# IV. Environmental Impact Analysis

# F. 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, 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 F to 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

[1] *All sound levels measured in decibel (dB), as identified in the noise calculation worksheets included in Appendix F to this Draft EIR and in this section of the Draft EIR, are relative to $2x10^{-5}$ $N/m^2$ (the reference unit for sound pressure measured in terms of newton per square meter, a common method for measuring sound pressure).*

the way the human ear perceives sound. Examples of various sound levels in different environments are shown in Table IV.F-1 on page IV.F-3.

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., 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

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

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

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

**Table IV.F-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.*

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.

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

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

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

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

building damage.[8] The RMS velocity is defined as the square-root of the average of the squared amplitude of the vibration signal and is typically more suitable for evaluating human response to ground-borne vibration.[9] The RMS vibration velocity level can be presented in inch per second or in VdB (a decibel unit referenced to 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 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

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[8] *Vibration levels are described in the noise calculation worksheets included in Appendix F to 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.*

[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 F to 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.*

technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project.

### (2) State

The State of California Governor's Office of Planning and Research (OPR) has established general plan guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. 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 OPR. 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 2019 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 (refer to Table IV.F-2 on page IV.F-7) and includes a number of goals, objectives, and policies for land use planning purposes. The City also has regulations to control unnecessary, excessive, and annoying noise, as set forth in the Los Angeles Municipal Code (LAMC) Chapter XI, Noise Regulation. In addition, the *L.A. CEQA Thresholds Guide* provides thresholds for determining noise impacts of a project. These regulations and policies are described further below.

#### *(a) Noise Element*

The overall purpose of the Noise Element of the General Plan (Noise Element) is to guide policymakers in making land use determinations and in preparing noise ordinances

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

**Table IV.F-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).*

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]

- Objective 2 (Non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise-sensitive uses.
- Policy 2.1: Enforce and/or implement applicable City, State, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.

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

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

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

The City's noise compatibility guidelines are provided in Table IV.F-2 on page IV.F-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.F-3 on page IV.F-9.

To account for people's increased tolerance for short-duration noise events, the Noise Regulations provide a 5-dBA allowance 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

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

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

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

*Source: LAMC Section 111.03.*

that 5 dBA shall be added to the sound level measurement for steady high-pitched noise or repeated impulsive noises.[15,16]

The LAMC also provides noise regulations with respect to vehicle-related noise, including Section 114.02, which prohibits the operation of any motor driven vehicles upon 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 operations between the hours of 10:00 P.M. and 7:00 A.M. that cause any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building; and Section 114.06, which requires vehicle theft alarm systems to be silenced within five minutes.

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

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

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

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, 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.

In addition, Section 91.3307.1 of the LAMC (Protection Required) specifies that adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs.

### (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.F-4 on page IV.F-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.

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[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.*

[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.F-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.*

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.F-5 on page IV.F-12, are based on the frequency of vibration events. Specific criteria are provided for three land use categories: (1) Vibration Category 1—High Sensitivity; (2) Vibration Category 2—Residential; and (3) Vibration Category 3—Institutional.

## c. Existing Conditions

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, particularly along Olympic Boulevard, which has high volumes of traffic. Other ambient noise sources in the vicinity of the Project Site include truck traffic, landscaping activities, 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 of the General Plan defines noise-sensitive land uses as single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels,

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

**Table IV.F-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.*

transient lodging, and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves; and parks.[22] These uses are generally considered more sensitive to noise than commercial and industrial land uses.

Based on a review of the land uses in the vicinity of the Project Site, six noise 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 for six receptor locations around the Project Site to establish baseline noise conditions in the vicinity of the Project Site. The receptor locations essentially surround the Project Site and thereby provide representative baseline noise levels for uses in all directions. The monitoring locations provide an adequate basis to evaluate potential impacts at other receptors in the same general direction of and beyond the receptor locations. The noise measurement locations are shown in Figure IV.F-1 on page IV.F-13 and described in Table IV.F-6 on page IV.F-14.

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


**Figure IV.F-1**
Noise Measurement Locations

Source: Acoustical Engineering Services, 2019.

**Table IV.F-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 | Residential use on the north side of Keswick Avenue, south of the Project Site. R1 also represents the residential use on the north side Orton Avenue.[b] | Receptor adjacent to Project Site/Noise measurement occurred on-site immediately adjacent to receptor | Residential |
| R2 | Courtyard by Marriott (hotel use) on the south side of Olympic Avenue, northeast of the Project Site. R2 also represents the Century Park hotel on the north side of Bellwood Avenue, north of the Project Site. | Receptor adjacent to the Project Site/Noise measurement occurred on-site immediately adjacent to receptor | Hotel |
| R3 | Residential use on the north side of Lauriston Avenue, north of the Project Site | 425 | Residential |
| R4 | Residential use at the northwest corner of Kerwood Avenue and Olympic Boulevard, northwest of the Project Site | 315 | Residential |
| R5 | Residential use on the west side of Kerwood Avenue (between Olympic Boulevard and Keswick Avenue), west of the Project Site | 155 | Residential |
| R6 | Residential use on the east side of Kerwood Avenue (between Olympic Boulevard and Keswick Avenue), west of the Project Site | Receptor adjacent to the Project Site/Noise measurement occurred on-site immediately adjacent to receptor | Residential |

[a] *Distances are estimated using Google Earth. Ambient measurements for receptors adjacent to the Project Site, R1, R2, and R6, were conducted on the Project Site, immediately adjacent to the off-site receptor locations.*

[b] *Ambient noise measurement was made at 5 feet above the existing building on the Project Site, which is at a similar elevation as receptor R1, to represent the ambient noise level at receptor R1.*

*Source: Acoustical Engineering Services (AES), 2021. See Appendix F to this Draft EIR.*

## (2) Ambient Noise Levels

To establish baseline noise conditions, existing ambient noise levels were monitored for 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 August 20, 2019, using a Quest Technologies Model 2900 Integrating/

Logging Sound Level Meter.[23] A 24-hour measurement was conducted for receptor location (R1) and two 15-minute measurements were conducted at the other receptor locations (R2 to R6) during daytime and nighttime hours. The daytime ambient noise levels were measured between 11:00 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 measurement periods represent the typical average ambient noise levels during the daytime and nighttime hours. As these average ambient noise levels are used as the base for comparison, the resulting analysis is more conservative (i.e., results in greater impacts) than use of other timeframes such as during peak traffic timeframes when noise levels are higher. 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]

Table IV.F-7 on page IV.F-16 provides a summary of the ambient noise measurements conducted at the six noise receptor locations. Based on field observations, the ambient noise at the Project noise receptor locations is dominated by local traffic and, to a lesser extent, helicopter flyovers and other typical urban noises. As indicated in Table IV.F-7, the existing daytime ambient noise levels at the off-site noise receptor locations ranged from 50.8 dBA ($L_{eq}$) at receptor location R6 to 67.3 dBA ($L_{eq}$) at receptor location R4. The measured nighttime ambient noise levels ranged from 49.5 dBA ($L_{eq}$) at receptor location R6 to 64.2 dBA ($L_{eq}$) at receptor location R4. Thus, the existing ambient noise levels at all off-site locations 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.F-3 on page IV.F-9.

