5.11 NOISE AND VIBRATION

This section addresses the potential noise and vibration impacts associated with construction and operation of the project. It describes the existing noise levels at the project site, the regulatory setting, the impacts of the project, and feasible mitigation measures to reduce impacts, where applicable. The analysis in this section is based on the following noise report, included as Appendix I: *Noise and Ground Vibration Technical Report for the La Brea Tar Pits Master Plan* (SWCA 2022).

5.11.1 Existing Conditions

5.11.1.1 Noise Fundamentals

DEFINITION OF ACOUSTICAL TERMS

Noise is commonly defined as sound that is undesirable because it interferes with speech communication and hearing, causes sleep disturbance, or is otherwise annoying. The following acoustical terms are used throughout this analysis:

- Ambient sound level is defined as the composite of noise from all sources near and far (i.e., the normal or existing level of environmental noise at a given location).
- Decibel (dB) is the physical unit commonly used to measure sound levels. Technically, a dB is a unit of measurement that describes the amplitude of sound equal to 20 times the base 10 logarithm of the ratio of the reference pressure to the sound of pressure, which is 20 micropascals (μPa).
- Sound measurement is further refined by using a decibel "A-weighted" sound level (dBA) scale that more closely measures how a person perceives different frequencies of sound; the A-weighting reflects the sensitivity of the ear to low or moderate sound levels.
- Equivalent noise level (L_{eq}) is the energy average A-weighted noise level during the measurement period.
- The root-mean-squared maximum noise level (L_{max}) characterizes the maximum noise level as defined by the loudest single noise event over the measurement period.
- Day-night sound level (L_{dn}) is the A-weighted equivalent sound level for a 24-hour period with an additional 10-dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10:00 p.m. to 7:00 a.m.).
- Community Noise Equivalent Level (CNEL) is a measure of the 24-hour average noise level that penalizes noise that occurs during the evening and nighttime hours, when noise is considered more disturbing. To account for this increase in disturbance, 5 dBA is added to the hourly L_{eq} during the evening hours (7:00 p.m. to 10:00 p.m.) and 10 dBA is added during the nighttime hours (10:00 p.m. to 7:00 a.m.).
- Percentile-exceeded sound level (L_{xx}) describes the sound level exceeded for a given percentage of a specific period.
- Noise-sensitive land use is defined as a location most likely to be adversely affected by excessive noise levels, or as a place where quiet is an essential element of their intended purpose.

SOUND LEVELS OF REPRESENTATIVE SOUNDS AND NOISES

The U.S. Environmental Protection Agency (EPA) has developed an index to assess noise impacts from a variety of sources. Noise levels in a quiet rural area at night are typically between 32 and 35 dBA. Quiet urban nighttime noise levels range from 40 to 50 dBA. Noise levels during the day in a noisy urban area are frequently as high as 70 to 80 dBA. Noise levels above 110 dBA become intolerable; levels higher than 80 dBA over continuous periods can result in hearing loss. Levels above 70 dBA tend to be associated with task interference. Levels between 50 and 55 dBA are associated with raised voices in a normal conversation (EPA 1974). In general, an average person perceives an increase of 3 dBA or less as barely perceptible. An increase of 10 dBA is perceived as a doubling of the sound. Table 5.11-1 provides criteria that has been used to estimate an individual's perception to increases in sound. Table 5.11-2 presents sound levels for some common noise sources and the human response to those decibel levels.

Table 5.11.1. Average Human Ability to Perceive Changes in Sound Levels

Increase in Sound Level (dBA)	Human Perception of Sound
2–3	Barely perceptible
5	Readily noticeable
10	Doubling of the sound
20	Dramatic change

Source: SWCA (2022)

NOISE ASSESSMENT COMPONENTS

A noise assessment is based on the following components: a sound-generating source, a medium through which the source transmits sounds, the pathways taken by these sounds, and an evaluation of the proximity to noise receptors. Soundscapes are affected by the following factors:

- **Source**. The sources of sound are any generators of small back-and-forth motions (i.e., motions that transfer their motional energy to the transmission path where it is propagated). The acoustic characteristics of the sources are very important. Sources must generate sound of sufficient strength, approximate pitch, and duration so that the sound may be perceived and can cause adverse effects, compared with the natural ambient sounds.
- **"Transmission path" or medium.** The "transmission path" or medium for sound or noise is most often the atmosphere (i.e., air). For the noise to be transmitted, the transmission path must support the free propagation of the small vibratory motions that make up the sound. Atmospheric conditions (e.g., wind speed and direction, temperature, humidity, precipitation) influence the attenuation of sound. Barriers and/or discontinuities (e.g., existing structures, topography, foliage, ground cover, etc.) that attenuate the flow of sound may compromise the path. For example, sound will travel very well across reflective surfaces such as water and pavement but can attenuate across rough surfaces (e.g., grass, loose soil).
- **Proximity to receptors.** A receptor is usually defined as a location where a state of quietness is a basis for use or where excessive noise interferes with the normal use of the location. Typical receptors include residential areas, monuments, schools, hospitals, churches, and libraries.

Table 5.11.2. Sound Levels of Representative Sounds and Noises

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 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 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: California Department of Transportation (2022)

5.11.1.2 Ground-borne Vibration Fundamentals

Ground-borne vibration is a small, rapidly fluctuating motion transmitted through the ground. When seismic waves can be felt, they are called “ground vibrations.” The ground vibration from surface waves is measured as the velocity of motion, or how many inches per second (in/sec) the ground is moving. The motion of the ground particles (vibration) happens in three dimensions: radial, transverse, and vertical. During vibration, each particle has a velocity, and the maximum velocity is referred to as the peak particle velocity (PPV). The resulting vector of all three components (i.e., radial, transverse, and vertical) combined is referred to as peak vector sum (PVS).

GROUND VIBRATION TERMS

Ground vibration is described using the following terms:

- Acceleration is the rate at which particle velocity changes.
- Crest factor is the ratio of peak particle velocity to maximum root mean square amplitude in an oscillating signal.

- Displacement is the farthest distance that the ground moves before returning to its original position.
- Frequency is the number of oscillations per second that a particle makes when under the influence of seismic waves.
- Hertz (Hz) is the unit of acoustic or vibration frequency representing cycles per second.
- Peak particle velocity (PPV) is the greatest particle velocity associated with an event.
- Peak vector sum (PVS) is the square root of the sum of the squares of the individual PPV values in all three vector directions.
- Particle velocity is the velocity at which the ground moves.
- Propagation velocity is the speed at which a seismic wave travels away from the blast.
- Root Mean Square (RMS) is the square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time.
- Vibration Velocity Level (LV) is 10 times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity.

GROUND VIBRATION AND STRUCTURE DAMAGE

Ground vibrations can produce permanent changes in the relative positions of "particles" that make up structures, resulting in "damage". The larger the vibration (i.e., the higher the ground movement speed), the greater is the potential for these permanent shifts in particle positions in structures. While structural damage associated with ground vibration can occur, noticeable vibration damage is often seen as cracks in drywall or plaster and exterior surfaces such as grout and stucco. This may, or may not, be a sign of structural damage. Since such cosmetic damage can also be caused by settling, temperature changes, and normal aging; overall, a few hairline cracks found in a house does not necessarily indicate a vibrational cause.

GROUND VIBRATION AND HUMAN PERCEPTION

In addition to concerns about structural damage, under specific conditions, humans can be startled or annoyed by ground vibration. Human response to vibration is difficult to evaluate due to differences in individual perception. Humans may detect lower levels of ground vibration than those levels that could adversely impact structures. The human body can distinctively perceive ground vibration as low as 0.1 in/sec, with some people being able to perceive even lower levels.

Table 5.11-3 indicates the average human response to vibration that may be anticipated when the person is at rest, situated in a quiet surrounding.

Table 5.11.3. Human Response to Ground Vibration

Average Human Response	PPV (in/sec)
Barely to distinctly perceptible	0.020–0.10
Distinctly to strongly perceptible	0.10–0.50
Strongly perceptible to mildly unpleasant	0.50–1.00

Average Human Response	PPV (in/sec)
Mildly to distinctly unpleasant	1.00–2.00
Distinctly unpleasant to intolerable	2.00–10.00

Source: California Department of Transportation (2020)

Section 12.08.350 of the Los Angeles County Noise Control Ordinance defines "vibration" as the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observations of moving objects, and assumes a human perception threshold of 0.01 in/sec over the range of 1 to 100 hertz.

