IV. Environmental Impact Analysis

G. Noise

1. Introduction

This section of the Draft EIR analyzes the potential noise and vibration impacts that may 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, identifies the potential for significant impacts, and provides mitigation measures to address significant impacts. In addition, this section of the Draft EIR evaluates the potential cumulative noise and vibration impacts resulting from the Project together with related projects and other future growth. 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.G-1 on page IV.G-2.

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[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.G-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, 2009.

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 “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 electrical equipment (e.g.,

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

air conditioner or bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically "hard" sites (e.g., asphalt and concrete surfaces) and 7.5 dBA per doubling of distance from the noise source to the receptor over acoustically "soft" sites (e.g., soft dirt, grass or scattered bushes and trees).[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 point 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 (City), 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

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[3] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2.*

[4] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2.*

[5] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2.*

[6] *FHWA, Highway Traffic Noise Analysis and Abatement Policy and Guidance, 1995.*

same amount of energy to the receptor's ear during exposure. L_{eq} for 1-hour periods, during the daytime or nighttime hours, and 24-hour periods are 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 that 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]

- *Day/Night Average Sound Level (L_{dn})*. L_{dn} is the time average of all A-weighted sound levels for a 24-hour period, similar to the CNEL. L_{dn} includes 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). Unlike CNEL, L_{dn} does not include the 5 dBA adjustment (upward) to the sound levels which occur between the hours of 7:00 P.M. and 10:00 P.M. (evening). L_{dn} is typically within one dBA of CNEL and the two measurements are often used interchangeably for the purposes of defining the community noise environment and measuring A-weighted sound levels for a 24-hour period.

(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

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[7] *State of California, General Plan Guidelines, 2017.*

[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 of peak particle velocity level in the unit of inches per second.*

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 one micro-inch per second).[10] Ground-borne vibration generated by man-made activities (e.g., road traffic, 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 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 operation 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 L_{dn} of 55 dBA and an indoor L_{dn} 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.

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[9] *Federal Transit Administration (FTA), "Transit Noise and Vibration Impact Assessment," Section 5.1, September 2018.*

[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.*

[11] *United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974.*

(2) State

The state of California adopted noise compatibility guidelines for general land use planning, which are used by the City for Noise Compatible Land Use guidelines (refer to Table IV.G-2 on page IV.G-7). 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, 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. The 2019 California Green Building Standards Code also 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 factors to consider regarding 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 (Noise Element) is to guide policymakers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels. The following policies and objectives from the Noise Element are applicable to the Project:[13]

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[12] *State of California, Governor's Office of Planning and Research, General Plan Guidelines, July 2017, p. 374.*

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

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

Land Use	Community Noise Exposure: Day-Night Average Exterior Sound Level (CNEL dB)						
	50	**55**	**60**	**65**	**70**	**75**	**80**
Residential Single-Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential Multi-Family	A	A	C	C	N	U	U
Transient Lodging, Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
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).

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

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

- Objective 3 (Land Use Development): Reduce or eliminate noise 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.G-2 on page IV.G-7.

(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 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, $L_{eq(15\text{-minute})}$. 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 LAMC Section 111.03 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.G-3 on page IV.G-9.

To account for people's increased tolerance for short-duration noise events, the Noise Regulations provide a 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 5 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). Furthermore, the Noise Regulations provide that 5 dBA shall be added to the noise level for steady high-pitched noise or repeated impulsive noises.[15,16]

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

[15] *LAMC, Chapter XI, Article I, Section 111.02 (b).*

Table IV.G-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 (A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5)	50	40
Commercial (P, PB, CR, C1, C1.5, C2, C4, C5, and CM)	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: LAMC Section 111.03.

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 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 shall be silenced within five minutes.

LAMC Section 112.01 prohibits the use or operation of a machine or device for the producing, reproducing or amplification of the human voice, music, or any other sound that causes the ambient noise level on the premises of any occupied property to be exceeded by more than 5 dBA.

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] LAMC Section 41.40 prohibits construction noise that disturbs persons occupying sleeping quarters in any dwelling, hotel,

[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.*

[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.*

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 Regulations relative to noise generated by operation of equipment, and the Los Angeles Police Department enforces Noise Regulations 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 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 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.G-4 on page IV.G-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.G-5 on page IV.G-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.

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18 *FTA, "Transit Noise and Vibration Impact Assessment," Chapter 5.2, September 2018.*

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

20 *FTA, "Transit Noise and Vibration Impact Assessment," September 2018.*

Table IV.G-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, 2018.

c. Existing Conditions

As discussed in Section II, Project Description, of this Draft EIR, the Project Site is located in a highly urbanized area. The predominant source of noise in the vicinity of the Project Site is vehicular traffic on adjacent roadways. Other ambient noise sources in the vicinity of the Project Site include truck traffic, landscaping activities, operation of the adjacent the Angels Flight, pedestrian and programmed activities at the adjacent California Plaza outdoor spaces, and other miscellaneous noise sources associated with typical urban activities.

(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 (hotels), schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.[21] Similarly, the Noise Element 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.

[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.G-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, 2018.

receptor locations were selected to represent noise-sensitive uses within 500 feet of the Project Site. These locations represent areas with land uses 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 the six selected off-site locations around the Project Site to establish baseline noise conditions in the vicinity of the Project Site. The monitoring locations essentially surround the Project Site and thereby provide representative baseline measurements for uses in all directions. The monitoring locations provide an 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.G-1 on page IV.G-13 and described in Table IV.G-6 on page IV.G-14.

(2) Ambient Noise Levels

To establish baseline noise conditions, existing ambient noise levels were monitored at the six off-site receptor locations (identified as R1 to R6) that are representative of sensitive uses in the vicinity of the Project Site. The baseline noise monitoring program was conducted on November 13, 2019 using a Quest Technologies Model 2900 Integrating/

Figure IV.G-1
Noise Measurement Locations

Source: Acoustical Engineering Services, May 21, 2020.

Table IV.G-6
Description of Noise Measurement Locations

Receptor Location	Description	Approximate Distance from Measurement Location to Nearest Project Site Boundary (feet)[a]	Nearest Noise-Sensitive Land Use(s)
R1	Multi-family residential use at 300 Olive Street, north side of the Project Site	110	Residential
R2	Multi-family residential use at 417 4th Street, south of the Project Site	75	Residential
R3	Existing commercial use on the east side of Hill Street, east of the Project Site. Future site of residential mixed-use development (Related Project No. 1)	90	Commercial (Future Residential)
R4	Hotel use on the east side of Hill Street, southeast of the Project Site	230	Residential, Hotel
R5	California Plaza (under renovation)	Adjacent to the Project Site	Commercial/ Amphitheater
R6	Residential outdoor open space, north of the Project Site. Ambient noise measurement was measured on the Project Site, due to site accessibility.	20	Residential

[a] *Distances are estimated using Google Earth.*

Source: Acoustical Engineering Services (AES), June 2020. See Appendix G of this Draft EIR.

Logging Sound Level Meter.[23] A 24-hour measurement was conducted at the receptor location (R6). Two 15-minute measurements were conducted at the remaining five off-site receptor locations (R1 to R5) during daytime and nighttime hours. The daytime ambient noise levels were measured between 10:00 A.M. and 1:00 P.M., and the nighttime ambient noise levels were measured between 10:00 P.M. and 12:00 A.M. The ambient noise measurements were recorded in accordance with the City's standards, which require ambient noise to be measured over a period of at least 15 minutes.[24]

[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.*

[24] *LAMC Section 111.01.*

Table IV.G-7 on page IV.G-16 provides a summary of the ambient noise measurements conducted at the off-site noise receptor locations. Note that the existing ambient noise level at receptor location R5 was affected by the construction activities associated with the California Plaza renovation. Also note that when California Plaza is operational, there are programmed outdoor events that include performances with amplified music, which increase the general level of ambient noise in this area. Therefore, the City's presumed ambient noise levels (for commercial zones) were utilized as baseline ambient noise levels for the impact analysis at this location. Based on field observations, the ambient noise at the Project measurement locations is dominated by local traffic (i.e., Olive Street, 4th Street, Hill Street), the adjacent Angels Flight funicular and, to a lesser extent, helicopter flyovers and other typical urban noises. As indicated in Table IV.G-7, the existing daytime ambient noise levels at the off-site noise receptor locations ranged from 60.0 dBA (L_{eq}) at receptor location R5 to 71.0 dBA (L_{eq}) at receptor location R2. The measured nighttime ambient noise levels ranged from 55.0 dBA (L_{eq}) at receptor location R5 to 68.4 dBA (L_{eq}) at receptor location R2. Thus, the existing ambient noise levels at off-site locations R1 through R4 and R6 are above the City's presumed daytime and nighttime ambient noise levels of 50 dBA (L_{eq}) and 40 dBA (L_{eq}), respectively, for residential and hotel uses, as presented above in Table IV.G-3 on page IV.G-9. The noise level at R5 (without ongoing construction activities) is also likely above the City's presumed daytime and nighttime ambient noise levels. This is due in large part to the fact that all of these receptors are located in the dense urban core of the city.

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 information provided by the Traffic Study prepared for the Project included as Appendix J.1 of this Draft EIR (the noise calculations are included as Appendix G of this Draft EIR). Eighteen (18) 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 (FHWA) Traffic Noise Model (TNM) and traffic volume data from the Traffic Study prepared for the Project. The TNM 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 TNM 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.G-8 on page IV.G-17.