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 and included as Appendix H of this Draft EIR. Thirteen (13) 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

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[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.F-7**
**Existing Ambient Noise Levels**

| Receptor Location | Noise-Sensitive Land Use | Measured Noise Levels, $L_{eq}$ (dBA) | | CNEL (24-hour) |
|---|---|---|---|---|
| | | Daytime Hours[c] (7:00 A.M.–10:00 P.M.) | Nighttime Hours[c] (10:00 P.M.–7:00 A.M.) | |
| R1 | Residential | 56.3[b] | 52.1[b] | 59.8[a] |
| R2 | Hotel | 58.2 | 55.2 | 60.6 |
| R3 | Residential | 56.7 | 55.2 | 60.2 |
| R4 | Residential | 67.3 | 64.2 | 69.7 |
| R5 | Residential | 58.8 | 53.1 | 59.6 |
| R6 | Residential | 50.8 | 49.5 | 54.5 |

[a] *Estimated based on short-term (15-minute) noise measurement based on FTA procedures (FTA Transit Noise and Vibration Impact Assessment Manual, Appendix E Determining Existing Noise, September 2018).*

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

[c] *The range of hours for the "Daytime Hours" and "Nighttime Hours" in the table heading are defined by the LAMC. For receptor locations R2 through R6, daytime ambient noise levels were measured between 11:00 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.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

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 typical of the project type and is shown in Table IV.F-8 on page IV.F-17.[25]

Table IV.F-9 on page IV.F-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 65.4 dBA CNEL along Kerwood Avenue (between Olympic Boulevard and Pico Boulevard) to 75.2 dBA CNEL along Olympic Boulevard (between Overland Avenue and Beverly Glen Boulevard). Currently, the existing traffic-related noise levels along the roadway segments of Century Park West and Kerwood Avenue fall within the conditionally acceptable noise levels for residential uses

[25] *Communication with the Project traffic consultant (Gibson Transportation Consulting, Inc.), May 2021.*

**Table IV.F-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 and Gibson, 2021. See Appendix F to this Draft EIR.*

(i.e., between 60 and 70 dBA CNEL). The existing traffic noise levels along Beverly Glen Boulevard, Avenue of the Stars, Motor Avenue, Santa Monica Boulevard, Olympic Boulevard (between Beverly Glen Boulevard and Avenue of the Stars), and Pico Boulevard are between 70 dBA CNEL and 75 dBA CNEL, which are considered normally unacceptable for residential uses. The existing traffic noise level along Olympic Boulevard (between Overland Avenue and Beverly Glen Boulevard) is greater than 75 dBA CNEL, which is considered clearly unacceptable for residential uses.

### (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. According to the FTA technical study "Federal Transit Administration: Transit Noise and Vibration Impacts Assessments," typical road traffic-induced vibration levels are unlikely to be perceptible by people. Specifically, the FTA study reports that "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads."[26] Trucks and buses typically generate ground-borne vibration velocity levels of around 63 VdB (at 50 feet distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. Per the FTA, 75 VdB is the dividing line between barely perceptible (with regards to ground vibration) and distinctly perceptible.[27] Therefore,

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

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

**Table IV.F-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] |
|---|---|---|---|---|---|
| Beverly Glen Boulevard | | | | | |
| Between Santa Monica Blvd. and Olympic Blvd. | Residential | 40 | 72.2 | Yes | Normally Unacceptable |
| Between Olympic Blvd. and Pico Blvd. | Residential | 40 | 71.3 | Yes | Normally Unacceptable |
| Century Park West | | | | | |
| Between Santa Monica Blvd. and Olympic Blvd. | Residential | 45 | 69.3 | Yes | Conditionally Acceptable |
| Avenue of the Stars | | | | | |
| Between Santa Monica Blvd. and Olympic Blvd. | Residential | 60 | 70.3 | Yes | Normally Unacceptable |
| Motor Avenue | | | | | |
| Between Pico Blvd. and Cresta Dr. | Residential | 35 | 71.9 | Yes | Normally Unacceptable |
| Kerwood Avenue | | | | | |
| Between Olympic Blvd. and Pico Blvd. | Residential | 25 | 65.4 | Yes | Conditionally Acceptable |
| Santa Monica Boulevard | | | | | |
| Between Beverly Glen Blvd. and Century Park West | Residential | 70 | 73.1 | Yes | Normally Unacceptable |
| Between Century Park West and Ave. of the Stars | Residential | 70 | 72.9 | Yes | Normally Unacceptable |
| Olympic Boulevard | | | | | |
| Between Overland Ave. and Beverly Glen Blvd. | Residential | 45 | 75.2 | Yes | Clearly Unacceptable |
| Between Beverly Glen Blvd. and Century Park West | Residential, Hotel | 50 | 74.6 | Yes | Normally Unacceptable |
| Between Century Park West and Ave. of the Stars | Residential | 50 | 74.4 | Yes | Normally Unacceptable |
| Pico Boulevard | | | | | |
| Between Overland Ave. and Beverly Glen Blvd. | School, Religious | 45 | 74.0 | Yes | Normally Unacceptable |
| Between Beverly Glen Blvd. and Motor Ave. | School, Religious | 45 | 73.6 | Yes | Normally Unacceptable |

[a] *Detailed calculation worksheets are included in Appendix F to 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.F-2 on page IV.F-7.*

*Source: AES, 2021.*

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.

# 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 2021 and be completed in 2023. 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.F-2 on page IV.F-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, based on LAMC Sections 112.01.(c), 112.02.(a), 114.02.(a).3.

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 noise compatibility 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 noise compatibility 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, 75 VdB at institutional uses (i.e., school), or 65 VdB at off-site recording studios.

## 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 used construction equipment noise levels published by the FHWA's "Roadway Construction Noise Model (FHWA 2006)."[28] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see Table IV.F-7 on page IV.F-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, which is included in Appendix H to 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 haul routes.

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

### (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 8.0) computer noise prediction model.[29] 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 Traffic Study, included as Appendix H 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. Vibration levels were calculated based on the FTA published standard vibration velocities for various construction equipment operations. In addition, vibration impacts are evaluated based on maximum peak vibration levels generated by each type of construction equipment, per FTA guidance.

### (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

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[29] *SoundPLAN GmbH, SoundPLAN version 8.0, 2017.*

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. Therefore, operation of the Project would not generate excessive ground-borne vibration in the immediate vicinity of the Project Site, and, as such, vibration impacts associated with operation of the Project would be less than significant. Accordingly, the ground-borne vibration analysis presented in this section is limited to construction activities.

## c. Project Design Features

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

**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. The construction contractor will keep documentation on-site demonstrating that the equipment has been maintained in accordance with manufacturer's specifications.

**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:** The loading dock will be screened from off-site sensitive noise receptors by the perimeter wall (ranging from approximately 4 feet to approximately 9 feet in height) at the northeastern property line and include an interior loading area (i.e., delivery vehicles would be located in the exterior loading driveway area, but unloading/loading activities would occur within an interior loading area in the ground floor of the building).

**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 P1 Courtyard. A qualified noise consultant will provide written documentation that the design of the system complies with this maximum noise level.

# 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 demolition of the existing buildings, parking areas, and the portion of Bellwood Avenue within 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. The Project also would include construction activities in adjacent streets associated with the water infrastructure improvements, which consists of a new water main line extending from the Project Site along Bellwood Avenue (at the east and west sides) to the north side of Olympic Boulevard. It is estimated that approximately 74,800 cubic yards of soil 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 San Diego Freeway (I-405) or the Santa Monica Freeway (I-10). Incoming trucks from the I-405 Freeway Southbound would exit the I-405 Freeway at Olympic Boulevard, heading north on Sawtelle Boulevard, and east on Olympic Boulevard, and turn right on Bellwood Avenue to the Project Site. Outgoing trucks to the I-405 Freeway would exit the Project Site onto Bellwood Avenue, head east on Olympic Boulevard, south on Century Park East, west on Pico Boulevard, north on Cotner Avenue to the I-405 northbound on-ramp. Incoming trucks from the I-10 Freeway Westbound would exit the I-10 Freeway at Overland Avenue, heading north on Overland Avenue, head east on Olympic Boulevard, and turn right on Bellwood Avenue to the Project Site. Outgoing trucks to the I-10 Freeway, would exit the Project Site onto Bellwood Avenue, head east on Olympic Boulevard, south on Century Park East, east on Pico Boulevard, and south on La Cienega Boulevard to the I-10 east bound on-ramp.