VIBRATION ASSESSMENT COMPONENTS

Vibration energy extends out as it travels through the ground, causing the vibration level to reduce with respect to the distance from the source. High-frequency vibration decreases much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. Geological factors that may influence the propagation of ground-borne vibration include the following:

- **Soil conditions.** The type of soil has a strong influence on the propagation of ground-borne vibration. Hard, dense, and compacted soil, stiff clay soil, and hard rock transfer vibration more efficiently than loose, soft soils, sand, or gravel.
- **Depth to bedrock.** Shallow depth to bedrock provides more efficient propagation of ground-borne vibration. Shallow bedrock concentrates the vibration energy near the surface, reflecting vibration waves back toward the surface that would otherwise continue to propagate farther down into the earth.
- **Soil strata.** Discontinuities in the soil layering can produce diffractions or channeling effects that impact the propagation of vibration over long distances.
- **Frost conditions.** Seismic waves typically propagate more efficiently in frozen soils than in unfrozen soils.
- **Water conditions.** The amount of moisture in the soil has an impact on vibration propagation. The depth of the water table in the path of the propagation also has substantial effects on ground-borne vibration levels.

Specific conditions at the source and receptor locations can also affect the vibration levels. For instance, how the source is connected to the ground (e.g., direct contact or via a structure) or when the source is underground versus on the surface will impact the amount of energy transmitted into the ground. At the receptor, vibration levels can be affected by variables such as the building construction and the foundation type.

5.11.1.3 Existing Land Use and Site Conditions

The project site is in an urbanized area surrounded by a variety of commercial uses, museums, and residential buildings. The project site is bounded by the Park La Brea Pool and multi-family residential uses to the north across West 6th Street; commercial and residential uses to the east across South Curson Avenue; the Craft Contemporary Museum and other museum and commercial uses to the south across Wilshire Boulevard; and museum and commercial uses to the west. The predominant noise sources in the vicinity of the project site include noise from vehicular traffic, commercial activities, park visitors,

landscaping equipment, parking lot activities, and construction noise from projects that are being developed in the area.

The nearest noise-sensitive land uses to the project site include four off-site residential receptors, ranging between 50 to 150 feet from the project site. As part of the noise monitoring conducted for the project, these off-site residential receptors (referenced hereafter as monitoring locations ST2, ST3, ST5, and ST6) were selected to represent noise-sensitive uses in the project site. Four commercial receptors (referenced hereafter as monitoring locations ST7, ST8, ST9, and ST10) were also selected to evaluate potential noise and vibration impacts adjacent to the project site. Additionally, two long-term noise monitoring locations were selected to provide the existing ambient noise levels at the project's site. The long-term noise monitors (LT-1 and LT-2) were placed at the southeast and northwest corners of the proposed project site (Figure 5.11-1). Table 5.11-4 provides a description of noise monitoring locations. The results of noise monitoring are shown in Table 5.11-5 (see Appendix I for a detailed description of monitoring efforts).