Table IV.G-7
Existing Ambient Noise Levels

Receptor Location	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	68.0	63.3	69.4[a]
R2	Residential	71.0	68.4	73.7[a]
R3	Commercial (Future Residential)	67.3	64.2	69.7[a]
R4	Hotel	67.2	65.2	70.3[a]
R5	Commercial/ Amphitheater[c]	60.0	55.0	61.5
R6	Residential Outdoor Open Space	63.7[b]	59.3[b]	67.0

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

[b] *Levels shown for R6 represent the average for the entire daytime and nighttime periods.*

[c] *The California Plaza is under renovation with on-site construction activities, which affects the existing ambient noise levels. Therefore, the City's presumed ambient noise levels (for commercial use zone) are used for the noise impact analysis at this receptor location.*

Source: AES, June 2020. See Appendix G of this Draft EIR.

Table IV.G-9 on page IV.G-18 provides the calculated CNEL for the analyzed local roadway segments based on existing traffic volumes. As shown therein, the existing CNEL due to surface street traffic volumes ranges from 61.2 dBA CNEL along 2nd Street (between Olive Street and Hill Street) to 73.0 dBA CNEL along Hill Street (between 2nd Street and 3rd Street). Currently, the existing traffic-related noise levels along the analyzed roadway segments of Olive Street, Hill Street (between 4th Street and 5th Street), Broadway, 2nd Street, 3rd Street (between Broadway and Spring Street), 4th Street, and 5th Street (between Olive Street and Broadway) fall within the conditionally acceptable noise levels for residential uses (i.e., between 60 and 70 dBA CNEL). The estimated traffic noise levels along Hill Street (between 2nd Street and 4th Street), 3rd Street (between Hill Street and Broadway), and 5th Street (between Grand Avenue and Olive Street) fall with the normally unacceptable noise levels for residential uses (i.e., between 70 and 75 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 buses) on local roadways. Operation of

Table IV.G-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, June 2020. See Appendix G of this Draft EIR.

Metro B and D (formerly Red and Purple) light rail lines underneath the Project Site, and the Angels Flight funicular adjacent to it, may also add to existing ground-borne vibration in the vicinity. 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."[25] 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.[26] Therefore, 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.

[25] *FTA, "Transit Noise and Vibration Impact Assessment," Page 112, September 2018.*

[26] *FTA, "Transit Noise and Vibration Impact Assessment," Table 5-5, September 2018.*

Table IV.G-9
Existing Roadway Traffic Noise Levels

Roadway Segment	Adjacent Sensitive Land Use	Approximate Distance to Roadway Center Line (feet)	Calculated Traffic Noise Levels, CNEL (dBA)[a]	Noise-Sensitive Land Uses	Existing Noise Exposure Compatibility Category[b]
Olive Street					
– Between 2nd St. and 4th St.	Residential, Hotel, Park	35	69.1	Yes	Conditionally Acceptable
– Between 4th St. and 5th St.	Residential	35	68.9	Yes	Conditionally Acceptable
– Between 5th St. and 6th St.	Hotel	35	69.2	Yes	Conditionally Acceptable
Hill Street					
– Between 2nd St. and 3rd St.	Hotel	40	73.0	Yes	Normally Unacceptable
– Between 3rd St. and 4th St.	Park	40	71.0	Yes	Normally Unacceptable
– Between 4th St. and 5th St.	Residential, Hotel	40	68.5	Yes	Conditionally Acceptable
Broadway					
– Between 2nd St. and 3rd St.	Residential	35	68.1	Yes	Conditionally Acceptable
– Between 3rd St. and 4th St.	Commercial	30	68.4	No	Conditionally Acceptable
– Between 4th St. and 5th St.	Residential	30	68.5	Yes	Conditionally Acceptable
2nd Street					
– Between Grand Ave. and Olive St.	School	35	62.7	Yes	Conditionally Acceptable
– Between Olive St. and Hill St.	Residential	45	61.2	Yes	Conditionally Acceptable
3rd Street					
– Between Hill St. and Broadway	Residential	30	71.6	Yes	Normally Unacceptable
– Between Broadway and Spring St.	Residential	30	68.6	Yes	Conditionally Acceptable
4th Street					
– Between Olive St. and Hill St.	Residential	40	67.1	Yes	Conditionally Acceptable
– Between Hill St. Broadway	Office	30	68.5	Yes	Conditionally Acceptable
5th Street					
– Between Grand Ave. and Olive St.	Hotel	30	70.1	Yes	Normally Unacceptable
– Between Olive St. and Hill St.	Residential, Park	30	68.3	Yes	Conditionally Acceptable
– Between Hill St. and Broadway	Residential	30	67.8	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.G-2 on page IV.G-7.*

Source: AES, June 2020.

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

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

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

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.

As discussed in Section II, Project Description, of this Draft EIR, construction of the Project is anticipated to begin in September 2022 and be completed in June 2026. Therefore, since construction activities would occur over a period longer than 10 days for all phases, the corresponding significance criteria 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 operation if:

- The Project 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.G-2 on page IV.G-7 for a description of these categories); or
- The Project causes the ambient noise levels measured at the property line of affected noise-sensitive uses to increase by 5 dBA in CNEL or greater; or
- Project-related operational on-site (i.e., non-roadway) noise sources, such as outdoor building mechanical/electrical equipment, outdoor activities, loading, trash compactor, or parking facilities, increase the ambient noise level (hourly L_{eq}) at noise-sensitive uses by 5 dBA.

The significance criteria 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., vehicles traveling on public roadways). Therefore, based on the *L.A. CEQA Thresholds Guide*, the significance criteria 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 significance 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.

(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) FTA Ground-Borne Vibration Standards and Guidelines

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

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

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

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

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

b. Methodology

(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)."[27] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see Table IV.G-7 on page IV.G-16). The construction noise levels were then calculated for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance (as described above in Subsection 2.a(1)(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.

(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. 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 included in Appendix J.1 of this Draft EIR (the noise calculations are included in Appendix G of this Draft EIR). The TNM calculates the hourly L_{eq} noise levels generated by construction-related haul trucks. Noise impacts were determined by comparing the predicted noise level plus ambient with that of the existing ambient noise levels along the Project's anticipated truck route(s).

(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 courtyard), parking facilities, and trash compactor; (2) calculating the noise level from each noise source at surrounding sensitive receptor property line locations; and (3) comparing such noise levels to ambient noise levels to determine significance. The on-site stationary noise sources were calculated using the SoundPLAN (version 8.1) computer noise prediction

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

model.[28] SoundPLAN is widely used by acoustical engineers as a noise modeling tool for environmental noise analysis.

(4) Off-Site Roadway Noise (Operation)

As discussed in Subsection 2.c, Existing Conditions, above, off-site roadway noise was analyzed using the FHWA TNM and traffic data from the Project's Transportation Assessment included as Appendix J.1 of this Draft EIR (the noise calculations are included in Appendix G of this Draft EIR). Roadway noise levels were calculated for various roadway segments, based on the intersection traffic volumes. Roadway noise conditions without the Project were compared to noise levels that would occur with implementation of the Project to determine Project-related noise impacts for operational off-site roadway noise.

(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 subterranean 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-condenser units (mounted at the roof level), that would include 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.

c. Project Design Features

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

[28] *SoundPLAN GmbH, SoundPLAN version 8.1, 2019.*

Project Design Feature NOI-PDF-1: Power construction equipment (including combustion engines), fixed or mobile, will be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment will be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

Project Design Feature NOI-PDF-2: All outdoor mounted mechanical equipment will be screened from off-site noise-sensitive receptors. The equipment screen shall be impermeable (i.e., solid material with minimum weight of 2 pounds per square feet) and break the line-of-sight from the equipment to the off-site noise-sensitive receptors.

Project Design Feature NOI-PDF-3: All loading docks will be acoustically screened from off-site noise-sensitive receptors.

Project Design Feature NOI-PDF-4: Project construction will not include the use of driven (impact) pile systems.

Project Design Feature NOI-PDF-5: Outdoor amplified sound systems, if any, will be designed so as not to exceed the maximum noise level of 70 dBA ($L_{eq\text{-}1hr}$) at a distance of 15 feet from the amplified speaker sound systems at the Level 5 Terrace location and the Lower California Plaza Terrace (Level 6), 75 dBA ($L_{eq\text{-}1hr}$) at Level PB1, Level 1, Level 3, Level 4, Level 5 (Hotel Pool Deck), and Level 6 (Hotel Lobby) exterior spaces; 80 dBA ($L_{eq\text{-}1hr}$) at a distance of 25 feet at Tower A Level 20 Terrace; and 85 dBA ($L_{eq\text{-}1hr}$) at a distance of 25 feet at Tower A Level 41 and Tower B Level 42 Terraces. A qualified noise consultant will provide written documentation that the design of the system complies with this maximum noise level.

Project Design Feature NOI-PDF-6: The final design of the Project shall include a noise attenuation feature (such as a plexiglass barrier) at least 6-feet high, along the eastern boundary of the Level 5 Terrace to shield noise sources on that terrace from the residential useable outdoor space at the receptor location immediately to the northeast of the Project Site.

d. Analysis of Project Impacts

Threshold (a): Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

(1) Impact Analysis

(a) Construction Noise

Construction of the Project would commence with the clearing of the existing landscaping on the Project Site, followed by grading and excavation for the subterranean parking. Building foundations would then be constructed, followed by building construction, paving/concrete installation, and landscape installation. It is estimated that approximately 334,000 cubic yards of export material would be hauled from the Project Site during the demolition and excavation phase. Construction delivery/haul trucks would travel on approved truck routes between the Project Site and the Harbor Freeway (I-110). Incoming trucks are anticipated to access the Project Site from I-110 via 4th Street (east bound). Outgoing trucks would utilize Hill Street (northbound) to 3rd Street, travel west on 3rd Street onto the I-110 Freeway on-ramp. In addition, concrete trucks could also utilize the local streets between the Project Site and the concrete mixing plant. Incoming concrete trucks would travel north on Alameda Street (from 27th Street) to 7th Street, head west on 7th Street, and then north on Hill Street toward the Project Site. Upon departure, empty concrete trucks would exit the Project site onto Hill Street toward 4th Street, head east on 4th Street to Alameda Street, and continue south on Alameda Street toward 27th Street.