#### *(i) On-Site Construction Noise*

Noise impacts from Project-related construction activities occurring within or adjacent to the Project Site would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Construction activities for the Project would generally include demolition, site grading and excavation for the subterranean parking garage, and building construction. Each stage of construction would involve the use of various types of construction equipment and would, therefore,

have its own distinct noise characteristics. Demolition generally involves the use of backhoes, front-end loaders, and heavy-duty trucks. Grading and excavation typically requires the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of cranes, forklifts, concrete trucks, pumps, and delivery trucks. The off-site infrastructure improvements would include the use of a backhoe/loader. 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.F-10 on page IV.F-27. These maximum noise levels would occur when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites often 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.[30] These noise levels are typically associated with multiple pieces of equipment operating on part power, simultaneously.

Table IV.F-11 on page IV.F-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, the corresponding significance criteria used in the construction noise analysis is when the construction-related noise exceeds the ambient $L_{eq}$ noise level

[30] *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.F-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.*

of 5 dBA at a noise-sensitive use. As indicated in Table IV.F-11 on page IV.F-28, the estimated noise levels during all stages of Project construction combined without mitigation 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 0.2 dBA at the uses represented by receptor location R4 to up to 41.7 dBA at the uses represented by receptor location R6, prior to implementation of mitigation. **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,

**Table IV.F-11**
**Construction Noise Impacts Prior to Mitigation Measures**

| 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? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Site Prep/ Demo | Grading | Mat Foundation | Foundation/ Concrete | Building Const. | Finishes/ Arch. Coating | Paving/ Landscape | Off-Site Infrastructure | | | | |
| R1 | 10[b] | 97.5 | 92.5 | 89.2 | 97.2 | 97.4 | 88.5 | 94.4 | 60.4 | 56.3 | 61.3 | 36.2 | Yes |
| R2 | 10[b] | 97.5 | 92.5 | 89.2 | 97.2 | 97.4 | 88.5 | 94.4 | 83.0 | 58.2 | 63.2 | 34.3 | Yes |
| R3 | 425 | 70.0 | 66.7 | 63.5 | 68.6 | 67.6 | 62.2 | 66.0 | 60.9 | 56.7 | 61.7 | 8.3 | Yes |
| R4 | 315 | 72.5 | 69.2 | 66.0 | 71.0 | 70.1 | 64.9 | 68.5 | 63.0 | 67.3 | 72.3 | 0.2 | Yes |
| R5 | 155 | 69.9 | 64.8 | 61.5 | 66.4 | 66.0 | 59.9 | 64.3 | 51.0 | 58.8 | 63.8 | 6.1 | Yes |
| R6 | 10[b] | 97.5 | 92.5 | 89.2 | 97.2 | 97.4 | 88.5 | 94.4 | 67.4 | 50.8 | 55.8 | 41.7 | Yes |

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.F-7 on page IV.F-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] *Although the receptor is adjacent to the Project Site, noise levels are calculated at 10 feet distance, as minimum distance between the noise source (i.e., construction equipment) and the receptor.*

[c] *Estimated construction noise levels do not take any credit for noise reduction associated with Project Design Feature NOI-PDF-1 but assume the construction equipment includes the manufacturer's provided muffling device.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

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 travel between the Project Site and I-405 via Sawtelle Boulevard, Olympic Boulevard, Bellwood Avenue, Century Park East, Pico Boulevard, and Cotner Avenue or between the Project and I-10 via Overland Avenue, Olympic Boulevard, Bellwood Avenue, Century Park East, Pico Boulevard, and La Cienega Boulevard. There are no noise sensitive uses along the segments of Sawtelle Boulevard and Cotner Avenue that would be utilized.

As discussed in Section IV.I, Transportation, of this Draft EIR, the peak period of construction with the highest number of construction trucks would occur during the mat foundation phase, which would occur over a limited number of days (approximately 1 to 3 days). Table IV.F-12 on page IV.F-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 shown in Table IV.F-12, the maximum number of hourly trucks along the haul routes would be associated with the mat foundation and grading and excavation phases of construction. Specifically, a maximum of 13 concrete and haul truck roundtrips would occur hourly during these phases. As the inbound and outbound routes would be different, a maximum of 13 hourly truck trips would occur along each haul route. As indicated in Table IV.F-12, the hourly noise levels generated by construction trucks during all stages of Project construction would be below the significance criteria of a 5-dBA increase over the ambient noise level. **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, although the noise impacts associated with off-site construction traffic would be less than significant. **Therefore, without mitigation measures, Project on-site 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 courtyards, terraces, and roof level deck), parking facilities, loading dock, and trash compactor; and (b) off-site mobile (roadway traffic) noise sources.

**Table IV.F-12**
**Off-Site Construction Truck Noise Levels**

| Construction Phase | Estimated Number of Construction and Delivery Trucks/ 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) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Olympic Boulevard | Century Park East | Pico Boulevard | Overland Avenue | La Cienega Boulevard |
| Site Prep/Demo | 30/30 | 2/12 | 58.0/67.8 | 57.3/62.9 | 57.3/66.4 | 58.0/63.7 | 57.3/65.3 |
| Grading | 172/30[e] | 13/12 | 65.3/69.4 | 64.6/66.3 | 64.6/68.3 | 65.3/67.1 | 64.6/67.6 |
| Mat Foundation | 400/30[f] | 13/12 | 65.3/69.4 | 64.6/66.3 | 64.6/68.3 | 65.3/67.1 | 64.6/67.6 |
| Foundation/Concrete | 100/100 | 7/40 | 63.4/68.8 | 62.7/65.2 | 62.7/67.5 | 63.4/65.9 | 62.7/66.8 |
| Building Construction | 50/180 | 4/72 | 62.6/68.6 | 61.8/64.7 | 61.8/67.3 | 62.6/65.5 | 61.8/66.4 |
| Finishes/Architectural Coating | 50/200 | 4/80 | 62.8/68.6 | 62.0/64.8 | 62.0/67.3 | 62.8/65.6 | 62.0/66.5 |
| Paving/Landscaping | 20/40 | 2/16 | 58.3/67.8 | 57.6/63.0 | 57.6/66.4 | 58.3/63.8 | 57.6/65.4 |
| Existing Ambient Noise Levels Along the Project Haul Routes, $L_{eq}$ (dBA)[c] | | | 67.3 | 61.5 | 65.8 | 62.3 | 64.6 |
| Significance Criteria, $L_{eq}$ (dBA)[d] | | | 72.3 | 66.5 | 70.8 | 67.3 | 69.6 |
| Significant Impact? | | | No | No | No | No | No |

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

*[b] Based on input from the Project Applicant, a maximum of 13 concrete or haul trucks can be accommodated at the Project Site in a given hour. For construction trucks in the remaining phases, the number of hourly trips assumes a uniform distribution of trips over the workday and is then divided by two, as incoming and departing trucks would travel on different roadways. For worker vehicles, the number of hourly assumes 40% of the worker trips would arrive in one hour to represent a conservative analysis.*

