71	71	0	71	72	1
M16	67	67	0	67	67	0

SOURCE: Traffic Noise Model Input / Output (Appendix I).

Based on the above, off-site operational noise impacts would not result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Impacts would be less than significant.

(2) Mitigation Measures

The following mitigation measure would reduce potentially significant construction-related noise impacts.

> **MM-NOI-1:** Prior to commencement of construction activities, temporary noise barriers shall be constructed at the Project site boundaries adjacent to residential land uses and other noise-sensitive land uses. The temporary sound barrier (minimum STC 25) shall be designed to provide a minimum 15-A-weighted decibels noise reduction at the adjacent residences.

(3) Level of Significance after Mitigation

Implementation of Project Design Feature **PDF-NOI-1** would ensure that all construction equipment is equipped with properly operating and maintained mufflers and silencers, shutting off idling equipment, use of electricity from power poles and/or solar powered generators, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of temporary noise barriers or noise blankets around stationary construction noise sources.

Implementation of Project Design Feature **PDF-NOI-1** and Mitigation Measure **MM-NOI-1**, as described above, would reduce the Project's on-site construction noise impacts at the off-site noise sensitive receptors, to the extent technically feasible. The noise analysis considered the expected types and numbers of construction equipment that would need to be used during the various construction activities and also considered the closest distances the construction activities would need to occur relative to the noise-sensitive uses in order to construct the proposed Project uses and achieve the Project objectives identified in Chapter III, Project Description, of this Draft EIR. Based on Table IV.J-10, Construction Noise Levels at Noise Sensitive Uses, the noise reduction required at nearby noise-sensitive uses would need to be up to 30 dBA (the difference between the loudest construction location and phase (Site 1 during building demolition and the applicable construction noise threshold) in order to reduce construction noise level to less than significant. Given the logarithmic nature of sound and the decibel scale, reducing the types and numbers of construction equipment by a few pieces of equipment would not result in a substantial reduction in noise levels. A 3-dBA reduction in noise requires a halving of the sound energy—in other words, a 50 percent reduction in the number of pieces of equipment operating. A 3-dBA reduction would represent only a small step in achieving the substantial noise reduction required of up to 35 dBA. Thus, there would be little benefit in terms of the construction noise levels by requiring a reduction in the types and numbers of construction equipment by only a few pieces of equipment. Given that a 3-dBA reduction in noise would require a halving of the construction sound energy, it would not be feasible to construct the proposed Project by substantially reducing the types and number of construction equipment used by half or more without severely impacting the ability to build the proposed Project within a reasonable schedule and the ability to safely and adequately construct the proposed Project buildings and facilities without access to the full range of the needed equipment.

Implementation of Mitigation Measure **MM-NOI-1** would reduce construction noise by 15 dBA or more, but the construction noise level would still exceed the significance thresholds at nearby noise-sensitive uses. Thus, with implementation of technical feasible mitigation, construction noise impacts would still exceed the applicable construction noise thresholds by up to 20 dBA. Therefore, construction noise impacts associated with on-site noise sources would remain temporarily significant and unavoidable. While construction noise impacts would be temporarily significant and unavoidable, construction noise levels fluctuate throughout a given workday as construction equipment moves from one location to another within a Project Site. When construction equipment would be in use further away from a sensitive receptor location, construction noise levels would be lower than the calculated values provided herein, which assumes construction equipment would be in use nearest to a sensitive receptor location.

Even with the implementation of Mitigation Measures **MM-NOI-1**, noise from construction would still exceed the City of Los Angeles' significance thresholds and would result in a substantial noise increase above ambient noise levels. **Therefore, noise from construction, though temporary, is considered to be a significant and unavoidable impact.**

Threshold (b): Would the Project result in the generation of excessive groundborne vibration noise levels?

(1) Impact Analysis

(a) Construction Impacts

(i) Structural Damage

Construction of the proposed Project would result in groundborne vibration from heavy equipment, including bulldozers, backhoes, rollers, cranes, pile drilling, graders, concrete mixers, and paving equipment. Based upon data from the FTA,[57] large tracked heavy equipment, such as excavators, loaders, bulldozers, and pile drilling, can produce vibration levels of 0.089 in/sec PPV at a reference distance of 25 feet. Loaded haul trucks and delivery vehicles on the construction site can produce vibration levels of 0.076 in/sec PPV at this distance. **Table IV.J-13** shows the estimated building damage from vibration

[57] FTA, Transit Noise and Vibration Impact Assessment, Chapter 12, 2018.