(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 require the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of cranes, forklifts, concrete trucks, pumps, and delivery trucks. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Project Site.

As provided in Project Design Feature NOI-PDF-1 above, construction equipment would have proper noise muffling devices per the manufacturer's standards. 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.G-10 on page IV.G-26. These

Table IV.G-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	20	84
Forklift	20	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.

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 operates 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.[29] These noise levels are typically associated with multiple pieces of equipment operating on part power, simultaneously.

[29] *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.G-11 on page IV.G-28 provides the estimated construction noise levels for various construction phases at the six off-site noise-sensitive receptor locations. 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 area nearest to the affected receptors. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the Project Site, 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 combined, the corresponding significance criteria used in the construction noise analysis is when the construction-related noise exceeds the ambient L_{eq} noise level of 5 dBA at a noise-sensitive use. As indicated in Table IV.G-11, the estimated noise levels during all stages of Project construction combined would exceed the significance criteria at all the representative off-site receptor locations. The estimated construction-related noise would exceed the significance threshold by a range of 3.6 dBA at receptor location R4 to up to 23.4 dBA at receptor location R6, without implementation of mitigation. In addition, the concrete mat foundation pour could extend into the nighttime hours (up to midnight). The concrete mat foundation pour occurring during the nighttime hours, if permitted by the Executive Director of the Board of Police Commissioners, would exceed the nighttime ambient noise levels by 5 dBA or more at all off-site noise sensitive receptors. Note however, that receptor locations R5 (amphitheater) and R6 (residential outdoor space), would likely not be used during the nighttime hours (after 10:00 P.M.). Nonetheless, the impact analysis discloses and identifies noise levels that would exceed the applicable daytime and nighttime thresholds without mitigation.[30] **Therefore, temporary noise impacts associated with the Project's on-site construction would be significant without mitigation measures.**

(ii) Off-Site Construction Noise

In addition to on-site construction noise sources, other noise sources may include materials delivery, concrete mixing, 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 from the delivery/ concrete/haul trucks. As described above, construction delivery/haul trucks would access

[30] *Nighttime construction for the mat foundation, if permitted, would exceed the applicable nighttime significance thresholds by 10.2, 6.9, 11.0, 3.5, 14.2, and 26.1 dBA (L_{eq}) at receptor locations R1, R2, R3, R4, R5 and R6, respectively.*

Table IV.G-11
Construction Noise Impacts

Off-Site Receptor Location	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))[a]	Maximum Noise Exceedance Above the Criteria (L_{eq} (dBA))	Sig. Impact Without Mitigation?
		Demo	Site Prep.	Grading	Drainage/ Utilities/ Trenching	Mat Found.	Building Const. (Podium Level)	Building Const.	Paving/ Landscape				
R1	110	80.9	77.4	79.2	75.6	78.5	78.5	79.2	77.5	68.0	73.0	7.9	Yes
R2	75	84.0	79.6	81.2	78.0	80.3	80.3	80.9	80.3	71.0	76.0	8.0	Yes
R3	90	82.7	79.2	81.0	77.3	80.2	80.2	81.0	79.3	67.3	72.3	10.4	Yes
R4	230	75.8	72.0	74.6	69.4	73.7	73.7	74.7	71.8	67.2	72.2	3.6	Yes
R5	50	76.7	73.5	74.9	72.0	74.2	74.2	74.7	73.6	60.0	65.0	11.7	Yes
R6	20	92.1	90.3	90.8	89.5	90.4	90.4	90.5	90.7	63.7	68.7	23.4	Yes

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.G-7 on page IV.G-16) 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 criteria, a construction-related noise impact is identified.*

[b] *Nighttime construction for the mat foundation, if permitted, would exceed the applicable nighttime significance thresholds by 10.2, 6.9, 11.0, 3.5, 14.2, and 26.1 dBA (L_{eq}) at receptor locations R1, R2, R3, R4, R5 and R6, respectively.*

Source: AES, June 2020. See Appendix G of this Draft EIR.

the Project Site via 3rd Street and 4th Street (between the Project Site and the I-110 Freeway on-ramp). In addition, concrete trucks would also access the Project Site via 4th Street and 7th Street (between Hill Street and Alameda Street); and Alameda Street (between 4th Street and 27th Street).

As discussed in Section IV.J, Transportation, of this Draft EIR, the peak period of construction with the highest number of construction trucks would occur during the site grading phase, which would include 210 haul trucks (420 truck trips) per day. Table IV.G-12 on page IV.G-30 provides the estimated number of construction-related truck trips for the various construction phases, including haul/concrete/material delivery trucks and worker vehicles, and the estimated noise levels along the anticipated truck route(s). As indicated in Table IV.G-12, the hourly noise levels generated by construction trucks during all stages of Project construction would be consistent with the existing daytime ambient noise levels along the anticipated truck routes and would be below the 5-dBA significance criteria. **Therefore, noise impacts from off-site construction traffic would be less than significant.**

(iii) Summary of Construction Noise Impacts

As discussed above, temporary noise impacts associated with the Project's on-site construction activities would be significant. **Therefore, without mitigation measures, Project construction activities would result in the generation of a substantial temporary increase in ambient noise levels in the vicinity of the Project in excess of significance criteria established by the City.**

(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., heating, ventilation, and air conditioning [HVAC] equipment), activities within the proposed outdoor spaces (e.g., outdoor courtyard and outdoor decks), parking facilities, loading docks and trash compactors; 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 building roof level and within the building interior (e.g., garage exhaust fans and mechanical rooms). 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

Table IV.G-12
Off-Site Construction Truck Noise Levels

Construction Phase	Estimated Number of Construction Truck/Worker Trips per Day	Estimated Number of Construction Truck/Worker Trips per Hour[b]	Estimated Truck Noise Levels Plus Ambient Along the Project Truck Routes,[a] (L_{eq} (dBA)) (Project/Project + Ambient)				
			3rd Street	4th Street	7th Street	Hill Street	Alameda St.
Demolition	80/30	5/12	55.2/71.1	59.3/71.3	—/—[c]	61.4/68.2	—/—[c]
Site Preparation	40/20	3/8	53.0/71.1	57.1/71.2	—/—[c]	59.3/67.9	—/—[c]
Grading /Excavation	420/45	35/18	63.3/71.7	67.4/72.6	—/—[c]	69.6/71.6	—/—[c]
Drainage/Utilities/Trenching	10/8	1/4	48.5/71.0	52.6/71.1	—/—[c]	54.7/67.4	—/—[c]
Mat Foundation	398/50	17/20	60.3/71.4	64.4/71.9	66.5/69.0	66.5/69.9	67.3/73.3
Building Construction (to Podium)	100/100	7/40	57.2/71.2	61.3/71.4	—/—[c]	63.4/68.7	—/—[c]
Building Construction	184/850	12/340	62.1/71.5	66.2/72.2	—/—[c]	68.3/70.8	—/—[c]
Paving/Landscaping	20/13	2/6	51.3/71.5	55.4/72.2	—/—[c]	57.6/70.8	—/—[c]
Existing Ambient Noise Levels Along the Project Truck Routes, L_{eq} (dBA)[d]			71.0	71.0	65.3	67.2	
Significance Criteria, L_{eq} (dBA)[e]			76.0	76.0	70.3	72.2	
Significant Impact?			No	No	No	No	

[a] Noise levels include Project-related truck trips plus ambient.

[b] For construction trucks, the number of hourly trips is based on an hourly average, assuming a uniform distribution of trips over an 8-hour workday and divided by two, as incoming and leaving trucks would be on different roadways, except for Alameda Street, which includes roundtrip. Haul truck hourly trips are based on 6-hour hauling per day. Concrete truck trips for mat foundation pour are based on a 12-hour workday. For worker vehicles, the number of hourly trips is based on 40 percent of the worker trips that would arrive in one hour to represent a conservative analysis.

[c] 7th Street and Alameda Street would only be used for concrete trucks (during mat foundation phase), no haul trucks.

[d] Ambient noise levels along the truck routes are based on nearby measurements:

– 3rd Street and 4th Street, measurement at receptor location R2

– 7th Street, based on measurements from the Fashion District Residences MND (City of Los Angeles, 2017)

– Hill Street, measurement at receptor location R4

– Alameda Street, based on measurement from the 668 S. Alameda Project DEIR (City of Los Angeles, 2017)

[e] Significance criteria are equivalent to the ambient noise levels plus 5 dBA.

Source: AES, 2020. See Appendix G of this Draft EIR.

Noise Regulations. Specifically, the Project would comply with LAMC Section 112.02, 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 screened from off-site noise-sensitive receptors. Table IV.G-13 on page IV.G-32 presents the estimated noise levels at the off-site receptor locations from operation of the Project mechanical equipment.