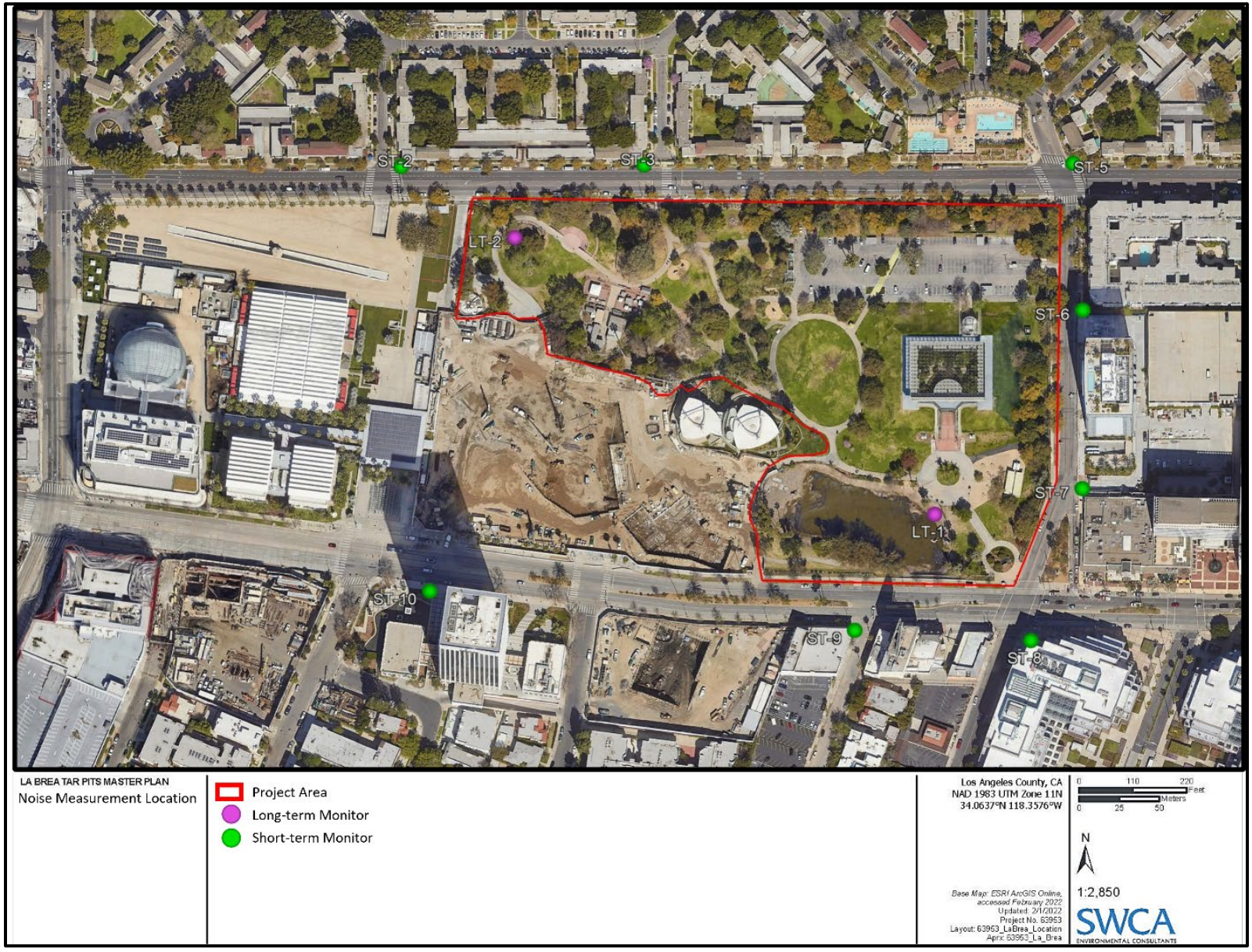


Figure 5.11-1. Noise measurement locations.

Table 5.11.4. Noise Monitoring Locations

Monitoring Location	Description	Approximate Distance from Measuring Location to Nearest Project Site Boundary*	Nearest Noise Land Use(s)
LT1	Northeast corner of the Lake Pit.	–	–
LT2	Northeast corner of Pit 13.	–	–
ST2	Multi-family residence on the north side of West 6th Street, northwest of the project site.	160 feet	Multi-Family Residential
ST3	Multi-family residence on the north side of West 6th Street, northwest of the project site.	72 feet	Multi-Family Residential
ST5	Multi-family residence on the north side of West 6th Street, northeast of the project site.	90 feet	Multi-Family Residential
ST6	Multi-family residence on the east side of Curson Avenue, east of the project site.	59 feet	Multi-Family Residential
ST7	Mixed-use commercial building on the east side of Curson Avenue, east of the project site.	61 feet	Commercial
ST8	Office building on the south side of Wilshire Boulevard, southeast of the project site.	124 feet	Commercial
ST9	Commercial building on the south side of Wilshire Boulevard, south of the project site.	114 feet	Commercial
ST10	Commercial building on the south side of Wilshire Boulevard, southwest of the project site.	669 feet	Commercial

Source: SWCA (2022)

Table 5.11.5. Measured Existing Ambient Noise Levels

	Measured Noise Levels (dBA)				Estimated Noise Levels (dBA)	
Monitoring Location	Daytime Hours (7:00 a.m.–7:00 p.m.)	Evening Hours (7:00 p.m.–10:00 p.m.)	Nighttime Hours (10:00 p.m.–7:00 a.m.)	L_{90} (24-hour)	L_{dn}* (24-hour)	CNEL* (24-hour)
LT1	58.9	54.2	53.0	46.6	60.6	60.9
LT2	56.6	54.2	51.7	46.0	59.1	59.5
ST2	67.5	–	–	52.1	66.7	68.1
ST3	65.5	–	–	51.8	65.3	66.4
ST5	74.9	–	–	56.1	73.1	75.1
ST6	62.8	–	–	51.5	63.8	64.4
ST7	64.8	–	–	54.6	64.9	65.9
ST8	69.8	–	–	57.1	68.5	70.2
ST9	74.6	–	–	63.7	72.8	74.8
ST10	67.1	–	–	54.7	66.4	67.8

Source: SWCA (2022)

Note: L_{90} is the sound level exceeded 90% of the time of the measurement period. Ldn is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10:00 p.m. to 7:00 a.m.).

