IV. Environmental Impact Analysis

H. Noise

1. Introduction

This section of the Draft EIR analyzes the potential noise and vibration impacts that would result from the Project. Specifically, the analysis describes the existing noise environment in the vicinity of the Project Site and estimates future noise and vibration levels at surrounding sensitive land uses resulting from construction and operation of the Project. In addition, evaluations of the potential cumulative noise impacts and vibration impacts resulting from the Project together with related projects and future growth are also provided. Noise calculation worksheets are included in Appendix G of this Draft EIR.

2. Environmental Setting

a. Noise and Vibration Fundamentals

(1) Noise

(a) Fundamentals of Sound and Environmental Noise

Noise is commonly defined as sound that is undesirable because it interferes with speech communication and hearing, causes sleep disturbance, or is otherwise annoying (unwanted sound). The decibel (dB) is a conventional unit for measuring the amplitude of sound as it accounts for the large variations in sound pressure amplitude and reflects the way people perceive changes in sound amplitude.[1] Human hearing is not equally sensitive to sound at all frequencies. Therefore, to approximate this human frequency-dependent response, the A-weighted filtering system is used to adjust measured sound levels (dBA). The term "A-weighted" refers to filtering the noise signal in a manner that corresponds to the way the human ear perceives sound. Examples of various sound levels in different environments are shown in Table IV.H-1 on page IV.H-2.

People commonly judge the relative magnitude of sound sensation using subjective terms, such as "loudness" or "noisiness." A change in sound level of 3 dB is considered

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

Table IV.H-1
Typical Noise Levels

Common Outdoor Activities	Noise Levels (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-Over at 1000 feet		
	100	
Gas Lawn Mower at 3 feet		
	90	
Diesel Truck at 50 feet at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
Gas Lawn Mower at 100 feet	**70**	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	**60**	
		Large Business Office
Quiet Urban Daytime	**50**	Dishwasher Next Room
Quiet Urban Nighttime	**40**	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
	0	

Source: Caltrans, Technical Noise Supplement (TeNS), Table 2-5, 2013.

"just perceptible," a change in sound level of 5 dB is considered "clearly noticeable," and a change (increase) of 10 dB is typically recognized as "twice as loud."[2]

(b) Outdoor Sound Propagation

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 construction equipment (e.g., air conditioner or bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor at acoustically "hard" sites (e.g., asphalt and concrete surfaces) and

[2] *Bies & Hansen, Engineering Noise Control, 1988, Table 2.1.*

7.5 dBA per doubling of distance from the noise source to the receptor at acoustically "soft" sites (e.g., soft dirt, grass or scattered bushes and trees).[3] 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 and 4.5 dBA per doubling of distance from the noise source to the receptor for hard and soft sites, respectively.[4]

In addition, 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), some 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 reflects 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 more substantial barrier.[5] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[6]

(c) Environmental Noise Descriptors

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise is dependent upon the total acoustical energy content, as well as the time and duration of occurrence. The most frequently used noise descriptors, including those used by the City of Los Angeles, are summarized below:

- *Equivalent Sound Level (L_{eq}).* L_{eq} is a measurement of the acoustic energy content of noise averaged over a specified time period. Thus, the L_{eq} of a time-varying sound and that of a steady sound are the same if they deliver the same amount of energy to the receptor's ear during exposure. L_{eq} for one-hour periods, during the daytime or nighttime hours, and 24-hour periods are

[3] *Caltrans, Technical Noise Supplement (TeNS), 2013, Chapter 2.1.4*.

[4] *Ibid.*

[5] *Ibid.*

[6] *Ibid, Table 7-1*.

commonly used in environmental assessments. For evaluating community impacts, this rating scale does not vary regardless of whether the noise occurs during day or night.

- *Maximum Sound Level (L_{max}).* L_{max} represents the maximum sound level measured during a measurement period.

- *Community Noise Equivalent Level (CNEL)*. CNEL is the time average of all A-weighted sound levels for a 24-hour period with a 10 dBA adjustment (upward) added to the sound levels that occur between the hours of 10:00 P.M. and 7:00 A.M. (nighttime), and a 5 dBA adjustment (upward) added to the sound levels which occur between the hours of 7:00 P.M. and 10:00 P.M. (evening). These penalties attempt to account for increased human sensitivity to noise during the nighttime and evening periods, particularly where sleep is the most probable activity. CNEL has been adopted by the State of California to define the community noise environment for development of the community noise element of a General Plan and is also used by the City for land use planning and to describe noise impacts in the *L.A. CEQA Thresholds Guide*.[7]

(2) Ground-Borne Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root-mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and is typically used for evaluating potential building damage.[8] The RMS velocity is defined as the square-root of the average of the squared amplitude of the vibration signal and is typically more suitable for evaluating human response to ground-borne vibration.[9] The RMS vibration velocity level can be presented in inch per second or in VdB (a decibel unit referenced to 1 micro-inch per second).[10] Ground-borne vibration generated by man-made activities (e.g., road traffic,

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[7] *State of California, General Plan Guidelines, 2003.*

[8] *Vibration levels are described in the noise calculation worksheets included in Appendix G of this Draft EIR and in this section of the Draft EIR in terms peak particle velocity level in the unit of inches per second.*

[9] *Federal Transit Administration (FTA), "Transit Noise and Vibration Impact Assessment," May 2006, Section 7.1.2.*

[10] *VdB (velocity level in decibel) = 20 x Log (V / V_{ref}), where V is the RMS velocity amplitude in micro-inch per second and V_{ref} is the reference velocity amplitude of $1x10^{-6}$ inch per second (1 micro-inch per second). All vibration levels described in decibel (VdB) in the noise calculation worksheets included in Appendix G of this Draft EIR and in this section of the Draft EIR are RMS and referenced to 1 micro-inch per second.*

construction operations) typically weakens with greater horizontal distance away from the source of the vibration.

b. Regulatory Framework

Various government agencies have established noise regulations and policies to protect citizens from potential hearing damage and other adverse effects associated with noise and ground-borne vibration. The City of Los Angeles has adopted a number of regulations and policies, which are based in part on federal and state regulations and are intended to control, minimize, or mitigate environmental noise effects. There are no City-adopted regulations or policies that relate to ground-borne vibration; therefore, the ground-borne vibration standards and guidelines from the Federal Transit Administration (FTA) are used for this analysis. The regulations and policies that are relevant to Project construction and operational noise are discussed below.

(1) Federal

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the USEPA issued guidance levels for the protection of public health and welfare in residential land use areas[11] of an outdoor Ldn of 55 dBA and an indoor Ldn of 45 dBA. These guidance levels are not considered as 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.

(2) State

The State of California has adopted noise compatibility guidelines for general land use planning (refer to Table IV.H-2 on page IV.H-8) and used by the City of Los Angeles for Noise Compatible Land Use guidelines. The types of land uses addressed by the state and the acceptable noise categories for each land use are included in the *State of California General Plan Guidelines,* which is published and updated by the Governor's Office of Planning and Research. The level of acceptability of the noise environment is dependent upon the activity associated with the particular land use. For example,

[11] *United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974, https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-healthand-welfare.html. Accessed August 2017.*

according to the State, an exterior noise environment up to 65 dBA CNEL is "normally acceptable" for single- and multi-family residential uses, without special noise insulation requirements. In addition, noise levels up to 75 dBA CNEL are "conditionally acceptable" with special noise insulation requirements, while noise levels at 75 dBA CNEL and above are "clearly unacceptable" for residential and hotel uses.[12] In addition, the 2016 California Building Standards Code requires that where the ambient noise environment exceeds 65 dBA CNEL, measures should be implemented to achieve an interior noise environment of a residential use (habitable room) not to exceed 45 dBA CNEL. In addition, the 2016 California Green Building Standards Code requires that where the ambient noise environment exceeds 65 dBA CNEL or 65 dBA L_{eq}, measures should be implemented to achieve an interior noise environment of a non-residential use that would not exceed 50 dBA $L_{eq\ (1\text{-}hour)}$.

(3) City of Los Angeles Regulations and Policies

The Noise Element of the City of Los Angeles General Plan (General Plan) establishes CNEL guidelines for land use compatibility and includes a number of goals, objectives, and policies for land use planning purposes. The City also has regulations to control unnecessary, excessive, and annoying noise, as set forth in the Los Angeles Municipal Code (LAMC) Chapter XI, Noise Regulation. In addition, the *L.A. CEQA Thresholds Guide* provides thresholds for determining noise impacts of a project. These regulations and policies are described further below.

(a) Noise Element

The overall purpose of the Noise Element of the General Plan is to guide policymakers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels. The following policies and objectives from the Noise Element of the General Plan are applicable to the Project:[13]

- Objective 2 (Non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise-sensitive uses.
- Policy 2.1: 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.

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[12] *State of California, Governor's Office of Planning and Research, General Plan Guidelines, October 2003, p. 250.*

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

- Objective 3 (Land Use Development): Reduce or eliminate noise impacts 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.

The City's noise compatibility guidelines are provided in Table IV.H-2 on page IV.H-8.

(b) City of Los Angeles Noise Regulations (Chapter XI of the LAMC)

Chapter XI, Noise Regulation, of the LAMC (referred to herein as the Noise Regulations) establishes acceptable ambient sound levels to regulate intrusive noises (e.g., stationary mechanical equipment and vehicles other than those traveling on public streets) within specific land use zones and provides procedures and criteria for the measurement of the sound level of noise sources. These procedures recognize and account for differences in the perceived level of different types of noise and/or noise sources. In accordance with the Noise Regulations, a noise level increase from certain regulated noise sources of 5 dBA over the existing or presumed ambient noise level at an adjacent property line is considered a violation of the Noise Regulations. The 5-dBA increase above ambient is applicable to City-regulated noise sources (e.g., mechanical equipment), and it is applicable any time of the day.[14]

The Noise Regulations state that the baseline ambient noise shall be the actual measured ambient noise level or the City's presumed ambient noise level, whichever is greater. The actual ambient noise level is the measured noise level averaged over a period of at least 15 minutes, L_{eq} (15-minute). The Noise Regulations indicate that in cases where the actual measured 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.) ambient noise levels defined in Section 111.03 of the LAMC should be used. The City's presumed ambient noise levels for specific land use zones, as set forth in LAMC Section 111.03, are provided in Table IV.H-3 on page IV.H-9.

To account for people's increased tolerance for short-duration noise events, the Noise Regulations provide an additional 5-dBA allowance beyond the 5 dBA above ambient for noise sources occurring more than five minutes but less than 15 minutes in any 1-hour period (for a total of 10 dBA above the ambient), and an additional 5-dBA allowance (total of 15 dBA above the ambient) for noise sources occurring five minutes or less in any 1-hour period. These additional allowances for short-duration noise sources are applicable to noise sources occurring between the hours of 7:00 A.M. and 10:00 P.M. (daytime hours).

[14] *Los Angeles Municipal Code, Chapter XI, Section 112.02.*

Table IV.H-2
City of Los Angeles Guidelines for Noise Compatible Land Use

Land Use	Community Noise Exposure: Day-Night Average Exterior Sound Level (CNEL dBA)						
	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
Auditoriums, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sports Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playgrounds, 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 Buildings, 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 the noise mitigation is made and needed noise insulation features included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

N = Normally Unacceptable: New construction or development generally should be discouraged. A detailed analysis of the noise reduction requirements must be made and noise insulation features included in the design of a project.

U = Clearly Unacceptable: New construction or development generally should not be undertaken.

Source: California Department of Health Services (DHS).. City General Plan Noise Element, adopted February 1999.

The Noise Regulations further provide that 5 dBA shall be added to the noise level for steady high-pitched noise or repeated impulsive noises.[15,16]

The LAMC also provides noise regulations with respect to vehicle-related noise, including Section 114.02, which prohibits the operation of any motor driven vehicles upon

[15] *Los Angeles Municipal Code, Chapter XI, Article I, Section 111.02 (b).*

[16] *Impulsive sound as defined in the LAMC Section 111.01 (e) is sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of impulsive sound shall include, but are not limited to, explosion, musical bass drum beats, or the discharge of firearms.*

Table IV.H-3
City of Los Angeles Presumed Ambient Noise Levels

Zone	Daytime (7:00 A.M. to 10:00 P.M.) dBA (L_{eq})	Nighttime (10:00 P.M. to 7:00 A.M.) dBA (L_{eq})
Residential, School, Hospitals, Hotels	50	40
Commercial	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: LAMC Section 111.03.

any property within the City in a manner that would cause the noise level on the premises of any occupied residential property to exceed the ambient noise level by more than 5 dBA; Section 114.03, which prohibits loading and unloading operating between the hours of 10:00 P.M. and 7:00 A.M., which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building; and Section 114.06, which requires vehicle theft alarm systems to be silenced within five minutes.

In addition, the Noise Regulations (LAMC Section 112.05) set a maximum noise level from construction equipment (powered equipment or powered hand tools) operating between the hours of 7:00 A.M. and 10:00 P.M., in any residential zone of the City or within 500 feet thereof, of 75 dBA, measured at a distance of 50 feet from the source, unless compliance with this limitation is technically infeasible.[17] Section 41.40 of the LAMC prohibits construction noise that disturbs persons occupying sleeping quarters in any dwelling, hotel, or apartment or other place of residence between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, before 8:00 A.M. and after 6:00 P.M. on Saturday or national holiday, and at any time on Sunday. Construction hours may be extended with approval from the Executive Director of the Board of Police Commissioners. In general, the City of Los Angeles Department of Building and Safety enforces noise ordinance provisions relative to noise generated by operation of equipment, and the Los Angeles Police Department enforces provisions relative to noise generated by people.