*[c] Ambient noise levels along the truck routes are based on measurements at nearby receptor locations (i.e., receptor R4 along Olympic Boulevard). Ambient noise levels along Century Park East, Pico Boulevard, Overland Avenue, and La Cienega Boulevard are based on measured ambient at receptor R4, adjusted for the existing traffic volumes along the roadway segments.*

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

*[e] The 172 truck trips includes 162 haul truck trips and 10 delivery truck trips. Based on input from the Project Applicant, a maximum of 13 haul truck roundtrips can be accommodated within a given hour. Thus, should haul trucks be limited to a six hour period, the 162 daily haul truck roundtrips is overstated.*

**Table IV.F-12 (Continued)**
**Off-Site Construction Truck Noise Levels**

| Construction Phase | Estimated Number of Construction and Delivery Trucks/ 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) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Olympic Boulevard | Century Park East | Pico Boulevard | Overland Avenue | La Cienega Boulevard |
| [f] *Based on input from the Project Applicant, a maximum of 13 concrete truck roundtrips can be accommodated at the Project Site within a given hour. As such, the 200 estimated daily concrete truck roundtrips over an approximate 12-hour period is conservative overestimation.* | | | | | | | |
| *Source: AES, 2021. See Appendix F to this Draft EIR.* | | | | | | | |

*(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 roof level and within the building structure (e.g., garage exhaust fans). Although operation of this equipment would generate noise, Project-related outdoor mechanical equipment would be designed so as not to increase the existing ambient noise levels by 5 dBA in accordance with the City's Noise Regulations. Specifically, the Project would comply with 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.F-13 on page IV.F-33 presents the estimated noise levels at the off-site receptor locations from operation of the Project mechanical equipment.

As indicated in Table IV.F-13, the estimated noise levels from the mechanical equipment would range from 36.4 dBA ($L_{eq}$) at receptor location R3 to 53.9 dBA ($L_{eq}$) at receptor location R1, which would be consistent with the existing ambient noise levels. 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 (based on the lowest measured ambient). **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 a series of landscaped courtyards and terraces at every floor of the building. The outdoor open space areas would include a central courtyard at the P1 level (which may include features such as outdoor kitchenette and barbecue stations, exercise lawn, garden seating area, flexible lounge seating, and outdoor dining seating) and outdoor terraces at the ground through the sixth 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

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

**Table IV.F-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 | 52.1 | 53.9 | 56.1 | 57.1 | 0.0 | No |
| R2 | 55.2 | 41.8 | 55.4 | 60.2 | 0.0 | No |
| R3 | 55.2 | 36.4 | 55.3 | 60.2 | 0.0 | No |
| R4 | 64.2 | 38.3 | 64.2 | 69.2 | 0.0 | No |
| R5 | 53.1 | 43.9 | 53.6 | 58.1 | 0.0 | No |
| R6 | 49.5 | 41.6 | 50.2 | 54.5 | 0.0 | No |

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

*Source: AES, 2021. See Appendix F to this Draft EIR.*

talking at the same time. In addition, as show in Table IV.F-14 on page IV.F-34, the hours of operation for use of the outdoor areas were assumed to be from 7:00 A.M. to 9:00 P.M. and the estimated number of people was based on the maximum occupancy per the Building Code for each area of outdoor space.

An additional potential noise source associated with outdoor uses would be the use of an outdoor sound system (e.g., music or other sounds broadcast through an outdoor mounted speaker system) at the P1 Level Courtyard. 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 a distance of 15 feet 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.F-15 on page IV.F-35 presents the estimated noise levels at the off-site sensitive receptors resulting from the use of outdoor areas. The estimated noise levels were calculated with the assumption that all of the outdoor spaces would be fully occupied, based on the maximum occupancy per the Building Code for the area of each outdoor space, and that all outdoor spaces would be operating concurrently to represent a worst-case noise analysis. As presented in Table IV.F-15, the estimated noise levels from the outdoor spaces would range from 27.6 dBA ($L_{eq}$) at receptor location R3 to 58.8 dBA ($L_{eq}$) at receptor location R1. The estimated ambient noise levels with the addition of

**Table IV.F-14**
**Outdoor Areas - Maximum Occupancy Per Building Code and Amplified Sound System Noise Levels**

| Outdoor Space | Number of People[a] | Amplified Sound System Level dBA ($L_{eq}$) |
|---|---|---|
| Level P1—Courtyard | 433 | 70 dBA at 15 feet |
| Level 1—Terraces | 522 | N/A |
| Level 2—Terraces | 128 | N/A |
| Level 3—Terraces | 50 | N/A |
| Level 4—Balconies | 100 | N/A |
| Level 5—Balconies | 50 | N/A |
| Level 6—Balconies | 162 | N/A |

*N/A = Not Applicable*

[a] *Based on maximum 15 square feet per person, per Building Code. This a conservative overestimation based on anticipated usage.*

*Source: AES, 2020.*

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 daytime 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.**

Parking Facilities

As discussed in Section II, Project Description, of this Draft EIR, the Project would provide 140 vehicular parking spaces, within two 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. **Therefore, noise impacts from the parking facilities would be less than significant.**

Loading Dock and Trash Collection Areas

The Project loading areas and trash compactors would be located inside the building at Level 1. The exterior loading drive would be partially covered by the second floor of the building above, and the perimeter wall at the northeastern property line would provide additional screening. Delivery vehicles would access the property from the service drive off of Bellwood Avenue, and pull into an exterior loading drive adjacent to the building.

**Table IV.F-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 | 56.3 | 58.8 | 60.7 | 61.3 | 0.0 | No |
| R2 | 58.2 | 46.3 | 58.5 | 63.2 | 0.0 | No |
| R3 | 56.7 | 27.6 | 56.7 | 61.7 | 0.0 | No |
| R4 | 67.3 | 40.5 | 67.3 | 72.3 | 0.0 | No |
| R5 | 58.8 | 40.2 | 58.9 | 63.8 | 0.0 | No |
| R6 | 50.8 | 41.9 | 51.3 | 55.8 | 0.0 | No |

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.F-7 on page IV.F-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.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

Delivery vehicles would remain in the exterior loading drive, but would back up to the loading dock to the interior loading area. Unloading/loading activities would occur within the interior loading area in the ground floor of the building. Noise sources associated with the loading dock and trash collection area 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 69 dBA ($L_{eq}$) and 66 dBA ($L_{eq}$), respectively, at a distance of 50 feet.[32] As provided above in Project Design Feature NOI-PDF-3, a perimeter wall would provide screening of the loading dock from off-site noise-sensitive receptors. 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.F-16 on page IV.F-36 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.F-16, the estimated noise from the loading dock and trash compactor would be below the significance criteria of 5 dBA ($L_{eq}$) above ambient noise levels. **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.F-16**
**Estimated Noise Levels from Loading Dock**

| 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 | 56.3 | 24.5 | 56.3 | 61.3 | 0.0 | No |
| R2 | 58.2 | 60.0 | 62.2 | 63.2 | 0.0 | No |
| R3 | 56.7 | 21.4 | 56.7 | 61.7 | 0.0 | No |
| R4 | 67.3 | 12.1 | 67.3 | 72.3 | 0.0 | No |
| R5 | 58.8 | 21.4 | 58.8 | 63.8 | 0.0 | No |
| R6 | 50.8 | 24.0 | 50.8 | 55.8 | 0.0 | No |

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.F-7 on page IV.F-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.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