As indicated in Table IV.G-13, the estimated noise levels from the mechanical equipment would range from 40.6 dBA (L_{eq}) at the uses represented by receptor location R4 to 52.5 dBA (L_{eq}) at the uses represented by receptor location R6, which would be consistent with the existing ambient noise levels and not above the applicable thresholds. As such, the estimated ambient noise levels at all off-site receptor locations with the addition of the Project's mechanical equipment would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels. **Therefore, noise impacts from mechanical equipment would be less than significant.**

Outdoor Spaces

As discussed in Section II, Project Description, of this Draft EIR, the Project would include various outdoor spaces including plazas at Level PB1 and Level 4, terraces and roof decks at Levels 1, 3, 5 (Tower B), 6 (Tower B), 7, A20 (Tower A), A41 (Tower A) and Tower B roof level. Noise sources associated with outdoor uses typically include noise from people gathering and conversing. For this operational noise analysis, reference noise levels of 65 dBA for a male and 62 dBA for a female speaking in a raised voice were used for analyzing potential noise impacts from people gathering at the outdoor spaces.[31] In order to analyze a typical noise scenario, it was assumed that up to 50 percent of the people (half of which would be male and the other half female) would be talking at the same time. In addition, the hours of operation for use of the outdoor areas were assumed to be from 7:00 A.M. to 2:00 A.M. Table IV.G-14 on page IV.G-33 presents the anticipated number of people at each of the outdoor spaces.

An additional potential noise source associated with outdoor spaces would be the use of an outdoor sound system (e.g., music or other sounds broadcast through an outdoor mounted speaker system) at the outdoor spaces. As set forth in Project Design Feature NOI-PDF-5, if an amplified sound system is used in outdoor areas, it would be designed so as not to exceed the maximum noise level of 70 dBA L_{eq} at the Lower California Plaza Terrace, 75 dBA L_{eq} at Levels PB1, 01, 03, 05, 06 (Tower B Hotel Outdoor Lobby), and

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

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

Receptor Location	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, dBA (L_{eq})[a]	Exceedance over Significance Criteria	Significant Impact?
R1	63.3	50.2	63.5	68.3	0.0	No
R2	68.4	43.5	68.4	73.4	0.0	No
R3	64.2	44.6	64.2	69.2	0.0	No
R4	65.2	40.6	65.2	70.2	0.0	No
R5	60.0	47.3	60.2	65.0[b]	0.0	No
R6	63.7	52.5	64.0	68.7[b]	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.G-7 on page IV.G-16) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

[b] *Significance criteria at receptor locations R5 and R6 are based on the daytime ambient noise levels, as these exterior spaces are not anticipated to be utilized during the nighttime hours. Nevertheless, the estimated noise levels from the mechanical equipment at receptor locations R5 and R6 would be below the nighttime ambient noise levels.*

Source: AES, 2020. See Appendix G of this Draft EIR.

07 (Upper California Plaza Terrace); 80 dBA L_{eq} at Tower A Level A20 terrace; and 85 dBA L_{eq} at Tower A Level A41 and Tower B roof terraces, from the amplified speaker sound system, thereby ensuring that the amplified sound system would not exceed the significance criteria (i.e., an increase of 5 dBA L_{eq}) at any off-site noise-sensitive receptor location.

Table IV.G-15 on page IV.G-34 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 outdoor spaces would be fully occupied and operating concurrently to represent a worst-case noise analysis. As presented in Table IV.G-15, the estimated noise levels from the outdoor spaces would range from 57.1 dBA (L_{eq}) at the uses represented by receptor location R5 to 65.0 dBA (L_{eq}) at the uses represented by receptor location R3. The estimated ambient noise levels with the addition of the noise levels generated by the Project's outdoor spaces would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the measured ambient noise level) at all off-site receptor locations. **As such, noise impacts from the use of the outdoor spaces would be less than significant.**

Table IV.G-14
Outdoor Use Analysis Assumptions

Outdoor Space	Approximate Area (sf)	Estimated Total Number of People[a]
Level PB1—Hill Street Plaza	11,350	757
Level 1—Hill Street Plaza	6,036	403
Level 3—Angels Terrace Restaurant Terrace 1 Restaurant Terrace 2	16,847 775 2,263	1,124 52 151
Level 4—Olive Street Plaza	2,328	156
Level 5—Terrace Tower B Hotel Pool Deck	4,156 2,855	277 190
Level 6—Lower California Plaza Terrace Tower B Hotel Outdoor Lobby	4,520 1,210	301 81
Level 7—Upper California Plaza Terrace	10,914	728
Level A20—Tower A Hotel Terrace	4,925	328
Level A41—Tower A Residential Terrace	4,720	315
Level B42—Tower B Residential (Roof Deck) Terrace	5,268	351

sf = square feet

[a] *Based on maximum 15 square feet per person, per the Building Code.*

Source: Handel Architects, June 2020; AES, June 2020

Parking Facilities

As discussed in Section II, Project Description, of this Draft EIR, the Project would provide 750 vehicular parking spaces in up to three subterranean parking levels. Sources of noise within the parking garage would primarily include vehicular movements and engine noise, doors opening and closing, and intermittent car alarms. Since the subterranean parking levels would be fully enclosed on all sides, noise generated within the subterranean parking garage would be effectively shielded from off-site sensitive receptor locations in the immediate vicinity of the Project Site. In addition, noise levels associated with vehicle parking inside the subterranean parking structure would be less than the existing on-site surface parking lot. **Therefore, noise impacts from the parking facilities would be less than significant.**

Loading Dock and Trash Collection Areas

The Project includes a loading area at the west side of the building facing Olive Street. The Project trash compactors would be located inside the building within the loading area. Noise sources associated with the loading dock and trash collection area

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

Receptor Location	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[a]	Exceedance over Significance Criteria	Significant Impact?
R1	63.3	61.8	65.6	68.3	0.0	No
R2	68.4	57.7	68.8	73.4	0.0	No
R3	64.2	65.0	67.7	69.2	0.0	No
R4	65.2	60.6	66.5	70.2	0.0	No
R5	60.0	57.1	61.8	65.0[b]	0.0	No
R6	63.7	60.9	65.6	68.7[b]	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.G-7 on page IV.G-16) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

[b] *Significance criteria at receptor locations R5 and R6 are based on the daytime ambient noise levels, as these exterior spaces are not anticipated to be utilized during the nighttime hours. Nevertheless, the estimated noise levels from the outdoor uses at receptor locations R5 and R6 would not increase the nighttime ambient noise levels by 5 dBA.*

Source: AES, June 2020. See Appendix G of this Draft EIR.

would include delivery/trash collection trucks and operation of the 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.[32] In addition, the trash compactors would be located inside an enclosed room, which would be effectively shielded to the off-site sensitive receptors. Table IV.G-16 on page IV.G-35 presents the estimated noise levels at the off-site receptor locations from operation of the loading dock and trash compactor. As indicated in Table IV.G-16, the estimated noise from the loading dock and trash compactor would range from 41.8 dBA (L_{eq}) at the uses represented by receptor location R3 to 50.2 dBA (L_{eq}) at the uses represented by receptor location R2, which would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels at all off-site sensitive receptors. **Therefore, noise impacts from loading dock and trash compactor operations would be less than significant.**

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

Table IV.G-16
Estimated Noise Levels from Loading Dock and Trash Compactor

Receptor Location	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[a]	Exceedance Over Significance Criteria	Significant Impact?
R1	68.0	48.1	68.0	73.0	0.0	No
R2	71.0	50.2	71.0	76.0	0.0	No
R3	67.3	41.8	67.3	72.3	0.0	No
R4	67.2	43.4	67.2	72.2	0.0	No
R5	60.0	47.7	60.2	65.0	0.0	No
R6	63.7	45.6	63.8	68.7	0.0	No

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.G-7 on page IV.G-16) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified. Significance criteria based on the daytime ambient noise levels, loading and trash compactors would only operate during the daytime hours. Nevertheless, the estimated noise levels from the loading dock and trash compactor operation would be below the nighttime ambient noise levels.*

Source: AES, June 2020. See Appendix G of this Draft EIR.

(ii) Off-Site Mobile Noise Sources

Future Plus Project

As discussed in the Traffic Study, the Project is expected to generate a net increase of 5,410 daily 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 volumes was analyzed to determine if any traffic-related noise impacts would result from operation of the Project. Table IV.G-17 on page IV.G-36 provides a summary of the roadway noise impact analysis. The calculated CNEL levels are conservatively calculated in front of the roadways and do not account for the presence of any physical sound barriers or intervening structures. As shown in Table IV.G-17, the Project would result in a maximum noise increase of 0.4 dBA along the roadway segment of 4th Street (between Olive Street and Hill Street). The estimated noise increase along all other analyzed roadway segments would be 0.2 dBA or lower. The estimated noise increase due to the Project-generated traffic would be well below the 5-dBA significance criteria along 2nd Street between Grand Avenue and Hill Street (as the estimated noise level is less than 70 dBA CNEL). At other analyzed roadway segments, the increase in traffic-related noise levels would be well below the 3-dBA CNEL

Table IV.G-17
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		
Olive Street					
– Between 2nd St. and 4th St.	Residential, Hotel, Park	71.6	71.8	0.2	No
– Between 4th St. and 5th St.	Residential	71.0	71.2	0.2	No
– Between 5th St. and 6th St.	Hotel	70.4	70.6	0.2	No
Hill Street					
– Between 2nd St. and 3rd St.	Hotel	74.2	74.2	0.0	No
– Between 3rd St. and 4th St.	Park	72.4	72.4	0.0	No
– Between 4th St. and 5th St.	Residential, Hotel	71.0	71.1	0.1	No
Broadway					
– Between 2nd St. and 3rd St.	Residential	70.4	70.5	0.1	No
– Between 3rd St. and 4th St.	Commercial	71.0	71.2	0.2	No
– Between 4th St. and 5th St.	Residential	71.1	71.1	0.0	No
2nd Street					
– Between Grand Ave. and Olive St.	School	65.8	66.0	0.2	No
– Between Olive St. and Hill St.	Residential	63.1	63.2	0.1	No
3rd Street					
– Between Hill St. and Broadway	Residential	72.9	72.9	0.0	No
– Between Broadway and Spring St.	Residential	70.6	70.7	0.1	No
4th Street					
– Between Olive St. and Hill St.	Residential	69.9	70.3	0.4	No
– Between Hill St. and Broadway	Office	70.9	71.1	0.2	No
5th Street					
– Between Grand Ave. and Olive St.	Hotel	72.4	72.4	0.0	No
– Between Olive St. and Hill St.	Residential, Park	70.2	70.3	0.1	No
– Between Hill St. and Broadway	Residential	70.2	70.2	0.0	No

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

Source: AES, June 2020.

significance criteria (applicable to noise levels 70 dBA CNEL or higher). **Therefore, traffic noise impacts under Future Plus Project conditions would be less than significant.**

Existing Plus Project

The analysis of traffic noise impacts provided above was based on the incremental increase in traffic noise levels attributable to the Project as compared to Future Without Project conditions. An additional analysis was performed to determine the potential noise impacts based on the increase in noise levels due to Project-related traffic compared with the existing baseline traffic noise conditions.