(4) Ground-Borne Vibration

The City currently does not have any adopted standards, guidelines, or thresholds relative to ground-borne vibration. As such, available guidelines from the Federal Transit

[17] *In accordance with the Noise Regulations, "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.*

Administration (FTA) are utilized to assess impacts due to ground-borne vibration. As discussed above, in most circumstances common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures.[18,19]

The FTA has published a technical manual titled, "Transit Noise and Vibration Impacts Assessment," which provides ground-borne vibration impact criteria with respect to building damage during construction activities.[20] As discussed above, building vibration damage is measured in PPV described in the unit of inches per second. Table IV.H-4 on page IV.H-11 provides the FTA vibration criteria applicable to construction activities. According to FTA guidelines, a vibration criterion of 0.20 PPV should be considered as the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber, have a vibration damage criterion of 0.50 PPV pursuant to the FTA guidelines.

In addition to the FTA Construction Vibration Impact Criteria for Building Damage, the FTA guidance manual also provides vibration criteria for human annoyance for various uses. These criteria were established primarily for rapid transit (rail) projects and, as indicated in Table IV.H-5 on page IV.H-12, are based on the frequency of vibration events. Specific criteria are provided for three land use categories: (1) Vibration Category 1—High Sensitivity; (2) Vibration Category 2—Residential; and (3) Vibration Category 3—Institutional.

c. Existing Conditions

The area surrounding the Project Site is highly urbanized and includes a mix of low- to high-rise buildings containing a variety of land uses. Land uses surrounding the Project Site specifically include commercial, retail, and residential uses to the north-northeast, along Maxella Avenue; multi-family residential uses to the east, along Glencoe Avenue; additional Marina Marketplace shopping center-related commercial and retail uses and associated parking to the south; the six-story Stella apartment complex to the west; and the Hotel MdR and associated parking located southwest of the Project Site. The predominant source of noise in the vicinity of the Project Site is vehicular traffic on adjacent roadways, including; SR-90 Marina Freeway, Lincoln Boulevard, Maxella Avenue, and Glencoe Avenue. Other existing ambient noise sources in the vicinity of the Project Site include commercial/retail activities; surface parking lot activities; and other miscellaneous noise sources associated with typical urban activities.

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[18] *FTA, "Transit Noise and Vibration Impact Assessment," May 2006, Chapter 7.*

[19] *Caltrans, "Transportation Related Earthborne Vibrations," February 2002.*

[20] *FTA, "Transit Noise and Vibration Impact Assessment," May 2006.*

Table IV.H-4
FTA Construction Vibration Impact Criteria for Building Damage

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

Source: Federal Transit Administration, Transit Noise and Vibration Impacts Assessment, Table 12-3, 2006.

(1) Noise-Sensitive Receptors

Some land uses are considered more sensitive to intrusive noise than others based on the types of activities typically involved at the receptor location. The *L.A. CEQA Thresholds Guide* states that noise-sensitive uses include residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.[21] Similarly, the Noise Element of the General Plan defines noise-sensitive land uses as single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels, transient lodging, and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves; and parks.[22] These uses are generally considered more sensitive to noise than commercial and industrial land uses.

Based on a review of the land uses in the vicinity of the Project Site, five noise receptor locations (four off-site and one on-site) were selected to represent noise-sensitive uses within and in the vicinity of the Project Site. These locations represent areas with land uses nearest to the Project Site that could qualify as noise-sensitive uses according to the definition of such uses in the *L.A. CEQA Thresholds Guide* and the General Plan. As discussed below, noise measurements were conducted at four off-site measurement locations (R1 to R4) surrounding the Project Site, including three multi-family residential buildings and one hotel building, and one on-site measurement location (R5) to establish baseline noise conditions within and in the vicinity of the Project Site. The off-site monitoring locations essentially surround the Project Site and thereby provide baseline measurements for uses in all directions. In addition, the monitoring locations provide an

[21] *City of Los Angeles, L.A. CEQA Thresholds Guide, p. I.1-3.*

[22] *Noise Element, City of Los Angeles General Plan, Chapter IV, p. 4-1.*

Table IV.H-5
FTA Vibration Impact Criteria for Human Annoyance

Land Use Category	Ground-Borne Vibration Impacts Levels, VdB		
	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Building where vibration would interfere with interior operations	65[d]	65[d]	65[d]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

[a] *"Frequent Events" are defined as more than 70 vibration events of the same source per day.*

[b] *"Occasional Events" are defined as between 30 and 70 vibration events of the same source per day.*

[c] *"Infrequent Events" are defined as fewer than 30 vibration events of the same source per day.*

[d] *This criterion limit is based on the levels that are acceptable for most moderately sensitive equipment such as optical microscopes.*

Source: Federal Transit Administration, Transit Noise and Vibration Impacts Assessment, Table 8-1, 2006.

adequate basis to evaluate potential impacts at the monitoring locations and receptors beyond in the same direction. The noise measurement locations are shown in Figure IV.H-1 on page IV.H-13 and described in Table IV.H-6 on page IV.H-14.

(2) Ambient Noise Levels

To establish baseline noise conditions, existing ambient noise levels were monitored at five representative receptor locations (identified as R1 to R5) within and in the vicinity of the Project Site. The baseline noise monitoring program was conducted on May 22, 2016, using a Quest Technologies Model 2900 Integrating/Logging Sound Level Meter.[23] A 24-hour measurement was conducted at receptor R1 and two 15-minute measurements were conducted at each of the receptor locations R2 to R5, one during daytime and another during nighttime hours. The daytime ambient noise levels were taken between 12:00 P.M. and 2:00 P.M., and the nighttime ambient noise levels were taken between 10:00 P.M. and 12:00 A.M. The ambient noise measurements were taken in accordance

[23] *This sound meter meets and exceeds the minimum industry standard performance requirements for "Type 2" standard instruments as defined in the American National Standard Institute (ANSI) S1.4. It also meets the requirement specified in Section 111.01(l) of the LAMC that instruments be "Type S2A" standard instruments or better. The sound meter was calibrated and operated according to the manufacturer's written specifications.*

Figure IV.H-1
Noise Measurement Locations

Source: Google Earth, 2016.

Table IV.H-6
Description of Existing Ambient Noise Measurement Locations

Receptor Location	Description	Approximate Distance from Measurement Location to Nearest Project Site Boundary[a]	Existing Land Use(s)
R1	Six-story multi-family residential use on Maxella Avenue (Stella apartments), west of the Project Site	50 feet	Residential
R2	Hotel MdR on Maxella Avenue, southwest of the Project Site	70 feet	Hotel
R3	Multi-family residential use on Glencoe Avenue, east of the Project Site	90 feet	Residential
R4	Multi-family residential use (apartment building) at the northeast corner of Glencoe Avenue and Maxella Avenue, northeast of the Project Site	135 feet	Residential
R5	Project Site northern boundary, along Maxella Avenue	Project Northern Property Line	Commercial

[a] *Distances are estimated using Google Earth (Map data ©2016 Google).*

Source: Acoustical Engineering Services (AES), 2017. See Appendix G of this Draft EIR.

with the City's standards, which require ambient noise to be measured over a period of at least 15 minutes.[24]

Table IV.H-7 on page IV.H-15 provides a summary of the ambient noise measurements. Based on field observations, the ambient noise at the measurement locations is dominated by local traffic (from adjacent roadways) and, to a lesser extent, other typical urban noises (e.g., parking lot and commercial/retail operation, landscape activities, etc.).

As indicated in Table IV.H-7, the existing daytime ambient noise levels at the noise receptor locations ranged from 56.1 dBA (L_{eq}) at receptor location R2 to 68.6 dBA (L_{eq}) at receptor location R4. The measured nighttime ambient noise levels at the noise receptor locations ranged from 54.9 dBA (L_{eq}) at receptor location R2 to 63.6 dBA (L_{eq}) at receptor location R3. Thus, the existing ambient noise levels at all receptor locations are above the City's presumed daytime and nighttime ambient noise standards of 50 dBA (L_{eq}) and 40 dBA (L_{eq}), respectively, for residential use, as presented above in Table IV.H-3 on page IV.H-9. Therefore, consistent with LAMC procedures, the measured existing ambient

[24] *LAMC Section 111.01.*

Table IV.H-7
Existing Ambient Noise Levels

Receptor Location	Existing Noise-Sensitive Land Use	Measured Noise Levels, L_{eq} (dBA)		CNEL (24-hour)
		Daytime Hours (7:00 A.M.–10:00 P.M.)	Nighttime Hours (10:00 P.M.–7:00 A.M.)	
R1	Residential	63.4[a]	57.1[a]	65.7
R2	Hotel	56.1	54.9	59.8[b]
R3	Residential	66.4	63.6	69.0[b]
R4	Residential	68.6	61.9	68.9[b]
R5	Commercial	67.7	60.3	67.7[b]

[a] *Levels shown for R1 represent the average for the entire daytime and nighttime periods.*

[b] *Estimated based on short-term (15-minute) noise measurement based on FTA procedures.*

Source: AES, 2016. See Appendix G of this Draft EIR.

noise levels are used as the baseline conditions for the purposes of determining Project impacts.

The existing CNEL levels at the receptor locations ranged from 59.8 dBA (CNEL) at receptor R2 to 69.0 dBA (CNEL) at receptor R3. The existing ambient noise levels at receptor location R2 fall within the normally acceptable land use for hotel uses (up to 60 dBA CNEL) and within conditionally acceptable land use category at receptor location R3 for residential uses (up to 70 dBA CNEL). In addition, the existing ambient noise levels at the Project Site ranged from 59.8 dBA (CNEL) as measured at R2 (Project southwest property line) to 69.0 dBA (CNEL) as measured at R3 (representative of Project eastern property line). The existing ambient noise levels at the Project Site fall within the conditionally acceptable land use category for the proposed mixed-use (residential and commercial) development.

In addition to the ambient noise measurements in the vicinity of the Project Site, the existing traffic noise on local roadways in the surrounding area was calculated to quantify the 24-hour CNEL noise levels using traffic volume data provided in the Traffic Study prepared for the Project.[25] Twenty-four (24) roadway segments were selected for the existing off-site traffic noise analysis included in this section based on proximity to noise-sensitive uses along the roadway segments and potential increases in traffic volumes from the Project. Traffic noise levels were calculated using the Federal Highway Administration

[25] *Linscott, Law & Greenspan, Engineers, Transportation Impact Study Paseo Marina Project, April 2017. See Appendix M of this Draft EIR.*

(FHWA) Traffic Noise Model (TNM). The TNM traffic noise prediction model calculates the hourly L_{eq} noise levels based on specific information including the hourly traffic volume, vehicle type mix, vehicle speed, and lateral distance between the noise receptor and the roadway. To calculate the 24-hour CNEL levels, the hourly L_{eq} levels were calculated during daytime hours (7:00 A.M. to 7:00 P.M.), evening hours (7:00 P.M. to 10:00 P.M.), and nighttime hours (10:00 P.M. to 7:00 A.M.).

The traffic noise prediction model calculates the 24-hour CNEL noise levels based on specific information, including Average Daily Traffic (ADT); percentages of day, evening, and nighttime traffic volumes relative to ADT; vehicle speed; and distance between the noise receptor and the roadway. Vehicle mix/distribution information used in the noise calculations is shown in Table IV.H-8 on page IV.H-17.

Table IV.H-9 on page IV.H-18 provides the calculated CNEL for the 24 analyzed local roadway segments based on existing traffic volumes. As shown therein, the existing CNEL due to surface street traffic volumes ranges from 64.2 dBA CNEL along Mindanao Way (east of Glencoe Avenue) to 72.2 dBA CNEL along Lincoln Boulevard (between Mindanao Way and Jefferson Boulevard), the latter of which is considered normally unacceptable for residential uses. Currently, the existing traffic-related noise levels along roadway segments surrounding the Project Site, including Maxella Avenue (along the northern property line) and Glencoe Avenue (along the eastern property line), fall within the conditionally acceptable noise levels for residential uses (i.e., between 60 and 70 dBA CNEL).

(3) Existing Ground-Borne Vibration Levels

Based on field observations, the primary source of existing ground-borne vibration in the vicinity of the Project Site is vehicular travel (e.g., standard cars, refuse trucks, delivery trucks, construction trucks, school buses, and transit buses) on local roadways. According to the FTA technical study "Federal Transit Administration: Transit Noise and Vibration Impacts Assessments," typical road traffic-induced vibration levels are unlikely to be perceptible by people. Specifically, the FTA study reports that "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads."[26] Trucks and buses typically generate ground-borne vibration velocity levels of around 63 VdB (at 50 feet distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. Per the FTA, 75 VdB is the dividing line between barely perceptible (with regards to ground vibration) and distinctly perceptible.[27] Therefore,

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[26] *FTA, "Transit Noise and Vibration Impact Assessment," May 2006, p. 7-1.*

[27] *Ibid, Figure 10-1.*

Table IV.H-8
Vehicle Mix for Traffic Noise Model

Vehicle Type	Percent of Average Daily Traffic (ADT), %			Total Percent of ADT per Vehicle Type
	Daytime Hours (7 A.M.–7 P.M.)	Evening Hours (7 P.M.–10 P.M.)	Nighttime Hours (10 P.M.–7 A.M.)	
Automobile	77.6	9.7	9.7	97.0
Medium Truck[a]	1.6	0.2	0.2	2.0
Heavy Truck[b]	0.8	0.1	0.1	1.0
Total	80.0	10.0	10.0	100.0

[a] *Medium Truck—Trucks with 2 axles.*

[b] *Heavy Truck—Trucks with 3 or more axles.*

Source: AES, 2017. See Appendix G of this Draft EIR.

the existing ground vibration in the vicinity of the Project Site is generally below the perceptible level. However, ground vibration associated with heavy trucks traveling on road surfaces with irregularities, such as speed bumps and potholes, could reach the perceptible threshold.