### *(ii) Off-Site Mobile Noise Sources*

Future Plus Project

As discussed in the Traffic Study, the Project is expected to have a net reduction of 75 daily trips, as compared to the existing conditions. As such, Project-related traffic would not increase the existing traffic volumes along the roadway segments in the study area when compared with Future Without Project conditions or Existing Plus Project conditions. **Therefore, traffic noise impacts related to Project operations 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 including amplified sound, parking facilities, loading dock and trash compactor, and off-site traffic), an evaluation of potential composite noise level increases (i.e., noise levels from all on-site noise sources combined, including amplified music) at the analyzed sensitive receptor locations was also performed. As analyzed above, with regard to noise related to off-site traffic, the Project would result in a net reduction of 75 daily trips. Therefore, the evaluation of composite noise levels is limited to all on-site Project-related noise sources. The 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.F-17 on page IV.F-38 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.F-17, the Project would result in an increase in composite noise levels ranging from 0.1 dBA at receptor location R3 to 4.5 dBA at receptor location R1, and no increase at receptor location R4. The composite noise level from Project operation at all off-site receptor locations would be below the 5-dBA significance criteria as the ambient plus Project composite noise level falls within the normally and conditionally acceptable (less than 70 CNEL) range for the residential and hotel land use categories. **As such, composite noise level impacts due to Project operations would be less than significant.**

**Based on the above, Project operations would not result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the City's general plan or noise ordinance, or applicable standards of other agencies. Therefore, the Project's operational noise impacts from on- and off-site sources would be less than significant.**

**Table IV.F-17**
**Composite Noise Impacts**

| Receptor Location | Existing Ambient Noise Levels (CNEL (dBA)) (A) | Calculated Project-Related Noise Sources (CNEL (dBA)) | | | Project Composite Noise Levels (CNEL (dBA)) (E=B+C+D)[b] | Ambient Plus Project Composite Noise Levels (CNEL (dBA)) (G=A+E)[b] | Increase in Noise Levels due to Project (CNEL (dBA)) (G-A) | Sig. Criteria[a] (CNEL (dBA)) | Sig. Impact? |
|---|---|---|---|---|---|---|---|---|---|
| | | Mechanical (B) | Loading/ Trash Compactor (C) | Outdoor Spaces (D) | | | | | |
| R1 | 59.8 | 60.6 | 21.8 | 57.6 | 62.4 | 64.3 | 4.5 | 64.8 | No |
| R2 | 60.6 | 48.5 | 57.2 | 45.1 | 57.9 | 62.5 | 1.9 | 65.6 | No |
| R3 | 60.2 | 43.1 | 18.8 | 26.5 | 43.2 | 60.3 | 0.1 | 65.2 | No |
| R4 | 69.7 | 45.0 | 10.9 | 39.3 | 46.0 | 69.7 | 0.0 | 74.7 | No |
| R5 | 59.6 | 50.6 | 18.8 | 39.0 | 50.9 | 60.1 | 0.5 | 64.6 | No |
| R6 | 54.5 | 48.3 | 21.3 | 40.7 | 49.0 | 55.5 | 1.0 | 59.5 | 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.*

[b] *Adding sound levels in dB are calculated based on energy (logarithmic) basis.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

## (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:** Prior to the start of demolition activities, a temporary and impermeable sound barrier shall be erected and maintained at the locations listed below and shown in Figure IV.F-2 on page IV.F-40 during earthmoving and exterior construction of the Project building. At plan check, building plans shall include documentation prepared by a noise consultant verifying compliance with this measure.

- Along the northern property line of the Project Site between the construction areas and the Century Park hotel on the north side of Bellwood Avenue and the Courtyard by Marriott on the east side of Bellwood Avenue (receptor location R2), and the residential use on the north side of Lauriston Avenue (receptor location R3). The temporary sound barrier shall be designed to provide a minimum 15-dBA noise reduction at the ground level of the Century Park hotel and the Courtyard by Marriott (receptor location R2), and minimum 9-dBA noise reduction at the residential use on Lauriston Avenue (receptor location R3).
- Along the northwestern property line of the Project Site between the construction areas and residential use at the northwest corner of Olympic Boulevard and Kerwood Avenue (receptor location R4). The temporary sound barrier shall be designed to provide a minimum 5-dBA noise reduction at the ground level of receptor location R4.
- Along the western property line of the Project Site between the construction areas and the residential uses on Kerwood Avenue (receptor locations R5 and R6). The temporary sound barrier shall be designed to provide a minimum 7-dBA noise reduction at the ground level of receptor location R5 and a minimum 15-dBA noise reduction at the ground level of receptor location R6.
- Along the southern property line of the Project Site between the construction areas and the residential uses on Keswick Avenue (receptor location R1). The temporary sound barrier shall be designed to provide a minimum 15-dBA noise reduction at the ground level of receptor location R1.


**Figure IV.F-2**
Temporary Construction Noise Barrier Locations

Source: Acoustical Engineering Services, 2019.

- In the event landscaping of the side yard along the eastern property line adjacent to the residential uses along Orton Avenue utilizes heavy construction equipment (e.g., large bulldozer and excavator), a temporary sound barrier at the side yard elevation shall be designed to provide a minimum 15-dBA noise reduction at the ground level of the residential uses along Orton Avenue.

## (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 construction noise levels to the extent feasible. Specifically, 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 at the ground level by a minimum 15 dBA at the residential uses along Keswick Avenue and Orton Avenue (receptor location R1), 15 dBA at the Courtyard by Marriott and Century Park hotels adjacent to the Project Site to the east and north, respectively (receptor location R2), by a minimum 9 dBA at the residential uses on Lauriston Avenue (receptor location R3), 5 dBA at the residential uses at the northwest corner of Olympic Boulevard and Kerwood Avenue (receptor location R4), by a minimum 7 dBA at the residential uses on Kerwood Avenue (receptor location R5), and 15 dBA at the ground level of the residential uses on Kerwood Avenue (receptor location R6).[33] As presented in Table IV.F-18 on page IV.F-42, the estimated construction-related noise levels at off-site sensitive receptor locations R3, R4, and R5 would be reduced to below a level of significance with implementation of Mitigation Measure NOI-MM-1. However, the estimated construction-related noise levels would still exceed the significance thresholds at receptor locations R1, R2 and R6. There are no other feasible mitigation measures that could be implemented to reduce the temporary noise impacts from on-site construction at receptor locations R1, R2 and R6. **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. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

[33] *15 dBA is the typical maximum noise reduction provided by temporary construction noise barrier.*

**Table IV.F-18**
**Construction Noise Impacts With Mitigation Measures**

| Off-Site Receptor Location | Minimum Noise Reduction Provided by Mitigation Measures[b] (dBA) | Estimated Construction Noise Levels by Construction Phases ($L_{eq}$ (dBA)) | | | | | | | | Existing Daytime Ambient Noise Levels ($L_{eq}$ (dBA)) | Sig. Criteria ($L_{eq}$ (dBA))[a] | Maximum Noise Exceedance Above the Criteria ($L_{eq}$ (dBA)) | Sig. Impact With Mitigation? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Site Prep/ Demo | Grading | Mat Foundation | Foundation/Concrete | Building Const. | Finishes/ Arch. Coating | Paving/ Landscape | Off-Site Infrastructure | | | | |
| R1 | 15 | 82.5 | 77.5 | 74.2 | 82.2 | 82.4 | 73.5 | 79.4 | 55.4 | 56.3 | 61.3 | 21.2 | Yes |
| R2 | 15 | 82.5 | 77.5 | 74.2 | 82.2 | 82.4 | 73.5 | 79.4 | 83.0[d] | 58.2 | 63.2 | 19.8[c] | Yes |
| R3 | 9 | 61.0 | 57.7 | 54.5 | 59.6 | 58.6 | 53.2 | 57.0 | 60.9[d] | 56.7 | 61.7 | 0.0 | No |
| R4 | 5 | 67.5 | 64.2 | 61.0 | 66.0 | 65.1 | 59.9 | 63.5 | 63.0[d] | 67.3 | 72.3 | 0.0 | No |
| R5 | 7 | 62.9 | 57.8 | 54.5 | 59.4 | 59.0 | 52.9 | 57.3 | 51.0 | 58.8 | 63.8 | 0.0 | No |
| R6 | 15 | 82.5 | 77.5 | 74.2 | 82.2 | 82.4 | 73.5 | 79.4 | 57.4 | 50.8 | 55.8 | 26.7 | Yes |