impacts that could be experienced by buildings in the vicinity of the building sites as a result of the Project's construction activities. As shown in the table, Project-related construction is estimated to result in vibration levels in excess of FTA criteria for potential building damage at the residences located nearest to Sites 1 and 6. Construction activities (i.e., the use of large bulldozers and similar heavy equipment) would exceed FTA vibration thresholds when conducted adjacent to sensitive receivers. **Therefore, vibration impacts during construction of the Project to off-site building structures would be significant.**

(ii) Human Annoyance

The potential for construction activities to result in significant levels of annoyance from vibration at nearby sensitive receivers was assessed. Based upon data from the FTA,[58] large tracked heavy equipment, such as excavators, loaders, bulldozers, and pile drilling can produce vibration levels of approximately 87 VdB at a reference distance of 25 feet. Loaded haul trucks and delivery vehicles on the construction site can produce vibration levels of 86 VdB at this distance. **Table IV.J-14** shows the estimated human annoyance vibration impacts that could be experienced by persons in the building sites' vicinity as a result of the Project's construction activities. As shown in the table, Project-related construction is estimated to result in vibration levels in excess of FTA criteria for annoyance at nearby residences located within approximately 25 feet of conventional construction activities (i.e., at Sites 1, 2, and 6). Additionally, as shown in Table IV.J-14, construction activities are estimated to result in vibration levels exceeding FTA criteria for human annoyance for passengers at the adjacent Metro B Line tunnel and the Vermont/Sunset Station. **Therefore, vibration impacts during construction of the Project to off-site receptors, pursuant to the significance criteria for human annoyance, would be significant.**

(iii) Off-Site Construction

Potential groundborne vibration impacts related to off-site construction activities would be limited to Project-related vehicle and truck pass-bys along the local roadways. The potential for construction activities to result in significant levels of annoyance from vibration at nearby sensitive receivers was assessed. Based upon information provided by Caltrans,[59] vehicles (including heavy trucks) traveling on smooth paved roads rarely result in excessive groundborne vibration levels. Because on-road vehicles are supported on flexible suspension systems and pneumatic tires, these vehicles are not a significant source of groundborne vibration. When traveling over rough roads at higher speeds,

58 FTA, Transit Noise and Vibration Impact Assessment, 2018.
59 Caltrans, Transportation and Construction Vibration Guidance Manual, September 2013.

heavy truck pass-bys can create localized, intermittent vibration peaks. However, these would be brief, isolated cases and would be highly unlikely to result in levels high enough to result in structural damage or annoyance. **Therefore, potential impacts, with respect to human annoyance and building damage, that would result from temporary and intermittent off-site vibration from construction activities is considered to be less than significant.**

(b) Operation

The primary anticipated source of vibration from operation of the proposed Project would be vehicular circulation within the proposed parking garages and off-site vehicular trips. . Passenger vehicle trips are unlikely to result in perceptible or structural damage-inducing vibration levels at nearby uses because passenger vehicles are relatively light in weight and use pneumatic rubber tires, typically resulting in negligible levels of vibration.[60] Similarly, vibration from other vehicles such as ambulances, shuttles, and delivery trucks would be unlikely to cause significant levels of vibration.

The Project would also include typical commercial-grade stationary mechanical equipment, such as air-condenser units (mounted at the roof level), that would include vibration-attenuation mounts to reduce the vibration transmission. Details regarding mechanical equipment, such as emergency standby generators, chillers, cooling towers, boilers and air-handling equipment, is not available at this time because these pieces of mechanical equipment have not yet been specified. However, any such mechanical equipment with the potential to create substantial vibration would be isolated and/or otherwise prevented from imparting that vibration into the ground because the machine could be damaged or cause damage to the base upon which it is fastened. Thus, these pieces of equipment would be isolated from the ground by virtue of being located at rooftop levels and (typically) would include vibration-absorbing mounts. In addition, groundborne vibration attenuates rapidly as a function of distance from the vibration source. **Therefore, operation of the Project would not increase the existing vibration levels in the immediate vicinity of the Project Site and would not exceed human annoyance or structural damage thresholds. As such, vibration impacts associated with the operation of the Project would be less than significant.**

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60 FTA, Transit Noise and Vibration Impact Assessment, 2018.