Table IV.H-9
Existing Roadway Traffic Noise Levels

Roadway Segment	Adjacent Land Use(s)	Approximate Distance to Roadway Center Line, (feet)	Calculated Traffic Noise Levels,[a] CNEL (dBA)	Noise-Sensitive Land Uses	Existing Noise Exposure Compatibility Category[b]
Abbot Kinney Boulevard					
– North of Venice Blvd.	Residential, Commercial	35	68.9	Yes	Conditionally Acceptable
– Between Venice Blvd. and Washington Blvd.	Residential, School, Religious	35	68.6	Yes	Conditionally Acceptable
Lincoln Boulevard					
– Between Rose Ave. and Venice Blvd.	School, Commercial	45	70.9	Yes	Normally Unacceptable
– Between Venice Blvd. and Washington Blvd.	Motel, Commercial	45	70.9	Yes	Normally Unacceptable
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	50	71.6	Yes	Normally Unacceptable
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	50	71.3	Yes	Normally Unacceptable
– Between Mindanao Wy. and Jefferson Blvd.	Residential, Commercial	50	72.2	Yes	Normally Unacceptable
Glencoe Avenue					
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	30	69.2	Yes	Conditionally Acceptable
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	30	68.8	Yes	Conditionally Acceptable
– South of Mindanao Wy.	Residential, Commercial	35	69.8	Yes	Conditionally Acceptable
Centinela Avenue					
– Between Venice Blvd. and Washington Blvd.	Residential, Commercial	45	70.1	Yes	Normally Unacceptable
– Between Washington Blvd. and Short Ave.	Residential, Commercial	40	70.8	Yes	Normally Unacceptable
– Between Short Ave. and Culver Blvd.	Commercial	40	71.1	No	Conditionally Acceptable
Venice Boulevard					
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Religious, Commercial	55	67.8	Yes	Conditionally Acceptable
– Between Lincoln Blvd. and Beethoven St.	Residential, School	60	69.0	Yes	Conditionally Acceptable
– Between Beethoven St. and Centinela Ave.	Residential, Commercial	60	69.6	Yes	Conditionally Acceptable

Table IV.H-9 (Continued)
Existing Roadway Traffic Noise Levels

Roadway Segment	Adjacent Land Use(s)	Approximate Distance to Roadway Center Line, (feet)	Calculated Traffic Noise Levels,[a] CNEL (dBA)	Noise-Sensitive Land Uses	Existing Noise Exposure Compatibility Category[b]
Washington Boulevard					
– West of Abbot Kinney Blvd.	Residential	45	68.5	Yes	Conditionally Acceptable
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Motel, Religious, Commercial	45	70.2	Yes	Normally Unacceptable
– Between Lincoln Blvd. and Glencoe Ave.	Motel, Commercial	45	69.3	Yes	Conditionally Acceptable
– Between Glencoe Ave. and Centinela Ave.	Residential, Commercial	45	69.7	Yes	Conditionally Acceptable
Maxella Avenue					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	30	67.5	Yes	Conditionally Acceptable
– East of Glencoe Ave.	Residential, School	30	65.3	Yes	Conditionally Acceptable
Mindanao Way					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	40	68.8	Yes	Conditionally Acceptable
– East of Glencoe Ave.	Residential	40	64.2	Yes	Conditionally Acceptable

[a] *Detailed calculation worksheets are included in Appendix G of this Draft EIR.*

[b] *Noise compatibility is based on the most stringent land use, per City's land use compatibility as provided in Table IV.H-2 on page IV.H-8.*

Source: AES, 2017.

3. Project Impacts

a. Thresholds of Significance

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

Threshold (a): 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; or

Threshold (b): Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels; or

Threshold (c): A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

Threshold (d): A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or

Threshold (e): For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or

Threshold (f): For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

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

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

(1) Construction Noise

A project would normally have a significant impact on noise levels from construction if:

- Construction activities lasting more than one day would exceed existing ambient exterior sound levels by 10 dBA (hourly 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 (hourly L_{eq}) or more at a noise-sensitive use; or

- Construction activities of any duration would exceed the ambient noise level by 5 dBA (hourly 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 any time on Sunday.

The Project is anticipated to be developed in one phase with approximately 37 months of construction and be completed in 2023. Therefore, the threshold of significance used in the construction noise analysis presented in this section of the Draft EIR is an increase in the ambient exterior noise levels by 5 dBA (hourly L_{eq}) or more at a noise-sensitive use.

(2) Operational Noise

A Project would normally have a significant impact on noise levels from operations if:

- The Project (on-site and off-site sources) causes the ambient noise levels measured at the property line of affected noise-sensitive uses to increase by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category (see Table IV.H-2 on page IV.H-8 for a description of these categories); or

- The Project (on-site and off-site sources) causes the ambient noise levels measured at the property line of affected noise-sensitive uses to increase by 5 dBA in CNEL or greater for noise levels remaining within the "conditionally acceptable" or "normally acceptable"; 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 (hourly L_{eq}) at noise-sensitive uses by 5 dBA.

The threshold of significance used in the noise analysis for on-site operations presented below is an increase in the ambient noise level of 5 dBA (hourly L_{eq}) at the noise-sensitive uses, in accordance with the LAMC. The LAMC does not apply to off-site traffic (i.e., vehicle traveling on public roadways). Therefore, based on the *L.A. CEQA Thresholds Guide,* the significance threshold for off-site traffic noise associated with Project operations is an increase in the ambient noise level by 3 dBA or 5 dBA in CNEL (depending on the land use category) at noise-sensitive uses. In addition, the threshold for composite noise levels (on-site and off-site sources) is also based on the *L.A. CEQA Thresholds Guide*, which is an increase in the ambient noise level of 3 dBA or 5 dBA in

CNEL (depending on the land use category) for the Project's composite noise (both project-related on-site and off-site sources) at noise-sensitive uses. The significance criteria used in the operational noise analysis for off-site operations presented below is an increase in the ambient noise level by 3 dBA or 5 dBA in CNEL (depending on the land use category) at noise-sensitive uses.

(3) Airport Noise

A project would normally have a significant impact on noise levels from airport noise if:

- Noise levels at a noise sensitive use attributable to airport operations exceed 65 dB CNEL and the project increases ambient noise levels by 1.5 dB CNEL or greater.

(4) Federal Transit Administration Ground-Borne Vibration Standards and Guidelines

The City of Los Angeles currently does not have significance criteria to assess vibration impacts during construction. Thus, FTA guidelines set forth in FTA's Transit Noise and Vibration Assessment, dated May 2006, are used to evaluate potential impacts related to construction vibration for both potential building damage and human annoyance. The FTA guidelines regarding construction vibration are the most current guidelines and are commonly used in evaluating vibration impacts.

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

- Project construction activities cause ground-borne vibration levels to exceed 0.5 PPV at the nearest off-site reinforced-concrete, steel, or timber building.
- Project construction activities cause ground-borne vibration levels to exceed 0.3 PPV at the nearest off-site engineered concrete and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.2 PPV at the nearest off-site non-engineered timber and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.12 PPV at buildings extremely susceptible to vibration damage, such as historic buildings.

There are no buildings that are extremely susceptible to building damage located immediately adjacent to the property line of the Project Site.

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

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

In assessing impacts related to noise in this section, the City will use Appendix G of the CEQA Guidelines as the thresholds of significance. The significance criteria identified above from the *L.A. CEQA Thresholds Guide,* and the FTA Ground-Borne Vibration Standards and Guidelines will be used where applicable and relevant to assist in analyzing the Appendix G thresholds.

b. Methodology

(1) On-Site Construction Activities

Construction noise impacts due to on-site construction activities associated with the Project were evaluated by calculating the construction-related noise levels at representative sensitive receptor locations and comparing these estimated construction-related noise levels associated with construction of the Project to the existing ambient noise levels (i.e., noise levels without construction noise from the Project). Construction noise associated with the Project was analyzed based on the Project's potential construction equipment inventory, construction durations, and construction schedule. The construction noise model for the Project is based on construction equipment noise levels as published by the FHWA's "Roadway Construction Noise Model (FHWA 2006)."[28] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see Table IV.H-7 on page IV.H-15). The construction noise levels were then calculated for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance (as described above in Section 2.a(1)(b), Outdoor Sound Propagation). Additional noise attenuation was assigned to receptor locations where the line-of-sight to the Project Site was interrupted by the presence of intervening structures.

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[28] *The reference noise levels for construction equipment from the FHWA are based on measurements of newer construction equipment (published in 2006), rather than the noise levels from the Environmental Protection Agency report (published in 1971) referenced in the City's L.A. CEQA Thresholds Guide as the former is based on more recent data and is considered more accurate.*

(2) Off-Site Construction Haul Trucks

Off-site construction noise impacts from haul trucks associated with the Project were analyzed using the FHWA's TNM computer noise model. The TNM is the current Caltrans standard computer noise model for traffic noise studies. The model allows for the input of roadway, noise receivers, and sound barriers, if applicable. The construction-related off-site truck volumes were obtained from the Traffic Study prepared for the Project, which is included in Appendix M of this Draft EIR. The TNM noise model calculates the hourly L_{eq} noise levels generated by construction-related haul trucks. Noise impacts were determined by comparing the predicted noise level with that of the existing ambient noise levels along the Project's anticipated haul route(s).

Since construction activities would occur over a period longer than 10 days for all phases, the corresponding thresholds of significance used in the construction noise analysis is an increase in the ambient L_{eq} noise level of 5 dBA at the property line of the closest noise-sensitive use.

(3) On-Site Stationary Noise Sources (Operation)

On-site stationary point-source noise impacts were evaluated by: (1) identifying the noise levels that would be generated by the Project's stationary noise sources, such as rooftop mechanical equipment, outdoor activities (e.g., use of the outdoor dining, plazas, paseo, and courtyards), parking facilities, and trash compactor; (2) calculating the noise level from each noise source at surrounding sensitive receptor property line locations; and (3) comparing such noise levels to ambient noise levels to determine significance. To provide a conservative analysis, the maximum allowable noise level from outdoor mechanical equipment was calculated based on the maximum sound level permitted by the LAMC. The on-site stationary noise sources were calculated using the SoundPLAN (version 7.4) computer noise prediction model.[29] SoundPLAN is a 3-dimensional acoustic ray tracing program for outdoor noise propagation prediction.

(4) Off-Site Roadway Noise (Operation)

As discussed in Section 2.c, Existing Conditions, above, off-site roadway noise was analyzed using the FHWA TNM model and traffic data included in the Project's Traffic Study. Roadway noise conditions without the Project were calculated and compared to noise levels that would occur with implementation of the Project to determine Project-related noise impacts for operational off-site roadway noise.

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[29] *SoundPLAN GmbH, SoundPLAN version 7.4, 2017*

The threshold of significance used in the noise analysis for on-site operations presented below is an increase in the ambient noise level of 5 dBA (hourly L_{eq}) at the noise-sensitive uses, in accordance with the LAMC. The LAMC does not apply to off-site traffic (i.e., vehicle traveling on public roadways). Therefore, based on the *L.A. CEQA Thresholds Guide,* the significance threshold for off-site traffic noise associated with Project operations is an increase in the ambient noise level by 3 dBA or 5 dBA in CNEL (depending on the land use category) at noise-sensitive uses. In addition, the threshold for composite noise levels (on-site and off-site sources) is also based on the *L.A. CEQA Thresholds Guide*, which is an increase in the ambient noise level of 3 dBA or 5 dBA in CNEL (depending on the land use category) for the Project's composite noise (both project-related on-site and off-site sources) at noise-sensitive uses.

(5) Construction Vibration

Ground-borne 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.

(6) Operational Vibration

The primary source of vibration related to operation of the Project would include vehicle circulation within the proposed parking garage and off-site vehicular trips. However, as discussed above, vehicular-induced vibration is unlikely to be perceptible by people. The Project would also include typical commercial-grade stationary mechanical equipment, such as air-handling units (mounted at grade or roof level), that would include appropriate vibration-attenuation mounts to reduce the vibration transmission. The Project does not include land uses that would generate high levels of vibration. In addition, ground-borne 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, as such, vibration impacts associated with operation of the Project would be less than significant. Accordingly, the ground-borne vibration analysis presented in this section is limited to Project-related construction activities.

c. Analysis of Project Impacts

(1) Project Design Features

The following project design features are proposed with regard to noise and vibration:

Project Design Feature NOI-PDF-1: Project construction will not include the use of driven (impact) pile systems.

Project Design Feature NOI-PDF-2: All outdoor mounted mechanical equipment will be enclosed or screened from off-site noise-sensitive receptors.[30]

Project Design Feature NOI-PDF-3: Loading and trash collection areas will be enclosed or screened from off-site noise-sensitive receptors.