As shown in Table IV.G-18 on page IV.G-38, when compared with existing conditions, the Project would result in a maximum increase of up to 0.8 dBA CNEL in traffic-related noise levels along the roadway segment of 4th Street (between Olive Street and Hill Street). At other analyzed roadway segments, the increase in traffic-related noise levels would be 0.4 dBA or less. The estimated increase in traffic noise levels as compared to existing conditions would be well below both the 3-dBA CNEL (applicable to noise levels less than 70 dBA CNEL) and the 5-dBA CNEL (applicable to noise levels 70 dBA CNEL or higher) significance criteria. **Therefore, traffic noise impacts under Existing Plus Project conditions would be less than significant.**

(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, outdoor areas, loading and trash compactor, and off-site traffic), an evaluation of potential composite noise level increases (i.e., noise levels from all on-site and off-site noise sources combined) at the analyzed sensitive receptor locations was also performed. The composite noise analysis uses the CNEL noise metric to determine the contributions at the noise-sensitive receptor locations in the vicinity of the Project Site.

Table IV.G-19 on page IV.G-39 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.G-19, the Project would result in an increase (relative to the existing ambient) in composite noise levels ranging from 0.4 dBA at the uses represented by receptor location R2 to 3.3 dBA at the uses represented by receptor location R5. The composite noise level from Project operation would be below the 3-dBA significance criteria at the receptor locations R1 through R4(applicable to normally unacceptable noise levels of 70 dBA CNEL or higher for the Residential Multi-Family land use category). The estimated composite CNEL noise levels at receptor location R6 is 2.6, which would not exceed the 3-dBA significance criteria because the Project includes Project Design Features NOI-PDF-5 and NOI-PDF-6, which reduce noise levels at the

Table IV.G-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		
Olive Street					
– Between 2nd St. and 4th St.	Residential, Hotel, Park	69.1	69.3	0.2	No
– Between 4th St. and 5th St.	Residential	68.9	69.2	0.3	No
– Between 5th St. and 6th St.	Hotel	69.2	69.4	0.2	No
Hill Street					
– Between 2nd St. and 3rd St.	Hotel	73.0	73.1	0.1	No
– Between 3rd St. and 4th St.	Park	71.0	71.0	0.0	No
– Between 4th St. and 5th St.	Residential, Hotel	68.5	68.7	0.2	No
Broadway					
– Between 2nd St. and 3rd St.	Residential	68.1	68.2	0.1	No
– Between 3rd St. and 4th St.	Commercial	68.4	68.7	0.3	No
– Between 4th St. and 5th St.	Residential	68.5	68.5	0.0	No
2nd Street					
– Between Grand Ave. and Olive St.	School	62.7	63.1	0.4	No
– Between Olive St. and Hill St.	Residential	61.2	61.5	0.3	No
3rd Street					
– Between Hill St. and Broadway	Residential	71.6	71.7	0.1	No
– Between Broadway and Spring St.	Residential	68.6	68.7	0.1	No
4th Street					
– Between Olive St. and Hill St.	Residential	67.1	67.9	0.8	No
– Between Hill St. and Broadway	Office	68.5	68.9	0.4	No
5th Street					
– Between Grand Ave. and Olive St.	Hotel	70.1	70.2	0.1	No
– Between Olive St. and Hill St.	Residential, Park	68.3	68.5	0.2	No
– Between Hill St. and Broadway	Residential	67.8	67.9	0.1	No

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

Source: AES, June 2020.

Table IV.G-19
Composite Noise Impacts

Receptor Location	Existing Ambient Noise Levels (CNEL (dBA))	Calculated Project-Related Noise Sources (CNEL (dBA))				Project Composite Noise Levels (CNEL (dBA))	Ambient Plus Project Composite Noise Levels (CNEL (dBA))	Increase in Noise Levels Due to Project (CNEL (dBA))	Sig. Criteria[a] (CNEL (dBA))	Sig. Impact?
		Traffic	Mechanical	Loading/ Trash Compactor	Outdoor Spaces					
R1	69.4	48.4	55.1	45.3	65.9	66.3	71.1	1.7	72.4	No
R2	73.7	60.2	49.9	47.1	59.7	63.3	74.1	0.4	76.7	No
R3	69.7	55.2	44.3	39.0	69.1	69.3	72.5	2.8	72.7	No
R4	70.3	49.4	47.3	40.6	64.7	65.0	71.4	1.1	73.3	No
R5	61.5	35.3	54.0	44.9	61.2	62.1	64.8	3.3	66.5	No
R6	67.0	47.3	59.2	42.8	65.0	66.2	69.6	2.6	70.0	No

[a] *Significance criteria are equivalent to the existing ambient plus 3 dBA if the estimated noise levels (ambient plus Project) fall within the "normally unacceptable" or "clearly unacceptable" land use categories or ambient plus 5 dBA if the estimated noise levels fall within the "normally acceptable" or "conditionally acceptable" land use categories, per the City of Los Angeles Noise Element. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

Source: AES, June 2020. See Appendix G of this Draft EIR.

receptor location R6. Therefore, noise impacts at receptor R6 are considered less than significant. The composite noise level from Project operations would be below the 5-dBA significance criteria at receptor location R5 (applicable to the conditionally acceptable noise levels of 67.5 dBA CNEL or lower for Amphitheater land use category).

(2) Mitigation Measures

(a) On-Site Construction Noise

As analyzed above, construction of the Project would have the potential to result in significant noise impacts at the off-site sensitive receptor locations from on-site construction activities. Therefore, the following mitigation measure is provided to reduce 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 northwestern property line of the Project Site between the construction areas and the residential use at 300 Olive Street (receptor location R1). The temporary sound barrier shall be designed to provide a minimum 9-dBA noise reduction at the ground level of the residential use (receptor location R1).
- Along the southern property line of the Project Site between the construction areas and residential use at 417 4th Street (receptor location R2). The temporary sound barrier shall be designed to provide a minimum 9-dBA noise reduction at the ground level of receptor location R2.

(3) Level of Significance After Mitigation

(a) On-Site Construction Noise

Implementation of Mitigation Measure NOI-MM-1 provided above would reduce the Project's and cumulative construction noise levels to the extent feasible. Specifically, as shown in Table IV.G-20 on page IV.G-41, implementation of Mitigation Measure NOI-MM-1 (installation of temporary sound barrier) would reduce the noise generated by on-site construction activities at the off-site sensitive uses, by a minimum 9 dBA at the residential use adjacent to the Project Site to the north (receptor location R1) and to the south (receptor location R2). However, the temporary noise barrier would only be effective at the ground level of receptor location R1 and R2 because the barriers blocks line of sight to these receptors, and thereby attenuates noise levels a grade level. The residential uses at these receptors are contained in multi-story high-rise buildings. The line of sight from the

Table IV.G-20
Construction Noise Impacts With Mitigation Measures

Off-Site Receptor Location	Minimum Noise Reduction Provided by Mitigation Measures[a] (dBA)	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))	Significant Impact With Mitigation?
		Demo	Site Prep.	Grading	Drainage/ Utilities/ Trenching	Mat Found.	Building Const. (Podium Level)	Building Const.	Paving/ Landscape				
R1	9	71.9	68.4	70.2	66.6	69.5	69.5	70.2	68.5	68.0	73.0	0.0[c]	Yes
R2	9	75.0	70.6	72.2	69.0	71.3	71.3	71.9	71.3	71.0	76.0	0.0[c]	Yes
R3	0	82.7	79.2	81.0	77.3	80.2	80.2	81.0	79.3	67.3	72.3	10.4	Yes
R4	0	75.8	72.0	74.6	69.4	73.7	73.7	74.7	71.8	67.2	72.2	3.6	Yes
R5	0	76.7	73.5	74.9	72.0	74.2	74.2	74.7	73.6	60.0	65.0	11.7	Yes
R6	0	92.1	90.3	90.8	89.5	90.4	90.4	90.5	90.7	63.7	68.7	23.4	Yes

[a] *Noise reduction provided by temporary noise barrier along the Project north and south boundaries.*

[b] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.G-7 on page IV.G-16) 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 criteria, 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, June 2020. See Appendix G of this Draft EIR.

upper floors at these receptors to the Project Site would remain unobstructed because it is not feasible to construct temporary noise barriers that would extend to the height of the buildings at these receptor locations. Thus, the construction-related noise levels at receptor locations R1 and R2 would still exceed the significance thresholds. In addition, due to the site elevation changes (a difference of approximately 70 feet from the southeast corner to the northwest corner), it would not be feasible to provide a temporary noise barrier that shields line of sight from construction activities on the higher northwest portions of the Project Site to the lower area of the off-site receptor locations R3 and R4. Likewise, due to elevation of the Project Site and adjacency of receptor location R6, line of sight noise barriers would be infeasible. It is important to note that the noise impact at receptor location R3 would only occur if the Related Project No. 1 is completed and occupied prior to or during Project construction. In addition, the receptor location R5 is located approximately 50 feet above the Project construction site and is already shielded by the California Plaza structure. Therefore, there are no other feasible mitigation measures that could be implemented to reduce the temporary noise impacts from on-site construction. **Therefore, construction noise impacts associated with on-site noise sources would remain significant and unavoidable.**

(b) Off-Site Construction Noise

As discussed above, the short-term noise impacts associated with off-site construction traffic would be less than significant without mitigation.