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.F-7 on page IV.F-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] *Noise reduction provided by temporary noise barrier along the Project boundaries.*

[c] *Noise barriers would not be effective in reducing the on-site construction noise at the upper levels of the Courtyard by Marriott and Century Park hotels (receptor R2). Therefore, on-site construction noise impacts would remain significant and unavoidable. On-site construction noise levels shown for R2 are for the ground level of the building only.*

[d] *Noise levels due to off-site infrastructure at receptors R2, R3 and R4 would not be affected by mitigation measures, as construction activities would occur within the public right-of-way.*

*Source: AES, 2021. See Appendix F to this Draft EIR.*

*(c) Operational Noise*

Noise impacts associated with on-site noise sources and off-site traffic during Project operations would be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

***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.F-19 on page IV.F-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 Initial Study included in Appendix A of this Draft EIR, there are no historical resources buildings located on or adjacent to the Project Site. However, the streetlights along Olympic Boulevard (in the vicinity of the Project Site) are identified as historical resources. These streetlights are located more than 25 feet from the Project construction area. As such, the streetlights would be exposed to a ground-borne vibration

**Table IV.F-19**
**Construction Vibration Impacts—Building Damage Without Mitigation**

| Nearest On- and Off-Site Building Structure[a] | Distance Between the Construction Equipment and Off-Site Buildings (feet) | 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] | | | | | Significance Criteria (PPV) | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| | | Large Bulldozer | Caisson Drilling | Loaded Trucks | Jack-hammer | Small Bulldozer | | |
| FTA Reference Vibration Levels at 25 feet | 25 | 0.089 | 0.089 | 0.076 | 0.035 | 0.003 | — | — |
| Four-story Courtyard by Marriott hotel at 10320 Olympic Boulevard adjacent to the Project site to the northeast | 10 | 0.244 | 0.244 | 0.208 | 0.096 | 0.008 | 0.5[d] | No |
| Single- and two-story residential buildings along Orton Avenue, southeast of the Project Site | 30 | 0.068 | 0.068 | 0.058 | 0.027 | 0.002 | 0.2[c] | No |
| Single- and two-story residential buildings along Keswick Avenue, south of the Project Site | 30 | 0.068 | 0.068 | 0.058 | 0.027 | 0.002 | 0.2[c] | No |
| Single-story residential buildings (garages) along Kerwood Avenue, west of the Project Site | 5 | 0.523 | 0.523 | 0.446 | 0.206 | 0.048 | 0.2[c] | Yes |
| Single-story commercial building at 10390 Bellwood Avenue adjacent to the Project Site to the northwest | 5 | 0.523 | 0.523 | 0.446 | 0.206 | 0.023 | 0.2[c] | Yes |
| Single-story commercial building at 10344 Olympic Boulevard adjacent to the Project Site to the north | 5 | 0.523 | 0.523 | 0.446 | 0.206 | 0.048 | 0.2[c] | Yes |
| Four-story Century Park hotel at 10330 Olympic Boulevard adjacent to the Project site to the north | 5 | 0.523 | 0.523 | 0.446 | 0.206 | 0.018 | 0.5[d] | Yes |

**Table IV.F-19 (Continued)|**
**Construction Vibration Impacts—Building Damage Without Mitigation**

| Nearest On- and Off-Site Building Structure[a] | Distance Between the Construction Equipment and Off-Site Buildings (feet) | 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] | | | | | Significance Criteria (PPV) | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| | | Large Bulldozer | Caisson Drilling | Loaded Trucks | Jack-hammer | Small Bulldozer | | |

*[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 reinforced-concrete, steel or timber buildings.*

*Source: FTA, 2006; AES, 2021. See Appendix F to this Draft EIR.*

level of up to 0.089 PPV (see Table IV.F-19 on page IV.F-44). The estimated vibration levels due to the construction activities would be well below the 0.12 PPV significance criteria, applicable to buildings extremely susceptible to vibration damage, such as, historic structures). Therefore, vibration impacts associated with Project construction in the vicinity of the historic streetlights along Olympic Boulevard would be less than significant.

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 a non-engineered timber and masonry building (applicable to the off-site single- and two-story buildings surrounding the Project Site) and the 0.5 PPV significance criteria for reinforced-concrete, steel and timber building (applicable to the off-site four-story hotel buildings). As indicated in Table IV.F-19, without mitigation, the estimated vibration levels from the construction equipment would exceed the 0.2 PPV building damage significance criteria at the residential buildings (garages) along Kerwood Avenue and the commercial buildings along Bellwood Avenue and Olympic Boulevard and the 0.5 PPV building damage significance criteria at the Century Park Hotel. **Therefore, the on-site vibration impacts during construction of the Project, pursuant to the significance criteria for building damage, would be significant without mitigation measures.**

*(ii) Human Annoyance Impacts from On-Site Construction*

Table IV.F-20 on page IV.F-47 provides the estimated vibration levels at the off-site sensitive uses due to construction equipment operation and compares the estimated vibration levels to the specified significance criteria for human annoyance. Per FTA guidance, the significance criteria for human annoyance is 72 VdB for sensitive uses, including residential (receptor locations R1, R3 to R6) and hotel (receptor location R2) uses, assuming there are a minimum of 70 vibration events occurring during a typical construction day. As indicated in Table IV.F-20, the estimated ground-borne vibration levels from construction equipment would be below the significance criteria for human annoyance at off-site sensitive receptor locations R3 through R5. The estimated ground-borne vibration levels at receptor locations R1, R2 and R6 without mitigation 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 locations R1, R2 and R6. **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-405 via Sawtelle Boulevard, Olympic Boulevard, Bellwood Avenue,

**Table IV.F-20**
**Construction Vibration Impacts—Human Annoyance Without Mitigation**

| 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) | Sig. Impact? |
|---|---|---|---|---|---|---|---|
| | Large Bulldozer | Caisson Drilling | Loaded Trucks | Jack-hammer | Small Bulldozer | | |
| FTA Reference Vibration Levels at 25 feet | 87 | 87 | 86 | 79 | 58 | — | — |
| R1 | 85 | 85 | 84 | 77 | 56 | 72 | Yes |
| R2 | 99 | 99 | 98 | 91 | 70 | 72 | Yes |
| R3 | 50 | 50 | 49 | 42 | 21 | 72 | No |
| R4 | 54 | 54 | 53 | 46 | 25 | 72 | No |
| R5 | 63 | 63 | 62 | 55 | 34 | 72 | No |
| R6 | 94 | 94 | 93 | 86 | 65 | 72 | Yes |

[a] *Vibration levels calculated based on FTA reference vibration level at 25 distance,*
*Source: FTA, 2018; AES, 2021. See Appendix F to this Draft EIR.*