Project Design Feature NOI-PDF-4: Outdoor amplified sound systems (e.g., speaker and stereo systems, amplification systems, or other sound-producing devices) will be designed as follows:

(i) Ground level retail and pedestrian plazas: maximum 75 dBA (L_{eq-1hr}) at a distance of 25 feet from the amplified sound systems,

(ii) Ground level outdoor dining areas (patios), community park, and the roof decks at Buildings 1, 2 and 3: maximum 80 dBA (L_{eq-1hr}) at a distance of 25 feet from the amplified sound systems, and

(iii) Podium level courtyards (pool deck) at Buildings 1, 2 and 3: maximum 90 dBA (L_{eq-1hr}) at a distance of 25 feet for the amplified sound systems.

A qualified noise consultant will provide written documentation that the design of the system complies with these maximum noise levels.

(2) Project Impacts

Threshold (a): Would the Project 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?

(a) Construction Noise

Since construction activities would occur over a period longer than 10 days for all phases, the corresponding thresholds of significance used in the construction noise analysis is an increase in the ambient L_{eq} noise level of 5 dBA at the property line of the closest noise-sensitive use.

As discussed in Section II, Project Description, of this Draft EIR, construction of the Project is anticipated to be constructed in one phase and be completed in 2023. Construction of the Project, which would be approximately 37 months, would commence with removal of the existing on-site buildings and the existing surface parking areas,

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[30] *Per L.A. CEQA Thresholds Guide, noise-sensitive uses include: residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.*

followed by grading and excavation for the subterranean parking garage. Building foundations would then be laid, followed by building construction, paving/concrete installation, and landscape installation. It is estimated that approximately 220,000 cubic yards of soil would be hauled from the Project Site during the excavation phase. The haul route from the Project Site is anticipated to be via Glencoe Avenue to Mindanao Way to SR-90. Incoming haul trucks would be anticipated to access the Project Site via SR-90 to Lincoln Boulevard to Maxella Avenue.

(i) On-Site Construction Noise

Noise impacts from Project-related construction activities occurring within or adjacent to the Project Site would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Construction activities for the Project would generally include demolition, site grading and excavation for the subterranean parking garage, and building construction. Each stage of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Demolition generally involves the use of backhoes, front-end loaders, and heavy-duty trucks. Grading and excavation typically requires the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of cranes, forklifts, concrete trucks, pumps, and delivery trucks. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Project Site.

Individual pieces of construction equipment anticipated to be used during construction of the Project could produce maximum noise levels (L_{max}) of 74 dBA to 90 dBA at a reference distance of 50 feet from the noise source, as shown in Table IV.H-10 on page IV.H-28. These maximum noise levels would occur when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites often operate under less than full power conditions, or part power. To more accurately characterize construction-period noise levels, the average (hourly L_{eq}) noise level associated with each construction phase is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction phase.[31] These noise levels are typically associated with multiple pieces of equipment operating on part power, simultaneously.

[31] *Pursuant to the FHWA Roadway Construction Noise Model User's Guide, 2006, the usage factor is the percentage of time during a construction noise operation that a piece of construction is operating at full power.*

Table IV.H-10
Construction Equipment Noise Levels

Equipment	Estimated Usage Factor[a] %	Typical Noise Level at 50 feet from Equipment, dBA (L_{max})
Air Compressor	40	78
Cement and Mortar Mixer	50	80
Concrete Mixer Truck	40	79
Concrete Saw	20	90
Crane	16	81
Drill Rig (Augur)	20	79
Forklift	10	75
Generator	50	81
Grader	40	85
Dump/Haul Truck	40	76
Excavator	40	81
Paver	50	77
Pump	50	81
Roller	20	80
Rubber Tired Loader	40	79
Tractor/Loader/Backhoe	40	80
Delivery Truck	40	74
Welders	40	74

[a] *Usage factor represents the percentage of time the equipment would be operating at full speed.*
Source: FHWA Roadway Construction Noise Model User's Guide, 2006.

Table IV.H-11 on page IV.H-29 provides the estimated on-site construction noise levels for various Project construction phases at the off-site noise-sensitive receptors. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all pieces of construction equipment were assumed to operate simultaneously and be located at the construction areas nearest to the affected receptors. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the development area, and, thus, some equipment would be farther away from the affected receptors. In addition, the noise modeling assumes that construction noise is constant, when, in fact, construction activities and associated noise levels are periodic and fluctuate based on the construction activities.

As discussed above, since construction activities would occur over a period longer than 10 days for all phases, the corresponding thresholds of significance used in the construction noise analysis is an increase in the ambient L_{eq} noise level of 5 dBA at the

Table IV.H-11
On-Site Construction Noise Impacts

Off-Site Receptor Location[a]	Approximate Distance from Receptor to Project Construction Area (feet)	Estimated Construction Noise Levels by Construction Phases, L_{eq} (dBA)					Existing Daytime Ambient Noise Levels, L_{eq} (dBA)	Significance Criteria, L_{eq} (dBA)[b]	Maximum Noise Exceedance Above the Criteria, L_{eq} (dBA)	Sig. Impact?
		Demolition	Grading	Garage/ Podium (Foundation)	Building Construction	Sitework/ Landscape				
R1	50	84.9	82.6	86.1	84.9	85.4	63.4	68.4	17.7	Yes
R2	140	77.9	76.7	80.1	77.5	78.5	56.1	61.1	19.0	Yes
R3	90	80.6	78.9	82.3	80.4	81.2	66.4	71.4	10.9	Yes
R4	135	77.9	76.5	79.9	77.5	78.3	68.6	73.6	6.3	Yes

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the construction noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the L.A. CEQA Thresholds Guide for construction activities lasting longer than 10 days in a three-month period. If the estimated construction noise levels exceed those significance thresholds, a construction-related noise impact is identified.*

Source: AES, 2016. See Appendix G of this Draft EIR.

property line of the closest noise-sensitive use. As presented in Table IV.H-11 on page IV.H-29, construction activities would generate the highest noise during the foundation phase, as it is anticipated to require the use of the noisiest construction equipment compared to the Project's other construction stages. It is estimated that the noise level associated with Project construction activities would exceed the significance threshold at all off-site receptor locations, from 6.3 dBA at receptor R4 to 19.0 dBA at receptor R2. **Therefore, noise impacts associated with the Project's on-site construction activities would be significant.**

(ii) Off-Site Construction Noise

In addition to on-site construction noise sources, other noise sources may include materials delivery, concrete trucks, and haul trucks (construction trucks), as well as construction worker vehicles accessing the Project Site during construction. Typically, construction trucks generate higher noise levels than construction worker vehicles. The major noise sources associated with off-site construction trucks would be associated with delivery/haul trucks.

As discussed above, the haul route from the Project Site is anticipated to be via Glencoe Avenue to Mindanao Way to SR-90. Incoming haul trucks would be anticipated to access the Project Site via SR-90 to Lincoln Boulevard to Maxella Avenue. Table IV.H-12 on page IV.H-31 provides the estimated number of construction-related trips, including haul/delivery trucks and worker vehicles, and the estimated noise levels at the noise sensitive receptors in the vicinity of the Project Site. As shown therein, Project-related construction traffic is estimated to be below the 5 dBA significance threshold along the anticipated haul routes. **As such, off-site construction noise impacts would be less than significant.**

(iii) Summary of Construction Noise Impacts

As discussed above, noise impacts associated with off-site construction traffic would be less than significant before mitigation at all off-site sensitive receptors. Implementation of Mitigation Measure NOI-MM-1 provided below in Subsection 3.e, Mitigation Measures, would reduce the Project's on-site construction noise levels to a less-than-significant level at two of the four representative receptor locations. However, significant impacts would remain at two of the representative receptor locations. Therefore, Project construction would 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.

Table IV.H-12
Off-Site Construction Traffic Noise Levels (construction trucks/worker vehicles)

Construction Phase	Estimated Maximum Number of Trips per Day, Construction Truck/Worker Vehicle	Estimated Maximum Number of Trips per Hour,[a] Construction Truck/Worker Vehicle	Estimated Construction Traffic Noise Along the Project Haul Routes (maximum construction truck/worker vehicle), L_{eq} (dBA)		
			Maxella Avenue	Glencoe Avenue	Lincoln Boulevard
Demolition	64/40	4/16	61.6	56.7	60.0
Grading/Excavation	124/60	8/24	64.4	59.6	62.8
Garage/Podium Construction	70/150	5/60	63.7	58.8	62.1
Building Construction	70/450	5/180	65.8	60.8	64.1
Sitework/Landscape	24/70	2/28	59.5	54.6	57.8
Existing Ambient Noise Levels,[b] L_{eq} (dBA)			67.7	66.4	70.0
Significance Criteria,[c] L_{eq} (dBA)			72.7	71.4	75.0
Significant Impact?			No	No	No

[a] *For construction trucks, the number of hourly trips is based on an hourly average, assuming a uniform distribution of trips over an 8-hour work day, and divided by two, as trucks coming to and leaving from the Project Site are traveled on different roadway. For worker vehicles, the number of peak hourly trips is equal to 40 percent of the daily trips.*

[b] *Ambient noise level along Maxella Avenue is based on measured ambient at receptor location R5; ambient noise level along Glencoe Avenue is based on measured ambient at receptor location R3; and ambient noise level along Lincoln Boulevard is estimated based on existing traffic volume and nearby measured ambient noise level (receptor location R5).*

[c] *Significance criteria are equivalent to the measured daytime ambient noise levels plus 5 dBA.*

Source: AES, 2017.

(b) Operational Noise

This section provides a discussion of potential operational noise impacts on nearby noise-sensitive receptors. Specific operational noise sources addressed herein include: (a) on-site stationary noise sources, including outdoor mechanical equipment (e.g., HVAC equipment), activities within the proposed outdoor spaces (i.e., outdoor dining seating, retail/pedestrian plazas, paseo, podium pool and roof level decks); and (b) off-site mobile (roadway traffic) noise sources.

(i) On-Site Stationary Noise Sources

Mechanical Equipment

As part of the Project, new mechanical equipment (e.g., air ventilation equipment) would be located at the exterior of the building (at grade or on the roof level) and within the interior of the building. Although operation of this equipment would generate noise, Project-related outdoor mechanical equipment would be designed so as not to increase the

existing ambient noise levels by 5 dBA in accordance with the City's Noise Regulations. Specifically, the Project would comply with Section 112.02 of the LAMC, which prohibits noise from air conditioning, refrigeration, heating, pumping, and filtering equipment from exceeding the ambient noise levels on the premises of other occupied properties by more than 5 dBA. In addition, as provided above in Project Design Feature NOI-PDF-2, all outdoor mounted mechanical equipment would be enclosed or screened from off-site noise-sensitive receptors. Table IV.H-13 on page IV.H-33 presents the estimated noise levels at the receptor locations associated with operation of the Project's mechanical equipment. As indicated in Table IV.H-13, the estimated noise levels from the mechanical equipment would range from 41.3 dBA (L_{eq}) at receptor location R1 to 46.0 dBA (L_{eq}) at receptor location R2, which would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the lowest measured ambient noise level). **Therefore, noise impacts from mechanical equipment would be less than significant.**

Outdoor Spaces

As discussed in Section II, Project Description, and illustrated in Figure II-3, Conceptual Site Plan, of this Draft EIR, the Project would include various outdoor spaces, including: outdoor dining areas, retail/pedestrian plazas, landscaped paseos, public (community) park, and outdoor courtyards at the podium level (i.e., third floor pool deck), and roof level (seventh floor). The proposed plazas located along the northwest portion and in the center of the Project Site would connect to a publicly accessible, privately maintained open space area via an outdoor pedestrian paseo that would run north–south and east–west through the center of the Project Site. This open space area includes a one-story amenity building and additional seating located along the southwestern portion of the Project Site. Noise sources associated with the outdoor spaces would include noise from people gathering and conversing. For this operational noise analysis, reference noise levels of 65 dBA for a male and 62 dBA for a female speaking in a raised voice were used for analyzing potential noise impacts from people gathering at the outdoor spaces.[32] In order to analyze a typical noise scenario, it was assumed that up to 50 percent of the people (half of which would be male and the other half female) would be talking at the same time. In addition, the hours of operation for use of the outdoor spaces were assumed to be from 7:00 A.M. to 2:00 A.M.

An additional potential noise source associated with outdoor uses would include the use of outdoor sound systems (e.g., music or other sounds broadcast through an outdoor mounted speaker system). The sound from outdoor sound systems, if used, would be heard by people in the immediate vicinity of the outdoor areas. As part of the Project and

[32] *Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, Third Edition, 1991, Table 16.1.*

Table IV.H-13
Estimated Noise Levels from Mechanical Equipment

Receptor Location[a]	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Mechanical Equipment, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria[b], dBA (L_{eq})	Exceedance Above the Significance Criteria	Significant Impact?
R1	57.1	41.3	57.2	62.1	0.0	No
R2	54.9	46.0	55.4	59.9	0.0	No
R3	63.6	45.8	63.7	68.6	0.0	No
R4	61.9	44.4	62.0	66.9	0.0	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the operational noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance thresholds, a significant noise impact is identified.*

Source: AES, 2017. See Appendix G of this Draft EIR.

as set forth above in Project Design Feature NOI-PDF-4, the amplified sound system used in outdoor areas would be designed so as not to exceed the maximum noise levels of 75 to 90 dBA L_{eq} as indicated in Table IV.H-14 on page IV.H-34, thereby ensuring that the amplified sound system would not exceed the significance criteria (i.e., an increase of 5 dBA Leq) at any off-site noise-sensitive receptor location. Table IV.H-14 presents the anticipated number of people at each of the outdoor spaces (based on occupancy levels for outdoor areas) and the Project's maximum amplified sound levels, utilized for the noise analysis.