(c) Operational Noise

Noise impacts associated with on-site and off-site noise sources during Project operations would be less than significant without mitigation.

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

(1) Impact Analysis

(a) Construction

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.

(i) 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.G-21 on page IV.G-44 provides the estimated ground vibration velocity 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-4 provided above, impact pile driving vibration is not included in the on-site construction vibration analysis. Installation of piles for shoring and foundation would utilize drilling methods to minimize vibration generation.

As discussed in the Project Historical Resources Technical Report, there are 14 historical resources (structures) in the vicinity of the Project Site.[33] With the exception of Angels Flight, the other 13 historical resources are located a minimum 100 feet from the Project Site. Based on the distance attenuation, the estimated maximum construction vibration levels due to the Project on-site construction equipment at the 13 structures would be approximately 0.011 PPV, which would be well below the most stringent 0.12 PPV significance criteria applicable to buildings extremely susceptible to vibration damage. The Angels Flight is located adjacent to the Project Site to the north, which would be exposed to vibration levels generated by the on-site construction equipment. The Angels Flight was dismantled in 1962 and was rebuilt with a new track structure in 1995. Therefore, for purposes of vibration impact analysis, it is considered an engineered structure.

The assessment of construction vibration provided below for potential building damage due to on-site construction compares the estimated vibration levels generated during construction of the Project to the 0.2 PPV significance criteria for non-engineered timber and masonry buildings (applicable to the single-story commercial building to the east of the Project Site), the 0.3 PPV significance criteria for engineered concrete and masonry buildings (applicable to the off-site 12-story residential building and parking structure to the south, and the Angels Flight to the north of the Project Site), and the 0.5 PPV significance criteria for reinforced-concrete, steel, and timber buildings (applicable to the off-site 17-story residential building and multi-level parking structures to the north and the California Plaza buildings to the west). As indicated in Table IV.G-21, the estimated

[33] *GPA Consulting, Angels Landing Project Historical Resource Technical Report, August 2019.*

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

Nearest On- and 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 (inch/second (PPV))[b]					Significant Criteria (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	—	—
Single-Story Commercial Buildings to the East	0.013	0.013	0.011	0.005	0.000	0.2[c]	No
12-Story Residential Building to the South	0.017	0.017	0.015	0.007	0.001	0.3[d]	No
Parking Structure to the South	0.017	0.017	0.015	0.007	0.001	0.3[d]	No
Angels Flight to the North	0.244	0.244	0.208	0.096	0.008	0.3[d,f]	No
17-story Residential Building to the North	0.010	0.010	0.008	0.004	0.000	0.5[e]	No
Parking Structure to the North	0.114	0.114	0.097	0.045	0.004	0.5[e]	No
California Plaza Buildings to the West	0.244	0.244	0.208	0.096	0.008	0.5[e]	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 25-foot distance.*

[c] *FTA criteria for non-engineered timber and masonry buildings.*

[d] *FTA criteria for engineered concrete and masonry buildings.*

[e] *FTA criteria for reinforced-concrete, steel or timber buildings.*

[f] *The Angel Flight is considered an engineered structure, as it was rebuilt with new track structure in 1995.*

Source: FTA, 2018; AES, June 2020. See Appendix G of this Draft EIR.

vibration levels from the construction equipment would be well below the 0.2 PPV building damage significance criteria for the single-story commercial building to the east (along Hill Street); the 0.3 PPV building damage significance criteria for the existing 12-story residential building and parking structures to the south (along 4th Street) and the Angels Flight; and the 0.5 PPV building damage significance criteria for the California Plaza buildings to the west, and the 17-story residential building and parking structures to the north (along Olive Street). **Therefore, the on-site vibration impacts during construction of the Project, pursuant to the significance criteria for building damage, would be less than significant.**

(ii) Human Annoyance Impacts from On-Site Construction

Table IV.G-22 on page IV.G-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. Vibration levels at receptor locations R5 and R6 are provided for information only, as there are no applicable vibration criteria for the outdoor use spaces. Per FTA guidance, the significance criteria for human annoyance is 72 VdB for residential uses, assuming there are a minimum of 70 vibration events occurring during a typical construction day. As indicated in Table IV.G-22, the estimated ground-borne vibration levels from construction equipment would be below the significance criteria for human annoyance at off-site sensitive receptor locations R1, R3 and R4. The estimated ground-borne vibration levels at receptor location R2 would exceed the 72 VdB significance criteria during the demolition and grading/excavation phases with large construction equipment (i.e., large bulldozer, caisson drilling and loaded trucks) operating within 80 feet of receptor location R2. **Therefore, on-site vibration impacts during construction of the Project, pursuant to the significance criteria for human annoyance, would be significant without mitigation measures.**

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

As described above, construction delivery/haul trucks would travel between the Project Site and I-110 via 3rd Street, 4th Street, and Hill Street, and to the concrete mixing plant via 7th Street, 4th Street and Alameda Street. Heavy-duty construction trucks would generate ground-borne vibration as they travel along the Project's anticipated truck route(s). Thus, an analysis of potential vibration impacts using the building damage and human annoyance criteria for ground-borne vibration along the anticipated local truck routes was conducted.

Regarding building damage, based on FTA data, the vibration generated by a typical heavy-duty truck would be approximately 63 VdB (0.00566 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 truck route that are situated approximately 20 feet from the right-of-way and would be exposed to ground-borne vibration 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 truck route(s) would be well below the

[34] *FTA, "Transit Noise and Vibration Impact Assessment," Figure 5-4, September 2018.*

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

Off-Site Receptor Location	Estimated Vibration Velocity Levels at the Off-Site Sensitive Uses Due to On-Site Construction Equipment Operation[a] (VdB)					Significance Criteria (VdB)	Signifi-cant Impact?
	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	87	87	86	79	58	—	—
R1	68	68	67	60	39	72	No
R2	73	73	72	65	44	72	Yes
R3	70	70	69	62	41	72	No
R4	58	58	57	50	29	72	No
R5	78	78	77	70	49	N/A[b]	No
R6	90	90	89	82	61	N/A[b]	No

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

[b] *Not applicable, as there are no applicable vibration criteria for outdoor spaces.*

Source: FTA, 2018; AES, June 2020. See Appendix G of this Draft EIR.

most stringent building damage criteria of 0.12 PPV for buildings extremely susceptible to vibration. **Therefore, vibration impacts (pursuant to the significance criteria 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 significance criteria for human annoyance is 72 VdB for sensitive uses, including residential and hotel 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] As indicated in the noise calculation worksheets included in Appendix G of this Draft EIR, the residential uses along Alameda Street (between 4th Street and 27th Street) are located a minimum of 50 feet from the anticipated truck route(s) and would be exposed to ground-borne vibration levels of approximately 63 VdB, which would be below the 72-VdB significance criteria. Vibration sensitive uses (i.e., residential and hotel) along 3rd Street and 4th Street (between Hill Street and I-110 Freeway on-ramp) are located a minimum of 30 feet from the anticipated truck route(s). The temporary vibration levels from trucks passing by would be approximately 70 VdB, which would be below the 72-VdB significance criteria. However, the residential uses along 4th Street and 7th Street (between Hill Street and Alameda

[35] *FTA, "Transit Noise and Vibration Impact Assessment," Page 113, September 2018.*

Street) are located approximately 20 feet from the anticipated truck route(s) and would be exposed to ground-borne vibration of approximately 75 VdB, which would exceed the 72-VdB significance criteria. **As such, potential vibration impacts with respect to human annoyance that would result from temporary and intermittent off-site vibration from construction trucks traveling along the anticipated truck route(s) would be significant without mitigation measures.**

(iv) Summary of Construction Vibration Impacts

As discussed above, the estimated vibration levels from on-site construction equipment would be below the building damage significance criteria. However, the estimated vibration levels from on-site construction equipment would exceed the human annoyance significance criteria of 72 VdB at the off-site residential uses south of the Project Site (receptor location R2). Receptor location R2 is across 4th Street from the Project Site and thus is susceptible to certain vibration in the existing condition from passing heavy trucks. In addition, the vibration impact from the Project would be primarily limited to receptors at grade and on the lower-level floors of the building because vibration attenuates rather quickly with distance from the ground level to upper floors. Accordingly, there would be limited vibration effects from the Project on most of the areas within receptor location R2. Nonetheless, to provide a conservative analysis in this Draft EIR, temporary and intermittent vibration impacts from on-site construction activities would be significant pursuant to the significance criteria for human annoyance without mitigation for receptors in the lower-level floors of receptor location R2.