Century Park East, Pico Boulevard, and Cotner Avenue or between the Project and I-10 via Overland Avenue, Olympic Boulevard, Bellwood Avenue, Century Park East, Pico Boulevard, and La Cienega Boulevard. There are no vibration sensitive uses along Sawtelle Boulevard and Cotner Avenue. Heavy-duty construction trucks would generate ground-borne vibration as they travel along the Project's anticipated haul routes. Thus, an analysis of potential vibration impacts using the building damage and human annoyance criteria for ground-borne vibration along the anticipated local haul 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 haul routes 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 F to this Draft EIR. This estimated vibration generated by construction trucks traveling along the anticipated haul routes would be well below the most stringent building damage criteria of 0.12 PPV for buildings extremely susceptible to vibration. **Therefore, vibration impacts (pursuant to the significance criteria for**

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

**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] Vibration sensitive uses along Olympic Boulevard include residential, hotel and studio (Fox Studios) uses. These residential and hotel uses are located approximately 20 feet from Olympic Boulevard. The studio uses (at Fox Studios) are located approximately 60 feet from the route. As indicated in the noise calculation worksheets included in Appendix F to this Draft EIR, the temporary vibration levels could reach approximately 75 VdB and 61 VdB periodically as trucks pass sensitive receptors along Olympic Boulevard at 20 feet and 60 feet, respectively. The residential and hotel uses along Olympic Boulevard would be exposed to ground-borne vibration levels up to 75 VdB, which would exceed the 72-VdB significance criteria from the construction trucks. The estimated ground-borne vibration at the Fox Studios (studios facing Olympic Boulevard) of 61 VdB would be below the 65-VdB significance threshold for studio uses. Vibration sensitive uses along Century Park East include residential uses, which are located approximately 30 feet from the roadway, which would be exposed to ground-borne vibration of 70 VdB and would be below the 72-VdB significance threshold. Vibration sensitive uses along Pico Boulevard include school and studio (Fox Studios) uses, which are located approximately 25 feet and 80 feet, respectively. The estimated ground-borne vibration from construction trucks would be 72 VdB (at the school use) and 57 VdB (at the studio uses), which would be below the 75-VdB and 65-VdB significance thresholds, respectively. There are residential and motel uses located approximately 25 feet along Overland Avenue and La Cienega Boulevard, respectively. The estimated ground-borne vibration at these sensitive uses would 72 VdB, which would be at the 72-VdB significance criteria. In addition, as discussed above, the temporary vibration levels from construction trucks passing residential and hotel uses along Olympic Boulevard could exceed the 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 haul routes would be significant without mitigation measures.**

*(iv) Summary of Construction Vibration Impacts*

As discussed above, the estimated vibration levels from on-site construction equipment without mitigation would exceed the building damage significance criteria of 0.2 PPV at the residential buildings (garages) along Kerwood Avenue and the commercial

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

buildings along Bellwood Avenue and Olympic Boulevard and the 0.5 PPV at the four-story Century Park hotel adjacent to the Project Site to the north and northeast. In addition, the estimated vibration levels from on-site construction equipment would exceed the human annoyance significance criteria of 72 VdB at the off-site residential and hotel uses adjacent to the Project Site. Therefore, vibration impacts from on-site construction activities would be significant pursuant to the significance criteria for building damage and human annoyance significance criteria without mitigation.

Vibration impacts associated with temporary and intermittent vibration from off-site construction activities (i.e., construction trucks traveling along the anticipated haul 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, construction of the Project would have the potential to result in significant vibration impacts with respect to potential damage to adjacent buildings from Project construction. Therefore, the following mitigation measures are provided to reduce the vibration impacts associated with potential building damage:

**Mitigation Measure NOI-MM-2:** The use of large construction equipment (i.e., large bulldozer, caisson drill rig, and/or loaded trucks) shall be a minimum of: 13 feet away from the residences abutting the Project Site on the east side of Kerwood Avenue, 13 feet away from the commercial buildings (located at 10390 Bellwood Avenue and 10344 Olympic

Boulevard) adjacent to the Project Site, and 6 feet away from the Century Park hotel.

**Mitigation Measure NOI-MM-3:** The use of jackhammers will be a minimum of 6 feet away from the residences abutting the Project Site on the east side of Kerwood Avenue and the commercial buildings located at 10390 Bellwood Avenue and 10344 Olympic Boulevard.

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. In addition, 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.

*(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*

Implementation of Mitigation Measure NOI-MM-2 and Mitigation Measure NOI-MM-3 provided above would reduce the Project's construction vibration impacts to the buildings adjacent to the Project Site, including the residential buildings garages) at the residences abutting the Project Site on the east side of Kerwood Avenue, the commercial buildings (located at 10390 Bellwood Avenue and 10344 Olympic Boulevard), and the Century Park hotel at 10330 Olympic Boulevard, to a less than significant level. As presented in Table IV.F-21 on page IV.F-51, the estimated construction-related vibration levels at off-site building structures would be reduced to below a level of significance with implementation of Mitigation Measure NOI-MM-2 and Mitigation Measure NOI-MM-3.

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

**Table IV.F-21**
**Construction Vibration Impacts—Building Damage with Mitigation**

| Nearest On- and Off-Site Building Structure[a] | Distance Between the Construction Equipment and Off-Site Buildings (feet) | 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] | | | | | Significance Criteria (PPV) | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| | | Large Bulldozer | Caisson Drilling | Loaded Trucks | Jack-hammer | Small Bulldozer | | |
| FTA Reference Vibration Levels at 25 feet | 25 | 0.089 | 0.089 | 0.076 | 0.035 | 0.003 | — | — |
| Four-story Courtyard by Marriott hotel at 10320 Olympic Boulevard adjacent to the Project site to the northeast | 10 | 0.244 | 0.244 | 0.208 | 0.096 | 0.008 | 0.5[d] | No |
| Single- and two-story residential buildings along Orton Avenue, southeast of the Project Site | 30 | 0.068 | 0.068 | 0.058 | 0.027 | 0.002 | 0.2[c] | No |
| Single- and two-story residential buildings along Keswick Avenue, south of the Project Site | 30 | 0.068 | 0.068 | 0.058 | 0.027 | 0.002 | 0.2[c] | No |
| Single-story residential buildings (garages) along Kerwood Avenue, west of the Project Site | 13 | 0.183 | 0.183 | 0.156 | 0.168 | 0.048 | 0.2[c] | No |
| Single-story commercial building at 10390 Bellwood Avenue adjacent to the Project Site to the northwest | 13 | 0.183 | 0.183 | 0.156 | 0.168 | 0.023 | 0.2[c] | No |
| Single-story commercial building at 10344 Olympic Boulevard adjacent to the Project Site to the north | 13 | 0.183 | 0.183 | 0.156 | 0.168 | 0.048 | 0.2[c] | No |
| Four-story Century Park hotel at 10330 Olympic Boulevard adjacent to the Project site to the north | 5 | 0.428 | 0.425 | 0.446 | 0.206 | 0.018 | 0.5[d] | No |

**Table IV.F-21 (Continued)|**
**Construction Vibration Impacts—Building Damage with Mitigation**

| Nearest On- and Off-Site Building Structure[a] | Distance Between the Construction Equipment and Off-Site Buildings (feet) | 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] | | | | | Significance Criteria (PPV) | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| | | Large Bulldozer | Caisson Drilling | Loaded Trucks | Jack-hammer | Small Bulldozer | | |

*[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 reinforced-concrete, steel or timber buildings.*

*Source: FTA, 2006; AES, 2021. See Appendix F to this Draft EIR.*

Mitigation measures considered to reduce vibration impacts from on-site and off-site construction activities with respect to human annoyance included the installation of a wave barrier, as discussed above. However, as discussed above, wave barriers must be very deep and long to be effective and are not considered cost effective for temporary applications, such as construction. Further, construction of the wave barriers themselves would generate ground borne vibrations. In addition, it would be technically infeasible along the haul routes, as these are miles of public right of way. Thus, there are no feasible mitigation measures that could be implemented to reduce the temporary vibration impacts from on-site and off-site construction associated with human annoyance to a less-than-significant level. **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 were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

***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 Santa Monica Airport located approximately 2.8 miles southwest of the Project Site. Since the Project is not located within an airport land use plan, within 2 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, there would be no impacts with respect to Threshold (c). 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, six 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. Related Project Nos. 1 through 5 are located a minimum 1,700 feet from the Project Site and are shielded from the Project Site by intervening buildings. Therefore, Related Project Nos. 1 through 5 would not contribute to cumulative construction noise impacts, in the event of concurrent construction. However, the Related Project No. 6 is approximately 375 feet from the Project Site to the east, which could contribute to cumulative construction noise impacts.