Table IV.H-15 on page IV.H-35 presents the estimated noise levels at the off-site sensitive receptors resulting from the use of outdoor areas. The estimated noise levels were calculated with the assumption that all of the outdoor spaces would be fully occupied and operating concurrently to represent a worst-case noise analysis. As presented in Table IV.H-15, the estimated noise levels from the outdoor areas would range from 51.1 dBA (L_{eq}) at receptor location R1 to 61.1 dBA (L_{eq}) at receptor location R3. The estimated noise levels from the outdoor spaces would thus be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels at all off-site sensitive receptors **As such, noise impacts from the use of the outdoor areas would be less than significant.**

Table IV.H-14
Outdoor Uses Assumptions

Project Location	Outdoor Space	Estimated Total Number of People[a]	Amplified Sound System Levels dBA (L_{eq})
Ground Level	Patio 1 (Restaurant 1)	27	80 dBA at 25 feet
	Patio 2 (Restaurants 3, 4 and 5)	69	80 dBA at 25 feet
	Patio 3 (Restaurant 8)	16	80 dBA at 25 feet
	Patio 4 (Restaurants 9, 10, 11 and 12)	50	80 dBA at 25 feet
	Retail/Pedestrian Plazas	263	70 dBA at 25 feet
	Paseo	290	N/A
	Community Park	340	75 dBA at 25 feet
Podium Level (third floor)	Pool Deck 1 (Building 1)	614	90 dBA at 25 feet
	Pool Deck 2 (Building 2)	694	90 dBA at 25 feet
	Pool Deck 3 (Building 3)	538	90 dBA at 25 feet
Roof Level (seventh floor)	Deck 1 (Building 1)	53	80 dBA at 25 feet
	Deck 2 (Building 2)	15	80 dBA at 25 feet
	Deck 3 (Building 2)	27	80 dBA at 25 feet
	Deck 4 (Building 2)	27	80 dBA at 25 feet
	Deck 5 (Building 3)	80	80 dBA at 25 feet
	Deck 6 (Building 3)	80	80 dBA at 25 feet

[a] *The estimated total number of people is based on the followings:*
- 30 square feet/person at the ground level restaurant patios.
- 50 square feet/person at the ground level plazas, paseo and community park.
- 15 square feet/person at the podium level pool decks and roof level decks.

Source: AES, 2017. See Appendix G of this Draft EIR.

Parking Facilities

As discussed in Section II, Project Description, of this Draft EIR, the Project would include two subterranean levels and two above grade parking levels within each of the three structures. Sources of noise within the parking garage would primarily include vehicular movements and engine noise, doors opening and closing, and intermittent car alarms. Noise levels within the parking garage would fluctuate with the amount of automobile and human activity. Noise levels within the subterranean parking levels would be contained within the parking structure itself, as the subterranean parking levels would be fully enclosed on all sides. Thus, noise generated within the subterranean parking garage would be effectively shielded from off-site sensitive receptor locations in the immediate the vicinity of the Project Site. The two above grade parking levels would be wrapped on all sides by the building structures (including exterior walls) and would not be exposed to the exterior. Furthermore, noise associated with the Project's subterranean and above grade

Table IV.H-15
Estimated Noise Levels from Outdoor Uses

Receptor Location[a]	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Outdoor Uses, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria[b]	Exceedance Above the Significance Criteria	Significant Impact?
R1	57.1	51.1	58.1	62.1	0.0	No
R2	54.9	58.0	59.7	59.9	0.0	No
R3	63.6	61.1	65.5	68.6	0.0	No
R4	61.9	60.2	64.1	66.9	0.0	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the operational noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance thresholds, a significant noise impact is identified.*

Source: AES, 2017. See Appendix G of this Draft EIR.

parking garages (244 parking spaces) would be less than the noise currently generated by the existing unenclosed surface parking lots (providing 418 parking spaces) within the Project Site. Table IV.H-16 on page IV.H-36 presents the estimated noise levels from the new parking structure at the off-site receptor locations. As indicated in Table IV.H-16, the estimated noise levels from the Project parking structures are estimated to range from 14.2 dBA (L_{eq}) at receptor location R2 to 28.9 dBA (L_{eq}) at receptor location R1. The estimated noise levels at all off-site receptor locations would be below the existing ambient noise levels and the significance criteria of 5 dBA (L_{eq}) above existing ambient noise levels. **Therefore, noise impacts from parking operations would be less than significant.**

Loading Dock and Trash Collection Areas

Loading and trash collection would be located within the parking structures of the three buildings and would not be visible to the surrounding uses, as set forth in Project Design Feature NOI-PDF-3. Noise sources associated with loading docks and trash collection areas would include delivery/trash collection trucks and operation of a trash compactor. Based on measured noise levels from typical loading dock facilities and trash compactors, delivery/trash collection trucks and trash compactors could generate noise levels of approximately 71 dBA (L_{eq}) and 66 dBA (L_{eq}), respectively, at a distance of 50 feet.[33] As indicated in Table IV.H-17 on page IV.H-37, the estimated noise levels from loading dock and trash compactor operations is estimated to range from 10.8 dBA (L_{eq}) at receptor location R2 to 22.3 dBA (L_{eq}) at receptor location R3. The estimated noise levels

[33] *RK Engineering Group, Inc., Wal-Mart/Sam's Club Reference Noise Level Study, 2003.*

Table IV.H-16
Estimated Noise Levels from Parking Facilities

Receptor Location[a]	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Parking Facilities, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria[b]	Exceedance Above the Significance Criteria	Significant Impact?
R1	57.1	28.9	57.1	62.1	0.0	No
R2	54.9	14.2	54.9	59.9	0.0	No
R3	63.6	27.2	63.6	68.6	0.0	No
R4	61.9	23.9	61.9	66.9	0.0	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the operational noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance thresholds, a significant noise impact is identified.*

Source: AES, 2017. See Appendix G of this Draft EIR.

at all off-site receptor locations would be below the existing ambient noise levels and the significance criteria of 5 dBA (L_{eq}) above existing ambient noise levels. **Therefore, noise impacts from loading dock and trash compactor operations would be less than significant.**

(ii) Off-Site Mobile Noise Sources

Existing Plus Project

An analysis was performed to determine the potential noise impacts based on the incremental increase in noise levels due to Project-related traffic compared with the existing traffic noise conditions. The roadway noise levels were calculated using the traffic data provided in the Traffic Study prepared for the Project, which is included in Appendix M of this Draft EIR. As shown in Table IV.H-18 on page IV.H-38, when compared with existing conditions, the Project would result in a maximum increase of 0.2 dBA CNEL in traffic-related noise levels along Glencoe Avenue between Washington Boulevard and Maxella Avenue, and south of Mindanao Way. The estimated noise increase due to Project-related traffic would be below the 5 dBA CNEL significance criteria. **Therefore, off-site traffic noise impacts under Existing Plus Project conditions would be less than significant.**

Future Plus Project

Future roadway noise levels were calculated along the 24 selected roadway segments in the vicinity of the Project Site. The roadway noise levels were calculated using the traffic data provided in the Traffic Study prepared for the Project, which is

Table IV.H-17
Estimated Noise Levels from Loading and Trash Compactor

Receptor Location[a]	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Loading Dock and Trash Compactor, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria[b]	Exceedance Above the Significance Criteria	Significant Impact?
R1	63.4	12.8	63.4	68.4	0.0	No
R2	56.1	10.8	56.1	61.1	0.0	No
R3	66.4	22.3	66.4	71.4	0.0	No
R4	68.6	21.2	68.6	73.6	0.0	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the operational noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance thresholds, a significant noise impact is identified.*

Source: AES, 2017. See Appendix G of this Draft EIR.

included in Appendix M of this Draft EIR. As discussed in the Traffic Study, the Project is expected to generate a net increase of 2,079 daily weekday trips. As such, Project-related traffic would increase the existing traffic volumes along the roadway segments in the study area when compared with Future without Project conditions. This increase in roadway traffic was analyzed to determine if any traffic-related noise impacts would result from operation of the Project.

Table IV.H-19 on page IV.H-40 provides a summary of the roadway noise impact analysis. The CNEL traffic levels were calculated using a conservative approach with the receptors facing the roadways and did not account for the presence of any physical sound barriers or intervening structures. As shown in Table IV.H-19, the Project would not result in measurable increase at all of the analyzed roadway segments. The Project is estimated to result in a maximum increase of up to 0.2 dBA (CNEL) in traffic-related noise levels along Glencoe Avenue between Washington Boulevard and Maxella Avenue, between Maxella Avenue and Mindanao Way, and south of Mindanao Way. The increase in traffic noise levels would be well below the 5 dBA CNEL significance criteria (applicable to noise levels within the conditionally acceptable land use category). In addition, a noise increase of less than 1 dBA is generally considered negligible. **Therefore, traffic noise impacts under Future Plus Project conditions would be less than significant.**

Table IV.H-18
Roadway Traffic Noise Impacts—Existing Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Existing Without Project	Existing Plus Project		
Abbot Kinney Boulevard					
– North of Venice Blvd.	Residential, Commercial	68.9	68.9	0.0	No
– Between Venice Blvd. and Washington Blvd.	Residential, School, Religious	68.6	68.7	0.1	No
Lincoln Boulevard					
– Between Rose Ave. and Venice Blvd.	School, Commercial	70.9	70.9	0.0	No
– Between Venice Blvd. and Washington Blvd.	Motel, Commercial	70.9	70.9	0.0	No
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	71.6	71.6	0.0	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	71.3	71.3	0.0	No
– Between Mindanao Wy. and Jefferson Blvd.	Residential, Commercial	72.2	72.2	0.0	No
Glencoe Avenue					
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	69.2	69.4	0.2	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	68.8	68.9	0.1	No
– South of Mindanao Wy.	Residential, Commercial	69.8	70.0	0.2	No
Centinela Avenue					
– Between Venice Blvd. and Washington Blvd.	Residential, Commercial	70.1	70.1	0.0	No
– Between Washington Blvd. and Short Ave.	Residential, Commercial	70.8	70.8	0.0	No
– Between Short Ave. and Culver Blvd.	Commercial	71.1	71.1	0.0	No
Venice Boulevard					
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Religious, Commercial	67.8	67.8	0.0	No
– Between Lincoln Blvd. and Beethoven St.	Residential, School	69.0	69.0	0.0	No
– Between Beethoven St. and Centinela Ave.	Residential, Commercial	69.6	69.6	0.0	No

Table IV.H-18 (Continued)
Roadway Traffic Noise Impacts—Existing Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Existing Without Project	Existing Plus Project		
Washington Boulevard					
– West of Abbot Kinney Blvd.	Residential	68.5	68.5	0.0	No
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Motel, Religious, Commercial	70.2	70.2	0.0	No
– Between Lincoln Blvd. and Glencoe Ave.	Motel, Commercial	69.3	69.3	0.0	No
– Between Glencoe Ave. and Centinela Ave.	Residential, Commercial	69.7	69.7	0.0	No
Maxella Avenue					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	67.5	67.5	0.0	No
– East of Glencoe Ave.	Residential, School	65.3	65.3	0.0	No
Mindanao Way					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	68.8	68.9	0.1	No
– East of Glencoe Ave.	Residential	64.2	64.2	0.0	No

[a] *Detailed calculation worksheets are included in Appendix G of this Draft EIR.*

Source: AES, 2017.

Table IV.H-19
Roadway Traffic Noise Impacts—Future Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Future Without Project	Future Plus Project		
Abbot Kinney Boulevard					
– North of Venice Blvd.	Residential, Commercial	69.4	69.4	0.0	No
– Between Venice Blvd. and Washington Blvd.	Residential, School, Religious	69.0	69.0	0.0	No
Lincoln Boulevard					
– Between Rose Ave. and Venice Blvd.	School, Commercial	71.6	71.6	0.0	No
– Between Venice Blvd. and Washington Blvd.	Motel, Commercial	71.7	71.8	0.1	No
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	72.2	72.3	0.1	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	72.0	72.0	0.0	No
– Between Mindanao Wy. and Jefferson Blvd.	Residential, Commercial	72.8	72.8	0.0	No
Glencoe Avenue					
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	69.6	69.8	0.2	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	69.3	69.5	0.2	No
– South of Mindanao Wy.	Residential, Commercial	70.3	70.5	0.2	No
Centinela Avenue					
– Between Venice Blvd. and Washington Blvd.	Residential, Commercial	70.6	70.6	0.0	No
– Between Washington Blvd. and Short Ave.	Residential, Commercial	71.6	71.6	0.0	No
– Between Short Ave. and Culver Blvd.	Commercial	71.7	71.7	0.0	No
Venice Boulevard					
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Religious, Commercial	68.3	68.3	0.0	No
– Between Lincoln Blvd. and Beethoven St.	Residential, School	69.3	69.3	0.0	No
– Between Beethoven St. and Centinela Ave.	Residential, Commercial	69.9	69.9	0.0	No

Table IV.H-19 (Continued)
Roadway Traffic Noise Impacts—Future Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Future Without Project	Future Plus Project		
Washington Boulevard					
– West of Abbot Kinney Blvd.	Residential	69.0	69.0	0.0	No
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Motel, Religious, Commercial	70.6	70.7	0.1	No
– Between Lincoln Blvd. and Glencoe Ave.	Motel, Commercial	69.6	69.7	0.1	No
– Between Glencoe Ave. and Centinela Ave.	Residential, Commercial	70.2	70.2	0.0	No
Maxella Avenue					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	68.1	68.1	0.0	No
– East of Glencoe Ave.	Residential, School	65.9	65.9	0.0	No
Mindanao Way					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	69.3	69.4	0.1	No
– East of Glencoe Ave.	Residential	65.1	65.2	0.1	No

[a] *Detailed calculation worksheets are included in Appendix G of this Draft EIR.*

Source: AES, 2017.