Vibration impacts associated with temporary and intermittent vibration from off-site construction activities (i.e., construction trucks traveling along the anticipated truck routes) would be less than significant with respect to building damage; however, vibration impacts from off-site construction activities would be significant with respect to the significance criteria for human annoyance.

(b) Operation Vibration Impacts

As described above, sources of vibration related to operation of the Project would include vehicle circulation, delivery trucks, and building mechanical equipment. As also discussed above, vehicular-induced vibration, including vehicle circulation within the subterranean parking area, would not generate perceptible vibration levels at off-site sensitive uses. Building mechanical equipment installed as part of the Project would include typical commercial-grade stationary mechanical equipment, such as air-condenser units (mounted at the roof level), that would include vibration-attenuation mounts to reduce vibration transmission so vibration would not be perceptible at the off-site sensitive receptors. **Therefore, operation of the Project would not result in the generation of excessive ground-borne vibration levels that would be perceptible in the vicinity of**

the Project Site. As such, vibration impacts associated with operation of the Project would be less than significant.

(2) Mitigation Measures

(a) *Construction Vibration*

As analyzed above, vibration impacts from on-site and off-site construction activities would be significant pursuant to the significance criteria for human annoyance. 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, are cost prohibitive for temporary applications such as construction, and therefore are considered infeasible.[36] 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. Furthermore, it would not be feasible to install a wave barrier along the public roadways for the off-site construction vibration impacts. As such, there are no feasible mitigation measures to reduce the potential vibration human annoyance impacts. These impacts are temporary and would cease when construction is complete.

(b) Operation Vibration Impacts

As discussed above, operation of the Project would not result in a significant vibration impact during operation and no mitigation measures are required.

(3) Level of Significance After Mitigation

(a) Construction Vibration

As described above, mitigation measures considered to reduce vibration impacts from on-site construction activities with respect to human annoyance included the installation of a wave barrier. However, wave barriers must be very deep and long to be effective and are not considered cost effective for temporary applications, such as construction. Thus, 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. In addition, it would not be feasible to install a wave barrier along the public roadways for the off-site construction vibration impacts.

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

Therefore, Project vibration impacts from on-site and off-site construction activities with respect to human annoyance would remain significant and unavoidable.

(b) Operation Vibration

As discussed above, vibration impacts associated with Project operation would be less than significant without mitigation.

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

As discussed in Section IV, Other CEQA Considerations, of this Draft EIR, and evaluated in the Initial Study prepared for the Project, included as Appendix A of this Draft EIR, the Project Site is not located within the vicinity of a private airstrip or an airport land use plan or within 2 miles of an airport. Thus, the Project would not expose people residing or working in the project area to excessive airport-related noise levels. The nearest airport is the Los Angeles International Airport located approximately 12 miles southwest of the Project Site. Since the Project is not located within an airport land use plan, within two miles of a public airport or public use airport, or within the vicinity of a private airstrip, impacts with regard to airport-related noise would not occur. **Therefore, no impacts with respect to Threshold (c) would occur. No further analysis is required.**

e. Cumulative Impacts

(1) Impact Analysis

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.

(a) Construction Noise

(i) On-Site Construction Noise

As indicated in Section III, Environmental Setting, of this Draft EIR, 50 related projects have been 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. Of the 50 related projects, 44 related projects are located more than 1,000 feet from the Project and with intervening building structures, which would not contribute to the cumulative on-site construction noise impacts. The following six related project are located within 1,000 feet of the Project Site, which could contribute to the cumulative construction noise impacts.

- Related Project No. 2 (5th & Olive, a mixed-used development located at 437 Hill Street), Related Project No. 3 (a mixed-use development located at 400 South Broadway), and Related Project No. 7 (a residential development located at 354 South Spring Street) have been completed. Therefore, these related projects would not contribute to cumulative construction-related noise impacts.

- Related Project No. 1 (Equity Residential mixed-use development) is located at 340 South Hill Street, approximately 90 feet east of the Project Site. The nearest sensitive use to the Project Site and the Related Project No. 1 is the residential use at 417 4th Street (receptor location R2), which has direct line-of-sight to both the Project and the Related Project No. 1. As indicated in Table IV.G-11 on page IV.G-28, the estimated noise from the Project construction activities at receptor location R2 would be approximately 8 dBA above the significance criteria. The estimated construction-related noise level from the Related Project No. 1 to the sensitive receptor R2 would increase the ambient by approximately 1.1 dBA.[37] Therefore, there is potential cumulative noise increase in the event of concurrent construction activities of the Project and the Related Project No. 1.

  It is noted, however, that should construction of the Project occur concurrently with Related Project No. 1, the Project-specific construction-related noise impact identified above (see Table IV.G-11 on page IV.G-28), which assumes the Equity Residential project (represented by receptor location R3) will be built and occupied prior to or during Project construction, would not occur. Moreover, should the Equity Residential project be built and occupied prior to or during Project construction, the cumulative construction impact identified in the paragraph above also would not occur.

- Related Project No. 4 (4th & Spring Hotel) is located at 361 South Spring Street, approximately 700 feet southeast of the Project Site. There are sensitive receptors located along Broadway between the Project and the Related Project No 4. However, there are multiple buildings located between the Project and Related Project No. 4 construction areas, which would provide noise reduction from the two projects. Therefore, cumulative noise impacts would not be expected in the event concurrent construction of the Project and Related Project No. 4 were to occur.

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[37] *City of Los Angeles, Equity Residential Mixed-Use Project, Sustainable Communities Environmental Assessment, Table V-29, September 2019.*

- Related Project No. 5 (5th & Hill, a mixed-use development) is located at 323 West 5th Street, approximately 570 feet southeast of the Project Site. The nearest noise-sensitive use to the Project Site and Related Project No. 5 are the hotel (receptor location R4) and residential use (417 4th Street Apartment and recently completed Related Project No. 2) located along Hill Street. As indicated in Table IV.G-11 on page IV.G-28, the estimated noise from the Project construction activities at receptor location R4 would be approximately 3.6 dBA above the significance criteria. In addition, the estimated construction-related noise level from the Related Project No. 5 to the sensitive receptor R4 would increase the ambient by approximately 0.3 dBA.[38] Therefore, there is a potential cumulative noise increase in the event of concurrent construction activities of the Project and the Related Project No. 5.

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 to the degree reasonably and technically feasible through proposed mitigation measures for each individual related project and compliance with locally adopted and enforced noise ordinances. Based on the above, there would be potential cumulative noise impacts at the nearby sensitive uses (e.g., residential uses) located in proximity to the Project Site, Related Project No. 1, and Related Project No. 5, in the event of concurrent construction activities. **As such, cumulative noise impacts from on-site construction would be significant.**

(ii) 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 truck routes. As analyzed above in Subsection 3.d. under Threshold (a) (see Table IV.G-12 on page IV.G-28), the estimated off-site construction noise levels from the Project would be below the significance criteria along the anticipated truck routes. However, based on the existing daytime ambient noise level of 67.2 dBA (L_{eq}) measured at receptor location R4 (refer to Table IV.G-7 on page IV.G-16), it is estimated that up to 43 truck trips per hour could occur along Hill Street (between 3rd Street and 7th Street) without exceeding the significance threshold 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 44 truck trips per hour along Hill Street, the estimated noise level with 44 truck trips per hour plus ambient would be 72.2 dBA, which would exceed the ambient noise levels by 5 dBA and exceed the significance

[38] *City of Los Angeles, 5th & Hill Draft Environmental Impact Report, Table IV.H-9, November 2018.*

threshold.[39] The nearest related projects that could utilize Hill Street (between 3rd Street and 7th Street) are Related Project No. 1 and Related Project No. 5. Related Project No. 1 would generate up to 75 truck trips per day (approximately 9 truck trips per hour) and Related Project No. 5 would generate up to 8 truck trips per hour, based on the published environmental noise studies. The total cumulative truck trips per hour (from the Project [35 trips] and Related Project No. 1 [9 trips] and No. 5 [8 trips]) along Hill Street could be up to 44 truck trips per hour. Therefore, cumulative noise due to construction truck traffic from the Project and other related projects has the potential to increase the ambient noise levels along Hill Street by 5 dBA, based on a conservative assumption that the peak construction period (with maximum construction trucks) for the Project and the related projects occur concurrently. **As such, cumulative noise impacts from off-site construction would be significant.**

(iii) Summary of Cumulative Construction Noise Impacts

As discussed above, on-site and off-site construction activities from the Project and related projects have the potential to result in generation of noise levels in excess of standards established by the City. **Therefore, cumulative noise impacts from on-site and off-site construction activities would be significant.**

(b) 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 project would produce traffic volumes that are capable of generating roadway noise impacts. The potential cumulative noise impacts associated with on- and off-site noise sources are addressed below.

[39] *It is estimated that with 43 truck trips, the cumulative noise level (70.4 dBA from construction traffic plus 67.2 dBA ambient) would be 72.1 dBA, which is 4.9 dBA above the ambient noise level of 67.2 dBA. With 44 truck trips, the cumulative noise level (70.5 dBA from construction traffic plus 67.2 dBA ambient) would be 72.2 dBA, which would exceed the ambient by 5.0 dBA*

(i) On-Site Stationary Noise Sources

Due to 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. In addition, as discussed above, noise impacts associated with operations within the Project Site would be less than significant. **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**.