TABLE IV.J-13
CONSTRUCTION VIBRATION ANALYSIS – BUILDING DAMAGE

Site(s)	Building	Approximate Distance (feet)	Building Type	Significance Criteria (in/sec PPV)	Construction Work Type/Vibration Level at 25 feet (in/sec PPV)	Estimated Vibration Levels (in/sec)	Significant Impact?
1 and 6	Nearest Residences	10	Non-engineered timber and masonry buildings	0.2	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.352	**Yes**
2	Nearest Residences	25	Non-engineered timber and masonry buildings	0.2	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.089	No
3 and 4	Nearest Residences	250	Non-engineered timber and masonry buildings	0.2	Typical Heavy Construction Equipment (i.e., large bulldozer) /0.089	0.003	No
4	Hollyhock House (Barnsdall Art Park)	350	Buildings extremely susceptible to vibration damage	0.12	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.002	No
5	Nearest Residences	350	Non-engineered timber and masonry buildings	0.2	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.002	No
5	Nearest Residences	350	Non-engineered timber and	0.2	Typical Heavy Construction Equipment (i.e.,	0.002	No

TABLE IV.J-13
CONSTRUCTION VIBRATION ANALYSIS – BUILDING DAMAGE

Site(s)	Building	Approximate Distance (feet)	Building Type	Significance Criteria (in/sec PPV)	Construction Work Type/Vibration Level at 25 feet (in/sec PPV)	Estimated Vibration Levels (in/sec)	Significant Impact?
			masonry buildings		large bulldozer)/ 0.089		
1 and 5	Metro B Line Tunnel	10[1]	Reinforced-concrete, steel or timber (no plaster)	0.5	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.352	No
5	Metro B Line Vermont/Sunset Station	10[1]	Reinforced-concrete, steel or timber (no plaster)	0.5	Typical Heavy Construction Equipment (i.e., large bulldozer)/ 0.089	0.352	No

SOURCE: FTA, Transit Noise and Vibration Impact Assessment, 2018.
NOTES:
[1] The 10-foot distance for Metro B Line tunnel and Metro B Line Vermont/Sunset Station represents what is believed to be a conservative assumption, based upon the alignment shown in the Southern California Rapid Transit District Final Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report for the Los Angeles Rail Rapid Transit Project, Metro Rail, July 1989.

TABLE IV.J-14
ESTIMATED HUMAN ANNOYANCE VIBRATION IMPACTS

Site(s)	Land Use	Approximate Distance (feet)	Significance Criteria (VdB)	Construction Work Type/Vibration Level at 25 feet (VdB)	Estimated Vibration Levels (in/sec)	Significant Impact?
1 and 6	Nearest Residences	10	72	Typical Heavy Construction/87	99	**Yes**
2	Nearest Residences	25	72	Typical Heavy Construction/87	87	**Yes**
3 and 4	Nearest Residences	250	72	Typical Heavy Construction/87	57	No
4	Hollyhock House (Barnsdall Art Park)	350	72	Typical Heavy Construction/87	53	No
5	Nearest Residences	350	72	Typical Heavy Construction/87	53	No
5	Nearest Residences	350	72	Typical Heavy Construction/87	53	No
1 and 5	Metro B Line Tunnel	10[1]	75	Typical Heavy Construction/87	99	**Yes**
5	Metro B Line Vermont/Sunset Station	10[1]	75	Typical Heavy Construction/87	99	**Yes**

SOURCE: FTA, Transit Noise and Vibration Impact Assessment, 2018.
NOTE:
[1] The 10-foot distance for Metro B Line tunnel and Metro B Line Vermont/Sunset Station represents what is believed to be a conservative assumption, based upon the alignment shown in the Southern California Rapid Transit District Final Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report for the Los Angeles Rail Rapid Transit Project, Metro Rail, July 1989.

(2) Mitigation Measures

There are no feasible mitigation measures available that would reduce potentially significant construction-related vibration impacts to below a level of significance.

(3) Level of Significance after Mitigation

Project Design Feature **PDF-NOI-2** (which requires the installation of vibration monitors, implementation of strategies to reduce vibratory impacts, and establishment of protocols for inspections and remediation in the event of exceedance of specified vibration levels) provides features that would reduce the potential for building damage and human annoyance from construction activities. However, because of the relatively high estimated levels at nearby sensitive uses, it is unlikely that features listed in Project Design Feature **PDF-NOI-2** would be adequate to reduce vibration impacts related to human annoyance to below a level of significance. **Therefore, vibration impacts associated with the proposed Project during construction as they relate to both building damage and human annoyance are considered 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 airport, would the Project expose people residing or working in the Project area to excessive noise levels?

As discussed in Section VI.6, Effects Not Found To Be Significant, and in the Initial Study (Appendix A of this Draft EIR), the Project Site is not located within an airport land use plan or within two miles of a public airport, public use airport or a private airstrip. Thus, the Project would have no impact with respect to Threshold (c), and no further analysis is required.

e) Cumulative Impacts

(1) Impact Analysis

Projects considered in the cumulative scenario due to their proximity to the Project and contribution to similar noise and vibration impacts include project numbers 5, 11, 14, 23, 26, 36, 60 and 73. For more information about the complete list of 85 related projects, please refer to Section II.4 of this Draft EIR.