(iii) Composite Noise Level Impacts from Project Operations

In addition to considering the potential noise impacts to neighboring noise-sensitive receptors from each specific on-site and off-site noise source (e.g., mechanical equipment, parking facilities, loading docks/trash compactors, outdoor areas, and off-site traffic), an evaluation of potential composite noise level increases (i.e., noise levels from all on-site noise sources combined) at the analyzed sensitive receptor locations was also performed. This evaluation of composite noise levels from all on-site Project-related noise sources, evaluated using the CNEL noise metric, was conducted to determine the contributions at the noise-sensitive receptor locations in the vicinity of the Project Site.

Table IV.H-20 on page IV.H-43 presents the estimated composite noise levels in terms of CNEL at the off-site sensitive receptor locations from the Project-related noise sources. As indicated in Table IV.H-20, the estimated composite plus ambient noise levels would be below the significance criteria at all off-site receptor locations. **Therefore, composite noise level impacts due to Project operations would be less than significant.**

(iv) Summary of Operational Noise Impacts

As discussed above, the Project's operational noise impacts associated with on-site sources would be less than significant. In addition, the Project's operational noise impacts from off-site source (roadway traffic) would be less than significant. As such, Project operation 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.

Threshold (b): Would the Project result in the exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

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

Table IV.H-20
Composite Noise Impacts

Receptor Location[a]	Existing Ambient Noise Levels, CNEL (dBA)	Calculated Project-Related Noise Sources, CNEL (dBA)					Project Composite Noise Levels, CNEL (dBA)	Ambient plus Project Noise Levels, CNEL (dBA)	Significance Criteria,[b] CNEL (dBA)	Significant Impact?
		Traffic	Mechanical	Parking	Loading/ Trash Compact.	Outdoor Spaces				
R1	65.7	41.0	48.0	33.0	12.4	55.0	55.9	66.1	70.7	No
R2	59.8	39.7	52.7	18.3	11.4	61.9	62.4	64.3	64.8	No
R3	69.0	52.5	52.5	31.3	19.8	65.0	65.4	70.6	72.0	No
R4	68.9	52.5	51.1	28.0	18.8	64.1	64.6	70.3	71.9	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the operational noise impact analysis.*

[b] *Significance criteria are equivalent to: a) the existing ambient noise level plus 5 dBA if the "Ambient plus Project Noise Level" is within the "normally acceptable" or "conditionally acceptable" categories; or b) the existing ambient noise level plus 3 dBA if the "Ambient plus Project Noise Level" is within the "normally unacceptable" or "clearly unacceptable" category.*

Source: AES, 2017. See Appendix G of this Draft EIR.

(a) Building Damage Impacts from On-Site Construction

With regard to potential building damage, the Project would generate ground-borne construction vibration during building demolition and site excavation/grading activities when heavy construction equipment, such as large bulldozers, drill rigs, and loaded trucks, would be used. The FTA has published standard vibration velocities for various construction equipment operations. Table IV.H-21 on page IV.H-45 provides the estimated vibration levels (in terms of inch per second PPV) at the nearest off-site structures to the Project Site. It is noted that since impact pile driving methods would not be used during construction of the Project, in accordance with Project Design Feature NOI-PDF-1 provided above, impact pile driving vibration is not included in the on-site construction vibration analysis. As indicated in Table IV.H-21, the estimated vibration velocity levels from all construction equipment would be below the building damage significance criteria of 0.3 PPV for the building structures to the north, south and east, and 0.5 PPV for the six-story residential building structure to the west. **Therefore, on-site vibration impacts, pursuant to the significance criteria for building damage, would be less than significant.**

(b) Human Annoyance Impacts from On-Site Construction

Table IV.H-22 on page IV.H-46 provides the estimated vibration levels at the off-site sensitive uses due to construction equipment operation and compares the estimated vibration levels to the specified significance criteria for human annoyance. Per FTA guidance, the significance criteria for human annoyance is 72 VdB at residential and hotel uses, assuming there are a minimum of 70 vibration events occurring during a typical construction day. As indicated in Table IV.H-22, the estimated ground-borne vibration levels from construction equipment would be below the significance criteria for human annoyance at all off-site receptor locations, with the exception of receptor R1. The estimated vibration level of 78 VdB at receptor R1 would exceed the significance threshold of 72 VdB. **Therefore, on-site vibration impacts during construction of the Project, pursuant to the significance criteria for human annoyance, would be significant.**

(c) Building Damage and Human Annoyance Impacts from Off-Site Construction

As described above, construction delivery/haul trucks would generally travel between the Project Site and the SR-90 Freeway via Lincoln Boulevard, Maxella Avenue, Glencoe Avenue, and Mindanao Way. Heavy-duty construction trucks would generate ground-borne vibration as they travel along the Project's anticipated haul route. Thus, an analysis of potential vibration impacts using the building damage and human annoyance thresholds for ground-borne vibration along the anticipated local haul routes was conducted.

Table IV.H-21
Construction Vibration Impacts—Building Damage

Off-Site Building Structure[a]	Estimated Vibration Velocity Levels at the outside of and adjacent to the Nearest Off-Site Structures from the Project Construction Equipment,[b] inch/second (PPV)					Significance Threshold, PPV	Significant Impact?
	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	0.089	0.089	0.076	0.035	0.003	—	—
Two-story commercial building across the Project Site to the north (north side of Maxella Avenue)	0.016	0.016	0.013	0.006	0.001	0.3[c]	No
The Pavilions supermarket building south of the Project Site	0.089	0.089	0.076	0.035	0.003	0.3[c]	No
Multi-family residential building across the Project to the east (east side of Glencoe Avenue)	0.013	0.013	0.011	0.005	<0.001	0.3[c]	No
Six-story apartment building west of the Project Site	0.032	0.032	0.027	0.012	0.001	0.5[d]	No

[a] *Represents off-site building structures located nearest to the Project Site to the north, south, east and west.*

[b] *Vibration level calculated based on FTA reference vibration level at a distance of 25 feet.*

[c] *FTA criteria for engineered timber and masonry buildings, applicable to the two-story commercial building to the north, the multi-family residential building to the east, and the Pavilions supermarket to the south.*

[d] *FTA criteria for reinforced-concrete, steel or timber buildings, applicable multi-story (3 stories and higher) residential building.*

Source: FTA, 2006; AES, 2017. See Appendix G of this Draft EIR.

Regarding building damage, based on FTA data, the vibration generated by a typical heavy-duty truck would be approximately 63 VdB (0.006 PPV) at a distance of 50 feet from the truck.[34] According to the FTA "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads." Nonetheless, there are existing buildings along the Project's anticipated haul route(s) that are situated approximately 20 feet from the truck path and would be exposed to ground-borne vibration

[34] *FTA, "Transit Noise and Vibration Impact Assessment," May 2006, Figure 7-3.*

Table IV.H-22
Construction Vibration Impacts—Human Annoyance

Off-Site Receptor Location[c]	Estimated Vibration Velocity Levels at the Off-Site Sensitive Uses due to On-Site Construction Equipment Operation,[a] VdB					Significance Threshold, VdB	Significant Impact?
	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	87	87	86	79	58	—	—
R1	78	78	77	70	49	72[b]	Yes
R2	65	65	64	57	36	72[b]	No
R3	70	70	69	62	41	72[b]	No
R4	65	65	64	57	36	72[b]	No

[a] *Vibration levels calculated based on FTA reference vibration level at a distance of 25 feet.*

[b] *FTA criteria for residential/hotel use with frequent events.*

[c] *Receptor location R5 is on the Project Site; therefore, it is not included in the construction vibration impact analysis.*

Source: FTA, 2006; AES, 2017. See Appendix G of this Draft EIR.

levels of approximately 0.022 PPV, as provided in the noise calculation worksheets included in Appendix G of this Draft EIR. This estimated vibration generated by construction trucks traveling along the anticipated haul route(s) would be well below the most stringent building damage threshold of 0.12 PPV for buildings extremely susceptible to vibration. **Therefore, vibration impacts (pursuant to the threshold of significance for building damage) from off-site construction activities (i.e., construction trucks traveling on public roadways) would be less than significant.**

As discussed above, per FTA guidance, the threshold of significance for human annoyance is 72 VdB for sensitive uses, including residential uses. It should be noted that buses and trucks rarely create vibration that exceeds 70 VdB at 50 feet from the receptor unless there are bumps in the road.[35] The residential uses along Maxella Avenue are approximately 20 feet from the truck travel path. As indicated in the noise calculation worksheets included in Appendix G of this Draft EIR, the temporary vibration levels could reach approximately 75 VdB periodically as trucks pass by the residences along Maxella Avenue. The estimated ground-borne vibration from the construction trucks would exceed the 72 VdB significance threshold for residential uses. **Therefore, potential vibration impacts with respect to human annoyance that could result from temporary and**

[35] *Id. at Section 7.2.1.*

intermittent vibration from construction trucks traveling along the anticipated haul route would be significant.

(d) Summary of Construction Vibration Impacts

As discussed above, the estimated vibration levels from Project construction equipment would be below the building damage significance criteria of 0.3 PPV. Therefore, vibration impacts from on-site construction of the Project with respect to building damage would be less than significant, and no mitigation is necessary.

Vibration impacts from on-site construction activities would be significant pursuant to the significance criteria for human annoyance. Vibration impacts from off-site construction trucks traveling along the anticipated haul route(s) would be less than significant pursuant to the threshold of significance for building damage and potentially significant pursuant to the threshold for human annoyance.

Based on the above, the Project's on- and off-site construction activities would generate excessive ground-borne vibration levels with respect to human annoyance, and impacts would be significant. As discussed in detail below in Subsection 3.f, there are no feasible mitigation measures that would reduce the potential vibration human annoyance impacts. Therefore, vibration impacts from the Project's on- and off-site construction with respect to human annoyance would be significant and unavoidable.

Threshold (c): Would the Project result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?

As discussed above under **Threshold (a)**, the Project's operational noise impacts associated with on-site sources would be less than significant. In addition, the Project's operational noise impacts from off-site source (roadway traffic) would be less than significant. **Thus, the Project would not result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.**

Threshold (d): Would the Project result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?

As discussed above, noise impacts associated with the Project's on-site construction would be significant at all off-site sensitive receptors. Implementation of Mitigation Measure NOI-MM-1 provided below in Subsection 3.e, Mitigation Measures, would reduce the Project's on-site construction noise levels to a less-than-significant level at two of the four representative receptor locations. However, significant impacts would remain at two of

the representative receptor locations. Noise impacts associated with the off-site construction traffic would be less than significant before mitigation at all off-site sensitive receptors. **Thus, the Project would result in a substantial temporary or periodic increase in ambient noise levels at noise-sensitive uses in the vicinity of the Project Site above levels existing without the Project.**

Threshold (e): For a project located within 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?

Threshold (f): For a project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?

As discussed in Section VI, Other CEQA Considerations, and in the Initial Study (Appendix A of this Draft EIR), the Project Site would not expose people residing or working in the project area to excessive airport-related noise levels. The Project Site is not located within an area subject to an airport land use plan or within 2 miles of an airport. The Project Site is also not located within the vicinity of a private airstrip. There are two airports located within 3 miles of the Project Site including: the Santa Monica Airport, which is located approximately 1.9 miles north of the Project Site and the Los Angeles International Airport, which is located approximately 2.5 miles south of the Project Site. However, the Project Site is not located within the Santa Monica Airport land use plan, and the airport is anticipated to be closed in 2028. Therefore, the Project would not expose people residing or working in the Project area to excessive airport-related noise levels. Thus, the Project would have no impact with respect to **Thresholds (e) and (f)**. No impacts from excessive airport-related noise levels would occur and no further analysis is required.

d. Cumulative Impacts

The Project, together with the related projects and future growth, could contribute to cumulative noise impacts. The potential for cumulative noise impacts to occur is specific to the distance between each related project and their stationary noise sources, as well as the cumulative traffic that these projects would add to the surrounding roadway network.

(1) Construction Noise

(a) On-Site Construction Noise

As indicated in Section III, Environmental Setting, of this Draft EIR, there are 39 related projects identified in the vicinity of the Project Site. Noise from construction of

development projects is typically localized and has the potential to affect noise-sensitive uses within 500 feet from the construction site, based on the *L.A. CEQA Thresholds Guide* screening criteria. Thus, noise from construction activities for two projects within 1,000 feet of each other can contribute to a cumulative noise impact for receptors located midway between the two construction sites. While the majority of the related projects are located over 1,000 feet from the Project Site, the following three related projects are within 1,000 feet of the Project Site:

- Related Project No. LA2 is a mixed-use (apartment and office) development located at 4140 Glencoe Avenue, approximately 810 feet north of the Project Site. However, construction of this related project is completed. Therefore, this related project would not contribute to cumulative construction-related noise impacts.