The Related Project No. 6 (Fox Studios Master Plan ) is a studio development with approximately 1.1 million square feet of additional buildings proposed.[37] There are noise sensitive receptors located within 500 feet of Related Project No. 6 and the Project Site, including the single-family residential uses along Orton Avenue (represented by receptor location R1), the Courtyard by Marriott on Olympic Boulevard (represented by receptor location R2), and the single-family residential uses along Lauriston Avenue and Fox Hills Drive (represented by receptor location R3). As analyzed above in Subsection 2.c.(2) (see Table IV.F-11 on page IV.F-28), the estimated Project-related construction noise levels at the uses represented by receptor location R1 would exceed the significance criteria by up to 36.2 dBA during the demolition phase, prior to mitigation and 21.2 dBA with mitigation. Since Related Project No. 6 has a direct line-of-sight to the residential uses along Orton Avenue, there is a potential for cumulative construction noise impacts to occur at the uses represented by receptor location R1 in the event Project construction occurs concurrently with construction of Related Project No. 6. Receptor locations R2 and R3 are shielded to the Related Project No. 6 construction by existing intervening buildings. However, since the estimated Project-related construction noise levels at receptor location R2 would exceed the significance criteria by up to 19.8 dBA with mitigation and the Project-related construction noise with mitigation at receptor R3 would be just below the significance criteria, any additional noise contribution from the Related Project No. 6 would have the

[37] *City of Los Angeles, Fox Studios Master Plan, Initial Study, April 2016.*

potential to contribute to the cumulative construction noise impacts. Therefore, cumulative noise impacts from on-site construction would be significant at receptor locations R1, R2 and R3. Receptor locations R4, R5 and R6 are located a minimum of 850 feet from the Related Project No. 6 and are also shielded by intervening buildings. Therefore, cumulative impacts from concurrent construction would not occur at receptor locations R4, R5 and R6.

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 and Related Project No. 6, 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 haul routes. The Related Project No. 6 could utilize the same truck routes (i.e., Olympic Boulevard, Century Park East, Pico Boulevard, Overland Avenue, or La Cienega Boulevard) as the Project. Therefore, any additional number of trucks from the Project and the Related Project No. 6 (if there is concurrent construction) would incrementally increase the noise levels. Based on the estimated lowest existing ambient noise level of 65.8 dBA along Pico Boulevard (see Table IV.F-12 on page IV.F-30), it is estimated that up to 37 truck trips per hour could occur along Pico Boulevard without exceeding the significance criteria of 5 dBA increase over the ambient noise levels. Therefore, if the total number of trucks from the Project and related projects were to add up to 38 truck trips per hour along Pico Boulevard, the estimated noise level from 38 truck trips per hour plus the ambient would be 70.8 dBA, which would increase the ambient noise levels by 5 dBA and exceed the significance criteria.[38] Since the Project would generate up to 13 truck trips per hour, an additional 25 truck trips from the Related Project No. 6 would increase the ambient noise level by 5 dBA or more along Pico Boulevard and Olympic Boulevard. Similarly, it is estimated that if the

[38] *It is estimated that with 38 truck trips, the noise level along Pico Boulevard would be 69.1 dBA, when added to the existing ambient of 65.8 dBA the cumulative noise levels would be 70.8 dBA, which would exceed the ambient by 5.0 dBA.*

Project and related projects were to add up to 29 and 44 construction-related truck trips per hour along La Cienega Boulevard and Olympic Boulevard, respectively, the estimated cumulative noise would increase the ambient by 5 dBA and significance criteria. 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 the truck route by 5 dBA. **As such, cumulative noise impacts from off-site construction could be significant.**

*(iii) Summary of Cumulative Construction Noise Impacts*

As discussed above, cumulative 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.

*(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 related projects and future growth would result in an increase of traffic volumes in the vicinity of the Project. However, as discussed above, the Project would result in a

reduction of daily trips as compared to the existing conditions. As such, the Project would not contribute to cumulative traffic noise impacts.

**Therefore, cumulative noise impacts due to off-site mobile noise sources associated with the Project, future growth, and related projects would be less than significant.**

*(iii) Summary of Cumulative Operational Noise Impacts*

As discussed above, 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 and off-site sources would be less than significant.**

*(c) Construction Vibration*

*(i) On-Site Construction Vibration*

As previously discussed, 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. 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 20 feet as related to building damage and 80 feet as related to human annoyance at residential uses).[39] As indicated above, the closest related project, Related Project No. 6, is approximately 375 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. 6 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 (closest sensitive receptor between the Project and the Related Project No. 6). Related Project No. 6 is approximately 375 feet from the receptor location R2. Due to the rapid attenuation characteristics of ground-borne vibration, Related Project No. 6 would not contribute to the cumulative construction vibration impact with respect to

[39] *Distances calculated based on estimated vibration levels for typical construction equipment at a distance which would be below the 72 VdB significance threshold with respect to human annoyance and 0.12 PPV significance threshold applicable to buildings extremely susceptible to vibration damage.*

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 haul routes for the Project. These buildings are anticipated to be exposed to ground-borne vibration levels of approximately 0.022 PPV. Trucks from the related projects are expected to generate similar ground-borne vibration levels. Therefore, the vibration levels generated from off-site construction trucks associated with the Project and other related projects along the anticipated haul routes would be below the most stringent building damage significance criteria of 0.12 PPV for buildings extremely susceptible to vibration. **Therefore, potential cumulative vibration impacts with respect to building damage from off-site construction would be less than significant.**

As discussed above, potential vibration impacts associated with temporary and intermittent vibration from project-related construction trucks traveling along the anticipated haul routes would be significant with respect to human annoyance. As related projects would be anticipated to use similar trucks as the Project, it is anticipated that construction trucks would generate similar vibration levels along the anticipated haul routes. **Therefore, to the extent that other related projects use the same haul 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 haul 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**

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

**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 than 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 haul route(s) as the Project, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated haul 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 375 feet from the Project Site. 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, the 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 and Related Project No. 6, 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. As such, cumulative off-site noise impacts from construction would be significant.

*(b) Operational Noise*

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

*(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. However, it is anticipated that cumulative vibration levels from off-site construction trucks would exceed the significance criteria for human annoyance at vibration sensitive receptors along the anticipated construction routes. There are no feasible mitigation measures to reduce the potential cumulative vibration human annoyance impacts. Even though impacts would be temporary, intermittent, and limited to daytime hours when haul trucks are traveling within 20 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 operational noise would be less than significant. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

*(c) Construction Vibration*

Cumulative vibration impacts associated with respect to building damage from on-site and off-site construction activities would be less than significant. Therefore, no mitigation measures were required or included, and the impact level remains less than significant. However, cumulative vibration impacts associated with human annoyance from construction trucks would be significant and unavoidable.

*(d) Operational Vibration*

Cumulative impacts related to operational vibration would be less than significant. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.