(a) Noise in Excess of Standards

The Project and the above-referenced related projects would all be subject to applicable noise standards (descriptions of the standards applicable within the City are described throughout this section). **However, as determined in the analysis in this section, noise and vibration from Project construction would exceed applicable standards, and temporary impacts would be significant and unavoidable. Therefore, the Project would contribute to temporary cumulative exceedances of noise and vibration standards, and its incremental effect would be cumulatively considerable.**

(b) Temporary/Periodic Increases in Ambient Noise Levels

The proposed Project would result in temporary noise increases during the construction period, as analyzed in Section IV.J.3, Project Impacts. The proposed Project's construction period would have the potential to overlap with the related projects' construction processes. The nearest related projects, numbers 23 and 5, are located within approximately 200 and 800 feet, respectively, of the proposed building sites. However, both of these projects will have completed construction prior to the proposed Project's construction start date. The remainder of the related projects are approximately 1,000 feet or more from the proposed building sites. **As determined in the analysis in this section, temporary and periodic increases in ambient noise levels would be significant and unavoidable. Therefore, the Project's contribution to temporary cumulative increases in ambient noise levels would be cumulatively considerable, and cumulative impacts would be significant.**

(c) Permanent Increases in Ambient Noise Levels

(i) Stationary Sources

Long-term operational noise would result from operation of the proposed Project, such as noise from the proposed parking structures and the Project's mechanical equipment, as addressed in the Long-Term Operational Noise section. A cumulative impact could result if noise produced during operation of the proposed Project were to combine with noise produced from the operation of some or all of the 85 related projects (as listed in **Table II-2**, Related Projects, in Chapter II, Environmental Setting) to create a cumulatively significant permanent increase in ambient noise levels.

Because the generation of noise from stationary sources is a localized phenomenon, the proximity of related projects to the proposed Project is a key factor in the determination of potential cumulative impacts. Related project no. 23 (currently under construction), is the nearest one and would be located approximately 200 feet east of Site 1. The next nearest related project (related project no. 5, currently under construction) is located approximately 500 feet or more from the proposed Project. Due to the decrease in noise levels with distance and the presence of physical barriers (the structures themselves, parapet walls, etc.), noise from other related projects would not combine with the proposed Project to produce a cumulative noise effect during operation.

The Project's operations and those of the related projects would be subject to the City's Noise Control Ordinance, which limits the exterior noise levels at residences. Similarly, the related projects would be required to comply with the City's noise standards. The Project's contribution to operational noise impacts would not be cumulatively considerable, and cumulative impacts would be less than significant.

(ii) Off-Site Traffic Noise

The proposed Project and the related projects would generate off-site traffic noise. When calculating future traffic impacts, traffic from the related projects (as listed in Table II-2, Related Projects, in Chapter II, Environmental Setting) was included in the future traffic volumes. Recent pending and approved projects in the City were included in the traffic model. Thus, the future traffic results without and with the proposed Project already account for the cumulative impacts from the list of related projects contributing to traffic increases. Since the noise impacts are generated directly from the traffic analysis results, the Future without Project Noise Levels and Future with Project Noise Levels described herein already reflect cumulative impacts. As described herein, the noise level increases associated with both of these scenarios (Future without Project and Future with Project) would generate a noise level increase of 1 dBA or less (rounded to whole numbers) along the studied roadways in the vicinity of the Project Site. **As such, increases would be below the significance threshold of 5 dBA. Without or with the proposed Project, traffic noise would not substantially increase in the Project vicinity. As such, the incremental effect of the Project's operation with regards to off-site traffic noise would not be cumulatively considerable, and impacts to cumulative operational traffic noise would be less than significant.**

(iii) 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 construction- or operational-period impacts with respect to groundborne vibration. Furthermore, because the nearest related projects (related projects 5 and 23) are already under construction and are expected to be complete before construction of the proposed Project begins, it is unlikely that groundborne vibration from construction trucks associated with the related projects would combine with the vibration from the proposed Project's haul trucks to create a cumulatively significant impact. **Therefore, potential cumulative groundborne vibration impacts with regard to human annoyance or potential for structural damage would be less than significant.**

(2) Mitigation Measures

In order to minimize noise impacts during construction of the Project and related projects to less than significant levels, Mitigation Measure **MM-NOI-1** is required.

(3) Level of Significance after Mitigation

Even with the implementation of Mitigation Measure **MM-NOI-1**, it is likely that noise from construction of the Project, in conjunction with the related projects, would still exceed the City of Los Angeles' significance thresholds and would result in a substantial noise increase above ambient noise levels. **Therefore, noise from construction, though temporary, would be cumulatively considerable and is considered to be a significant and unavoidable impact.**