- Related Project No. LA3 is a mixed-use (residential and office) development located at 4210 Del Rey Avenue and is approximately 500 feet north of the Project Site. The nearest noise sensitive use between Related Project No. LA3 and the Project Site is the multi-family residential use located on the west side of Glencoe Avenue, adjacent to Related Project No. LA3. However, this related project is under construction and is anticipated to be completed prior to the construction of the Project. Therefore, Related Project No. LA3 would not contribute to cumulative construction-related noise impacts.

- Related Project No. LA18 (Stella Phase 2) is a 65-unit apartment development at 13488 Maxella Avenue and is located approximately 240 feet west of the Project Site. There are existing noise-sensitive uses in the vicinity of this related project site and the Project Site, including the existing multi-family residential use (Stella Phase 1) west of the Project Site (receptor location R1) and the Hotel MdR Hotel southwest of the Project Site (receptor location R2). As analyzed above, Project-related construction noise levels (before mitigation) would be up to 86.1 dBA and 80.1 dBA at receptor locations R1 and R2, respectively, which would exceed the existing ambient noise levels by more than 5 dBA. Thus, in the event concurrent construction activities occur, cumulative construction noise impacts associated with the Project and Related Project No. LA18 would exceed the 5-dBA significance criteria at receptor locations R1 and R2. Therefore, construction noise impacts resulting from both projects could be cumulatively considerable and would be considered significant before mitigation.

Based on the analysis provided above, cumulative noise impacts at sensitive uses located in proximity to the Project Site and Related Project No. LA18 could occur. Construction-related noise levels from the related projects would be intermittent and temporary, and it is anticipated that, as with the Project, the related projects would comply with the construction hours and other relevant provisions set forth in the LAMC. Noise associated with cumulative construction activities would be reduced through proposed mitigation measures for each individual related project and compliance with locally adopted

and enforced noise ordinances. **Nonetheless, if nearby Related Project No. LA18 were to be constructed concurrently with the Project, significant cumulative construction noise impacts could result.**

(b) Off-Site Construction Noise

In addition to the cumulative impacts of on-site construction activities, off-site construction haul trucks would have a potential to result in cumulative impacts if the trucks for the related projects and the Project were to utilize the same haul routes. Specifically, based on the existing daytime ambient noise level of 67.7 dBA (L_{eq}) measured along Maxella Avenue at receptor location R5 (refer to Table IV.H-7 on page IV.H-15), it is estimated that up to 58 truck trips per hour could occur along Maxella Avenue without exceeding the significance thresholds of 5 dBA above ambient noise levels. Therefore, if the total number of trucks from the Project and related projects were to add up to 59 truck trips per hour along Maxella Avenue, the estimated noise level from 59 truck trips per hour would be 72.7 dBA, which would exceed the existing ambient noise levels by 5 dBA and exceed the significance criteria.[36] Since the Project would only generate up to 8 truck trips per hour (see Table IV.H-12 on page IV.H-31) along Maxella Avenue during peak construction period (i.e., grading/excavation), it is unlikely that truck traffic related to construction of the Project and the nearby related projects could cumulatively add up to 59 or more hourly truck trips, as it would require minimum of six additional similarly sized projects using Maxella Avenue for hauling. There is only one related project (Related Project No. LA18) located near the Project Site, which would likely use Maxella Avenue for construction trucks. In addition, for Glencoe Avenue and Lincoln Boulevard, it would require a total of 103 and 146 cumulative truck trips per hour to exceed the ambient noise levels by 5 dBA, respectively. Similarly, it would require approximately 12 and 17 similar related projects using Glencoe Avenue and Lincoln Boulevard, at the same time as the Project. Therefore, cumulative noise due to construction truck traffic from the Project and other related projects would not exceed the existing ambient noise levels along Maxella Avenue by 5 dBA. **As such, cumulative noise impacts from off-site construction would be less than significant.**

(c) Summary of Cumulative Construction Noise Impacts

As discussed above, if nearby Related Project No. LA18 were to be constructed concurrently with the Project, significant cumulative on-site construction noise impacts could result. **Therefore, cumulative construction noise impacts from on-site construction activities are conservatively considered to be significant and**

[36] *It is estimated that with 58 truck trips, the noise level would be 72.6 dBA, which is 4.9 dBA above the ambient noise level of 67.7 dBA. With 59 truck trips, the noise level would be 72.7 dBA, which would exceed the ambient by 5.0 dBA.*

unavoidable. Thus, construction of the Project and related projects could result in the temporary and intermittent exposure of persons to or generation of noise levels in excess of standards established by the City or result in a substantial temporary or periodic increase in ambient noise levels in the vicinity of the Project Site above levels existing without the Project and related projects.

Cumulative noise impacts from off-site construction activities would be less than significant based on the assumption that the Project and the related projects in the vicinity of the Project Site would not generate up to 59, 103, and 146 truck trips per hour along Maxella Avenue, Glencoe Avenue, and Lincoln Boulevard, respectively. **Therefore, off-site construction activities from the Project and related projects would not result in the exposure of persons to or generation of noise levels in excess of standards established by the City or result in a substantial temporary or periodic increase in ambient noise levels in the vicinity of the Project Site above levels existing without the Project and related projects.**

(2) Operational Noise

The Project Site and surrounding area have been developed with uses that have previously generated, and will continue to generate, noise from a number of community noise sources, including mechanical equipment (e.g., HVAC systems), outdoor activity areas, and vehicle travel. Similar to the Project, each of the related projects that have been identified in the vicinity of the Project Site would also generate stationary-source and mobile-source noise due to ongoing day-to-day operations. All related projects are of a residential, retail, commercial, or institutional nature, and these uses are not typically associated with excessive exterior noise levels. However, each related project would produce traffic volumes that are capable of generating roadway noise impacts. The potential cumulative noise impacts associated with on-site and off-site noise sources are addressed below.

(a) On-Site Stationary Noise Sources

Due to the provisions set forth in the LAMC that limit stationary source noise from items such as rooftop mechanical equipment, noise levels would be less than significant at the property line for each related project. Therefore, based on the distance of the related projects from the Project Site and the operational noise levels associated with the Project, cumulative stationary source noise impacts associated with operation of the Project and related projects would be less than significant.

(b) Off-Site Mobile Noise Sources

The Project and related projects in the area would produce traffic volumes (off-site mobile sources) that would generate roadway noise. Cumulative noise impacts due to off-site traffic were analyzed by comparing the projected increase in traffic noise levels from existing conditions to Future Plus Project conditions to the applicable significance criteria. Future Plus Project conditions include traffic volumes from future ambient growth, related projects, and the Project. The calculated traffic noise levels under Existing Conditions and Future Plus Project conditions are presented in Table IV.H-23 on page IV.H-53. As shown therein, cumulative traffic volumes would result in an increase ranging from 0.3 dBA (CNEL) along the roadway segment of Venice Boulevard (between Lincoln Boulevard and Centinela Avenue) to a maximum increase of 1.0 dBA (CNEL) along the roadway segment Mindanao Way (east of Glencoe Avenue). The estimated noise increase would be below the 3 dBA significance criteria (applicable to noise levels fall within the normally unacceptable land use category). Therefore, cumulative noise impacts due to off-site mobile noise sources associated with the Project, future growth, and related projects would be less than significant.

(c) Summary of Cumulative Operational Noise Impacts

As discussed above, cumulative operational noise impacts from on-site and off-site sources would be less than significant. Therefore, the Project and related projects would not result in the exposure of persons to or generation of noise levels in excess of standards established by the City or in a substantial permanent increase in ambient noise levels in the vicinity of the Project Site above levels existing without the Project and the related projects.

(3) Construction Vibration

(a) On-Site Construction Vibration

As previously discussed, ground-borne vibration decreases rapidly with distance. Potential vibration impacts due to construction activities are generally limited to buildings/structures that are located in proximity to the construction site (i.e., within 15 feet with regard to building damage and 80 feet with regard to human annoyance at residential and hotel uses). As indicated above, the nearest related projects to the Project Site are Related Project No. LA18, which is approximately 240 feet west of the Project Site and Related Project No. LA3, which is approximately 500 feet from the Project Site. Due to the rapid attenuation characteristics of ground-borne vibration and given the distance of the nearest related projects to the Project Site, there is no potential for a cumulative construction vibration impact with respect to building damage associated with ground-borne vibration from on-site sources.

Table IV.H-23
Cumulative Roadway Traffic Noise Impacts

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Existing Without Project	Future Plus Project		
Abbot Kinney Boulevard					
– North of Venice Blvd.	Residential, Commercial	68.9	69.4	0.5	No
– Between Venice Blvd. and Washington Blvd.	Residential, School, Religious	68.6	69.0	0.4	No
Lincoln Boulevard					
– Between Rose Ave. and Venice Blvd.	School, Commercial	70.9	71.6	0.7	No
– Between Venice Blvd. and Washington Blvd.	Motel, Commercial	70.9	71.8	0.9	No
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	71.6	72.3	0.7	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	71.3	72.0	0.7	No
– Between Mindanao Wy. and Jefferson Blvd.	Residential, Commercial	72.2	72.8	0.6	No
Glencoe Avenue					
– Between Washington Blvd. and Maxella Ave.	Residential, Commercial	69.2	69.8	0.6	No
– Between Maxella Ave. and Mindanao Wy.	Residential, Commercial	68.8	69.5	0.7	No
– South of Mindanao Wy.	Residential, Commercial	69.8	70.5	0.7	No
Centinela Avenue					
– Between Venice Blvd. and Washington Blvd.	Residential, Commercial	70.1	70.6	0.5	No
– Between Washington Blvd. and Short Ave.	Residential, Commercial	70.8	71.6	0.8	No
– Between Short Ave. and Culver Blvd.	Commercial	71.1	71.7	0.6	No
Venice Boulevard					
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Religious, Commercial	67.8	68.3	0.5	No
– Between Lincoln Blvd. and Beethoven St.	Residential, School	69.0	69.3	0.3	No
– Between Beethoven St. and Centinela Ave.	Residential, Commercial	69.6	69.9	0.3	No

Table IV.H-23 (Continued)
Cumulative Roadway Traffic Noise Impacts

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] CNEL (dBA)		Increase in Noise Levels due to Project, CNEL (dBA)	Significant Impact?
		Existing Without Project	Future Plus Project		
Washington Boulevard					
– West of Abbot Kinney Blvd.	Residential	68.5	69.0	0.5	No
– Between Abbot Kinney Blvd. and Lincoln Blvd.	Residential, Motel, Religious, Commercial	70.2	70.7	0.5	No
– Between Lincoln Blvd. and Glencoe Ave.	Motel, Commercial	69.3	69.7	0.4	No
– Between Glencoe Ave. and Centinela Ave.	Residential, Commercial	69.7	70.2	0.5	No
Maxella Avenue					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	67.5	68.1	0.6	No
– East of Glencoe Ave.	Residential, School	65.3	65.9	0.6	No
Mindanao Way					
– Between Lincoln Blvd. and Glencoe Ave.	Residential, Commercial	68.8	69.4	0.6	No
– East of Glencoe Ave.	Residential	64.2	65.2	1.0	No

[a] *Detailed calculation worksheets are included in Appendix G of this Draft EIR.*

Source: AES, 2017.

With regard to human annoyance, the nearest sensitive use to the Project Site and Related Project No. LA18 is the Hotel MdR (receptor location R2), which is approximately 140 feet from the Project construction area and 30 feet from the Related Project No. LA18 construction area. As discussed above, the closest distance at which heavy construction equipment could result in a significant impact related to human annoyance is 80 feet. The construction vibration associated with Related Project No. LA18 at Hotel MdR would likely exceed the 72 VdB significance threshold; however, the construction-related vibration generated from the Project to Hotel MdR would be 65 VdB (as provided in Table IV.H-22 on page IV.H-46), which is well below the significance threshold. Therefore, construction activities from the Project would not be cumulatively considerable with respect to ground-borne vibration. In addition, while Project-related on-site construction activities would result in a significant impact at receptor R1, construction activities from Related Project No. LA18 would be well below the 72 VdB significance threshold at receptor R1, due to distance attenuation. As such, cumulative construction vibration impacts pursuant to the threshold for human annoyance would be less than significant in the event concurrent construction of the Project and Related Project No. LA18 were to occur.

(b) Off-Site Construction Vibration

As previously discussed, based on FTA data, the vibration generated by a typical heavy truck would be approximately 63 VdB (0.006 PPV) at a distance of 50 feet from the truck.[37] In addition, according to the FTA "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads." As discussed above, there are existing buildings that are approximately 20 feet from the right-of-way of the anticipated haul routes. These buildings are anticipated to be exposed to ground-borne vibration levels of approximately 0.022 PPV. Trucks from the related projects are expected to generate similar ground-borne vibration levels. Therefore, the vibration levels generated from off-site construction trucks associated with the Project and other related projects along the anticipated haul route(s) would be well below the most stringent building damage threshold of 0.12 PPV for buildings extremely susceptible to vibration. Therefore, potential cumulative vibration impacts with respect to building damage from off-site construction would be less than significant.

As discussed above, potential vibration impacts associated with temporary and intermittent vibration from Project-related construction trucks traveling along the anticipated haul route would be potentially significant with respect to human annoyance. As the related projects would be anticipated to use similar trucks as the Project, it is anticipated that construction trucks would generate similar vibration levels along the anticipated haul route (i.e. Maxella Avenue). Therefore, to the extent that other related projects use the

[37] *FTA, "Transit Noise and Vibration Impact Assessment," May 2006, Figure 7-3.*

same haul route at the same time as the Project, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated haul routes would be significant.