(ii) 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" and "Future Plus Project" conditions are presented in Table IV.G-23 on page IV.G-54. As shown therein, cumulative traffic volumes would result in an increase ranging from 1.2 dBA (CNEL) along the roadway segment of Hill Street (between 2nd Street and 3rd Street) to up to 3.3 dBA (CNEL) along the roadway segment of 2nd Street (between Grand Avenue and Olive Street). The estimate cumulative noise increase along 2nd Street would be below the 5-dBA significance criteria (applicable to noise levels less than 70 dBA CNEL). However, the estimated cumulative noise increase along 4th Street (between Olive Street and Hill Street) would exceed the 3-dBA significance (applicable to noise levels of 70 dBA CNEL and higher for residential uses). The estimated noise levels along all other analyzed roadway segments would be below the 3-dBA significance criteria (applicable to noise levels of 70 dBA CNEL and higher). **Therefore, cumulative noise impacts due to off-site mobile noise sources associated with the Project, future growth, and related projects would be significant.**

(iii) Summary of Cumulative Operational Noise Impacts

As discussed above, on-site noise sources associated with the Project and related projects would not result in the exposure of persons to or generation of noise levels in excess of the significance criteria 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. **Therefore, cumulative operational noise impacts from on-site sources would be less than significant. However, cumulative off-site traffic noise levels would be significant and unavoidable.**

Table IV.G-23
Cumulative Roadway Traffic Noise Impacts

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] (CNEL (dBA))		Increase in Noise Levels Due to Cumulative + Project (CNEL (dBA))	Significant Impact?
		Existing Conditions	Future Cumulative Plus Project		
Olive Street					
– Between 2nd St. and 4th St.	Residential, Hotel, Park	69.1	71.8	2.7	No
– Between 4th St. and 5th St.	Residential	68.9	71.2	2.3	No
– Between 5th St. and 6th St.	Hotel	69.2	70.6	1.4	No
Hill Street					
– Between 2nd St. and 3rd St.	Hotel	73.0	74.2	1.2	No
– Between 3rd St. and 4th St.	Park	71.0	72.4	1.4	No
– Between 4th St. and 5th St.	Residential, Hotel	68.5	71.1	2.6	No
Broadway					
– Between 2nd St. and 3rd St.	Residential	68.1	70.5	2.4	No
– Between 3rd St. and 4th St.	Commercial	68.4	71.2	2.8	No
– Between 4th St. and 5th St.	Residential	68.5	71.1	2.6	No
2nd Street					
– Between Grand Ave. and Olive St.	School	62.7	66.0	3.3	No
– Between Olive St. and Hill St.	Residential	61.2	63.2	2.0	No
3rd Street					
– Between Hill St. and Broadway	Residential	71.6	72.9	1.3	No
– Between Broadway and Spring St.	Residential	68.6	70.7	2.1	No
4th Street					
– Between Olive St. and Hill St.	Residential	67.1	70.3	3.2	Yes
– Between Hill St. and Broadway	Office	68.5	71.1	2.6	No
5th Street					
– Between Grand Ave. and Olive St.	Hotel	70.1	72.4	2.3	No
– Between Olive St. and Hill St.	Residential, Park	68.3	70.3	2.0	No
– Between Hill St. and Broadway	Residential	67.8	70.2	2.4	No

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

Source: AES, June 2020.

(c) Construction Vibration

(i) 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 10 feet as related to building damage and 80 feet as related to human annoyance at residential uses). As indicated above, the closest related project, Related Project No. 1, is approximately 90 feet east of the Project Site. Therefore, based on distance attenuation potential cumulative vibration impacts with respect to the building damage from the Project and Related Project No. 1 would be less than significant. **Therefore, the Project would not contribute to a cumulative construction vibration impact with respect to building damage associated with on-site construction and the cumulative impact would be less than significant.**

As discussed above, potential vibration impacts associated with Project-related on-site construction activities would be significant with respect to human annoyance at receptor location R2 (the closest sensitive receptor between the Project and Related Project No. 1). Related Project No. 1 is approximately 270 feet from the receptor location R2. Due to the rapid attenuation characteristics of ground-borne vibration, Related Project No. 1 would not contribute to a cumulative construction vibration impact with respect to human annoyance at the uses represented by receptor location R2. **Therefore, potential cumulative construction vibration impact with respect to human annoyance associated with on-site construction would be less than significant.**

(ii) Off-Site Construction Vibration

As previously discussed, based on FTA data, the vibration generated by a typical heavy truck would be approximately 63 VdB (0.00566 PPV) at a distance of 50 feet from the truck.[40] 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 truck route(s) for the Project (i.e., 3rd Street, 4th Street, 7th Street, Hill Street, and Alameda Street). 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 truck route(s) would be below the most stringent building damage significance criteria of 0.12 PPV for buildings extremely

[40] *FTA, "Transit Noise and Vibration Impact Assessment," Figure 5-4, September 2018.*

susceptible to vibration. **As such, 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 truck routes (i.e., 4th Street and 7th Street) would be significant with respect to human annoyance. As related projects would be anticipated to use similar trucks as the Project (i.e., 4th Street and 7th Street), it is anticipated that construction trucks would generate similar vibration levels along the anticipated truck route(s). **Therefore, to the extent that other related projects use the same truck route as the Project, potential cumulative vibration impacts with respect to human annoyance associated with temporary and intermittent vibration from haul trucks traveling along the designated truck route(s) would be significant.**

(iii) 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 from on-site construction activities pursuant to the significance criteria for human annoyance would be less significant in the event concurrent construction of the Project and the related projects were to occur. However, to the extent that other related projects use the same truck route(s) as the Project, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated truck route(s) would be significant. **Therefore, on-site construction activities would not generate excessive ground-borne vibration levels with respect to human annoyance that would result in cumulative vibration impacts. However, cumulative vibration impacts with respect to human annoyance associated with off-site construction activities would be significant.**

(d) Operational Vibration

Vibration levels from project operation are generally limited to building mechanical equipment and vehicle circulations and would be limited to immediate vicinity of the project sites. The related projects (mixed-use and commercial developments) would generate

similar vibration levels as the Project. As described above, the nearest related project is approximately 90 feet from the Project Site (Related Project No. 1). Since ground-borne vibration decreases rapidly with distance, operation of the related projects would not contribute to cumulative vibration impacts due to distance between the Project and the related projects. As analyzed above, Project operation would not result in the generation of excessive ground-borne vibration levels that would be perceptible in the vicinity of the Project Site. **Therefore, based on the distance of the related projects from the Project Site and the operational vibration levels associated with the Project, cumulative vibration impacts associated with operation of the Project and related projects would be less than significant**.

(2) Mitigation Measures

(a) Construction Noise

As analyzed above, there would be potential cumulative noise impacts at the nearby sensitive uses (e.g., residential uses) located in proximity to the Project Site, Related Project No. 1, and Related Project No. 5, in the event of concurrent construction activities. Noise associated with cumulative construction activities would be reduced to the degree reasonably and technically feasible through proposed mitigation measures (e.g., providing temporary noise barriers) for each individual related project. However, even with these mitigation measures cumulative noise impacts would continue to occur and there are no other physical mitigation measures that would be feasible. As such, cumulative on-site noise impacts from on-site construction would be significant.

As analyzed above, cumulative noise impacts associated with off-site construction trucks from the Project and other related projects could occur. Conventional mitigation measures, such as providing temporary noise barrier walls to reduce the off-site construction truck traffic noise impacts, would not be feasible as the barriers would obstruct the access and visibility to the properties along the anticipated truck routes. There are no other feasible mitigation measures to reduce the temporary significant noise impacts associated with the cumulative off-site construction trucks.

(b) Operational Noise

As discussed above, operation of the Project would not result in a significant noise impact during operation and no mitigation measures are required. However, as analyzed above, significant cumulative noise impacts associated with off-site traffic would occur along the roadway segment of 4th Street (between Olive Street and Hill Street). Conventional mitigation measures, such as providing a noise barrier to reduce the off-site traffic noise impacts, would not be feasible as the barriers would obstruct access and visibility to the properties along the impacted roadway segments. There are no other feasible mitigation measures to reduce the significant noise impacts associated with the

cumulative off-site traffic. As such, cumulative off-site traffic noise impacts would remain significant and unavoidable.

(c) Construction Vibration

Cumulative vibration impacts with respect to building damage associated with on-site and off-site construction activities would be less than significant. Cumulative on-site vibration impacts with respect to human annoyance would also be less than significant. However, vibration levels from off-site construction trucks would exceed the significance criteria for human annoyance at vibration sensitive receptors along the anticipated truck routes. There are no feasible mitigation measures to reduce the potential vibration human annoyance impacts. Even though impacts would be temporary, intermittent, and limited to daytime hours when haul trucks are traveling within 25 feet of a sensitive receptor, cumulative vibration impacts from off-site construction with respect to human annoyance would remain significant and unavoidable.

(d) Operational Vibration

Cumulative vibration impacts associated with operation of the Project and related projects would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance after Mitigation

(a) Construction Noise

Cumulative construction noise impacts associated with on-site noise sources and off-site construction traffic would remain significant and unavoidable.

(b) Operational Noise

Cumulative impacts related to on-site operational noise would be less than significant and cumulative off-site operational traffic noise would be significant and unavoidable.

(c) Construction Vibration

Cumulative vibration impacts with respect to building damage from on-site and off-site construction activities would be less than significant. Cumulative vibration impacts with respect to human annoyance associated with on-site construction activities would also be less than significant. However, cumulative vibration impacts associated with human annoyance from off-site construction trucks would be significant and unavoidable.

(d) Operational Vibration

Cumulative impacts related to operational vibration would be less than significant.