(c) Summary of Cumulative Construction Vibration Impacts

As discussed above, due to the rapid attenuation characteristics of ground-borne vibration and given the distance of the nearest related project to the Project Site, there is no potential for a cumulative construction vibration impact with respect to building damage associated with ground-borne vibration from on-site sources. In addition, potential cumulative vibration impacts with respect to building damage from off-site construction would be less than significant. Therefore, on-site and off-site construction activities associated with the Project and related projects would not generate excessive ground-borne vibration levels with respect to building damage.

Cumulative construction vibration impacts pursuant to the threshold for human annoyance from on-site construction activities would be less than significant.

To the extent that the nearby related projects would use the same haul route at the same time as the Project, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated haul routes would be potentially significant.

e. Mitigation Measures

(1) Construction Noise

As analyzed above, use of on-site construction equipment during construction of the Project would have the potential to result in significant noise impacts at the off-site sensitive receptor locations. Therefore, the following measures are provided to reduce the construction-related noise impacts:

Mitigation Measure NOI-MM-1: A temporary and impermeable sound barrier shall be erected at the locations listed below. At plan check, building plans shall include documentation prepared by a noise consultant verifying compliance with this measure.

- Along the northeastern property line of the Project Site between the construction areas and the apartment building at the northeast corner of Glencoe Avenue and Maxella Avenue (receptor location

R4). The temporary sound barrier shall be designed to provide a minimum 7-dBA noise reduction at receptor location R4.

- Along the eastern property line of the Project Site between the construction areas and multi-family residential use located on Glencoe Avenue (receptor location R3). The temporary sound barrier shall be designed to provide a minimum 11-dBA noise reduction at receptor location R3.
- Along the western property line of the Project Site between the construction area and the multi-family residential (receptor location R1) and hotel (receptor location R2) uses west and southwest of the Project Site, respectively. The temporary sound barrier shall be designed to provide a minimum 18-dBA and 20-dBA noise reduction at ground level of receptor locations R1 and R2, respectively.

(2) Operational Noise

As discussed above, operation of the Project would not result in a significant impact. Therefore, no mitigation is required.

f. Level of Significance After Mitigation

(1) Construction Noise

(a) On-Site Construction Noise

Installation of the temporary sound barriers provided in the mitigation measures above would reduce the noise generated by on-site construction activities at receptor R3 by 7 dBA and at receptor R4 by 11 dBA. Table IV.H-24 on page IV.H-58 provides the estimated construction noise levels at the off-site sensitive receptors with mitigation measures implemented. As indicated therein, the potential impacts associated with on-site construction activities would be reduced to less than significant levels at receptors R3 and R4. However, the temporary sound barriers specified for receptors R1 and R2 would not be effective in reducing the construction-related noise for the upper levels of the residential and hotel uses at receptors R1 and R2. In order to be effective, the temporary noise barrier would need to be as high as the buildings (i.e., 6 stories and 5 stories for receptors R1 and R2, respectively). The construction of barriers of these heights would not be feasible. There are no other feasible mitigation measures that could be implemented to reduce the temporary noise impacts from on-site construction at receptors R1 and R2. As such, construction noise impacts associated with on-site noise sources would remain significant and unavoidable. In addition, cumulative construction noise impacts associated with on-site noise sources would remain significant and unavoidable if nearby Related Project No. LA18 were to be constructed concurrently with the Project.

Table IV.H-24
On-Site Construction Noise Impacts—With Mitigation Measures

Off-Site Receptor Location[a]	Noise Reduction Provided by Mitigation Measures	Estimated Construction Noise Levels by Construction Phases, L_{eq} (dBA)					Existing Daytime Ambient Noise Levels, L_{eq} (dBA)	Significance Criteria, L_{eq} (dBA)[b]	Maximum Noise Exceedance Above the Criteria, L_{eq} (dBA)	Sig. Impact?
		Demolition	Grading	Garage/ Podium (Foundation)	Building Construction	Sitework/ Landscape				
R1	18[c]	66.9[c]	64.6[c]	68.1[c]	66.9[c]	67.4[c]	63.4	68.4	[c]	Yes[c]
R2	20[c]	57.9[c]	56.7[c]	60.1[c]	57.5[c]	58.5[c]	56.1	61.1	[c]	Yes[c]
R3	11	69.6	67.9	71.3	69.4	70.2	66.4	71.4	0.0	No
R4	7	70.9	69.5	72.9	70.5	71.3	68.6	73.6	0.0	No

[a] *Receptor location R5 is on the Project Site; therefore, it is not included in the construction noise impact analysis.*

[b] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.H-7 on page IV.H-15) plus 5 dBA, per the L.A. CEQA Thresholds Guide for construction activities lasting longer than 10 days in a three-month period. If the estimated construction noise levels exceed those significance thresholds, a construction-related noise impact is identified.*

[c] *Noise barriers would not be effective in reducing the on-site construction noise at the upper levels of receptors R1 and R2. Therefore, on-site construction noise impacts would remain significant and unavoidable. On-site construction noise levels shown for R1 and R2 are for the ground level of the building only.*

Source: AES, 2018. See Appendix G of this Draft EIR.

(b) Off-Site Construction Noise

Project-level noise impacts from off-site construction would be less than significant. In addition, cumulative noise levels due to construction truck traffic from the Project and other related projects would be less than significant.

(2) Operational Noise

Project-level and cumulative impacts with regard to operational noise would be less than significant.

(3) Construction Vibration

(a) On-Site Construction Vibration

Vibration levels generated from on-site construction activities would be below the significance threshold for building damage at the adjacent off-site buildings. Therefore, Project-related and cumulative vibration impacts with respect to building damage would be less than significant.

Vibration levels from on-site construction activities at the off-site sensitive receptor R1 would exceed the significance threshold for human annoyance. Therefore, Project-related vibration impacts from on-site construction with respect to human annoyance would be significant. However, as evaluated above (for the off-site sensitive receptor R2, approximately 140 feet and 30 feet from the Project and the Related Project No. LA18), cumulative vibration impacts with respect to human annoyance from on-site construction activities would be less than significant. Additional mitigation measures considered to reduce vibration impacts from on-site construction activities with respect to human annoyance included the installation of a wave barrier, which is typically a trench or a thin wall made of sheet piles installed in the ground (essentially a subterranean sound barrier to reduce noise). However, wave barriers must be very deep and long to be effective and are not considered cost effective for temporary applications, such as construction.[38] In addition, constructing a wave barrier to reduce the Project's construction-related vibration impacts would, in and of itself, generate ground-borne vibration from the excavation equipment. Thus, it is concluded that there are no feasible mitigation measures that could be implemented to reduce the temporary vibration impacts from on-site construction associated with human annoyance to a less-than-significant level. **Therefore, Project-level vibration impacts from on-site construction activities with respect to human annoyance would remain significant and unavoidable.**

[38] *Caltrans, Transportation- and Construction-Induced Vibration Guidance Manual, June 2004.*

(b) Off-Site Construction Vibration

Vibration levels generated by construction trucks (i.e., haul, delivery, and concrete trucks) along the Project's haul route would be well below the significance threshold for building damage. Therefore, Project-related and cumulative vibration impacts with respect to building damage would be less than significant.

Vibration levels from construction trucks would exceed the significance threshold for human annoyance at vibration sensitive receptors along the anticipated haul route (i.e., Maxella Avenue). There are no feasible mitigation measures that would reduce the potential vibration human annoyance impact. While impacts would be temporary, intermittent, and limited to daytime hours when the haul truck is traveling within 20 feet of a sensitive receptor, Project-level and cumulative vibration impacts from off-site construction with respect to human annoyance would remain significant and unavoidable.

(4) Human Health Impacts Related to Noise

The California Supreme Court decision on December 24, 2018, *Sierra Club v. County of Fresno* (Friant Ranch), requires projects with significant impacts to "relate the expected adverse impacts to likely health consequences or explain why it is not feasible at the time of drafting to provide such an analysis, so that the public may make informed decisions regarding the costs and benefits of the project". While this case involved the health impacts from emissions of pollutants beyond established thresholds, this Draft EIR conservatively assumes that it also could apply to noise impacts.

As discussed above, the Project's construction noise impacts would be reduced to less than significant with implementation of the Project's mitigation measures. Noise impacts associated with off-site construction would also be less than significant. In addition, Project-specific and cumulative noise impacts and vibration associated with Project operation would be less than significant for on-site and off-site noise sources. However, the Project's cumulative construction noise impacts would remain significant and unavoidable. Furthermore, on-site and off-site vibration related to human annoyance during construction of the Project would result in significant and unavoidable vibration impacts.

With respect to potential noise impacts on human health, the City of Los Angeles (City) currently has not set specific noise limits beyond the City's Noise Regulations. However, the U.S. Occupational Safety and Health Administration (OSHA) and the State's Division of Occupational Safety and Health (also known as Cal/OSHA) have established

the permissible noise exposure limits, primarily applicable to workers working in noisy environments, to prevent noise-induced hearing loss.[39]

In addition to damaging hearing, loud noises may cause other physical stress as well as mental stress. The National Institute for Occupational Safety and Health (NIOSH) has performed studies to review the relationship between loud noise and health conditions such as high blood pressure and high cholesterol. The most recent study performed by NIOSH has shown an association occupational noise exposure with high blood pressure and high cholesterol. However, the study did not prove that a noisy workplace was the direct cause of high blood pressure and cholesterol levels.[40] As these health conditions may be caused by other lifestyle factors (diet, exercise, smoking), a clear link between loud noises and high blood pressure and cholesterol levels have not yet been established.

As no specific harmful noise levels have been established for non-hearing related noise health effects, the Cal/OSHA standards are being used as a guide to evaluate potential health effects of the Project's noise impacts to the public at large, in absence of the City-specific limit. The noise exposure limitation is defined as exposure duration per day (for workers). Per Cal/OSHA, the permissible noise exposure for 8 hours would be 90 dBA (L_{eq}).[41] In addition, the United States Environmental Protection Agency (EPA) provides noise exposure limits for environmental noise with respect to hearing loss. The EPA has identified a noise level With Margin of Safety of 70 dBA (24-hr L_{eq}), based on a 24-hour-per-day, 365-day-per-year, 40-year period, as exposure levels that produce no more than 5 dB noise-induced hearing damage or noise induced permanent threshold shift (NIPTS).[42,43]

Noise levels associated with the Project's construction activities would be short-term and intermittent, as construction equipment would be moving around the Project Site; as such, the EPA's limit would not be applicable. As analyzed above, the estimated maximum mitigated noise levels due to the Project's construction activities would be

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[39] *OSHA, Hearing Conservation, OSHA 3074, 2002 (Revised)*

[40] *American Journal of Industrial Medicine. Cardiovascular Conditions, Hearing Difficulty, and Occupational Noise Exposure within US Industries and Occupations. March 14, 2018.*

[41] *Cal/OSHA, Title 8 Regulations, Subchapter 7. General Industry Safety Orders, Group 15. Occupational Noise, Article 105. Control of Noise Exposure, §5096. Exposure Limits for Noise, Table N-1 Permissible Noise Exposure.*

[42] *EPA, Noise Effects Handbook: A Desk Reference to Health and Welfare Effects of Noise, July 1981, Table 2-1.*

[43] *Noise induced permanent threshold shift (NIPTS) is defined as hearing loss suffered as a result of noise exposure which increases a person's auditory threshold. As an example, a 5 dB NIPTS would indicate that a person that would originally be able to hear sounds as low as 45 dB (auditory threshold), would now be able to hear sounds as low as 50 dB.*

72.9 dBA (L_{eq}). Therefore, with the identified mitigation measures, the Project's construction-related noise levels would be well below the Cal/OSHA permissible noise exposure of 90 dBA (L_{eq}). As described, the EPA's limit would not be applicable for construction noise, as construction noise would be short-term and intermittent. Moreover, as described above, the construction impact analysis was based on a worst-case scenario, which assumes all pieces of construction equipment would be operating simultaneously and would be located nearest to the affected receptors. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the development area, and, thus, some equipment would be farther away from the affected receptors. In addition, the noise modeling assumes that construction noise is constant, when, in fact, construction activities and associated noise levels are periodic and fluctuate based on the construction activities. Therefore, the estimated construction noise levels at the off-site noise sensitive receptors are likely overstated, and actual noise levels would be lower. As such, Project-related construction noise levels would be unlikely to negatively affect human health as they would be below the noise limits, pursuant to Cal/OSHA noise exposure limit.

Potential human health effects due to vibration includes whole-body exposure to vibration forces, which could result in low back pain or neck pain.[44] The American Conference of Governmental Industrial Hygienists (ACGIH) published recommendations for prevention of whole-body vibration. The ACGIH sets a limit value of 0.9 m/s^2 (8 hour equivalent total value) as an impact threshold for whole-body exposure to vibration forces. As analyzed above, the estimated maximum vibration levels due to the Project's construction activities would be 78 VdB (approximately 0.07 m/s^2) at the nearest off-site receptor, which would be well below the ACGIH limit value of 0.9 m/s^2. Therefore, Project-related vibration levels would be below the vibration level that would be anticipated to affect human health.

[44] *Jens Wahlström, Review and Meta-Analysis of Whole-Body Vibration Disorders with Focus on the Low Back, 7th American Conference on Human Vibration - 2018.*