* Estimated from measured daytime noise levels and estimated nighttime levels based on the presented nighttime hours in the Presumed Ambient Noise Levels, City of Los Angeles Municipal Code, Section 111.03.

As shown in Table 5.11-5, the existing daytime noise levels in project vicinity range between 62.8 and 74.9 dBA L_{eq}. The two long-term noise measurements (LT1 and LT2) indicate that the average hourly noise levels during daytime hours ranged between 56.6 and 58.9 dBA L_{eq} and between 59.5 and 60.9 dBA CNEL at the project site.

5.11.1.4 Existing Traffic Noise

In addition to the noise measurements, the existing traffic noise on local roadways in the surrounding area was calculated to quantify the 24-hour CNEL noise levels in the project site. Thirteen roadway segments were selected to represent the existing noise conditions for the analysis. Traffic noise levels were calculated using a proprietary noise model (i.e., SoundPlan Essential v5.1) based on the Federal Highway Administration (FHWA) Traffic Noise Model Version 2.5 (FHWA 2004). The inputs used in the traffic noise modeling included hourly traffic volumes, assumed traffic mix and daily distribution (the percentage of automobiles versus medium trucks and heavy trucks during each hour of the day), and traffic speeds based on the posted speed limits (see Appendix I for a detailed description of modeling efforts).

Table 5.11-6 presents the estimated traffic noise levels for the analyzed roadway segments based on existing traffic volumes for both a weekday and weekend. The estimated existing CNEL due to roadway traffic ranges from 62.6 dBA to 71.7 dBA for weekdays, and between 60.8 dBA and 69.8 dBA during weekends (see Table 5.11-6).

Table 5.11.6. Existing Roadway Traffic Noise Levels

Roadway Segment		Adjacent Land Use	Calculated Traffic Noise Levels, CNEL*		Noise-Sensitive Land Uses?	Existing Noise Exposure Compatibility Category†
			Weekday (dBA)	Weekend (dBA)		
6th Street	Between Fairfax Avenue and Ogden Drive	Residential	71.3	69.8	Yes	Normally unacceptable
	Between Ogden Drive and Curson Avenue	Residential	71.7	67.7	Yes	Normally unacceptable
	East of Curson Avenue	Residential	71.0	67.7	Yes	Normally unacceptable
Ogden Drive	North of 6th Street	Residential	62.6	60.8	Yes	Conditionally acceptable
	South of Wilshire Boulevard	Commercial	62.9	60.8	No	Normally acceptable
Spaulding Avenue	South of Wilshire Boulevard	Commercial	64.9	63.2	No	Normally acceptable
Curson Avenue	North of 6th Street	Residential	67.3	64.8	Yes	Conditionally acceptable
	Between 6th Street and Wilshire Boulevard	Residential	68.1	67.6	Yes	Conditionally acceptable
	South of Wilshire Boulevard	Residential	71.0	69.1	Yes	Normally unacceptable

Roadway Segment		Adjacent Land Use	Calculated Traffic Noise Levels, CNEL*		Noise-Sensitive Land Uses?	Existing Noise Exposure Compatibility Category†
			Weekday (dBA)	Weekend (dBA)		
Wilshire Boulevard	Between Fairfax Avenue and Ogden Drive	Museum	68.3	66	No	Normally acceptable
	Between Ogden Drive and Spaulding Avenue	Commercial	67.2	65.1	No	Normally acceptable
	Between Spaulding Avenue and Curson Avenue	Museum	69.4	67.0	No	Normally acceptable
	East of Curson Avenue	Commercial	67.8	65.8	No	Normally acceptable

* Detailed calculation worksheets are included in Appendix B of the Noise and Vibration Technical Report (see Appendix I).

† Noise compatibility is based on the most stringent land use and the higher of the calculated CNEL during weekday and weekend days. Normally Acceptable = Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable = New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable = New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

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

5.11.1.5 Existing Ground-Borne Vibration Conditions

The primary ground-borne vibration source at urban settings is vehicular traffic. It is unusual for vibration from traffic sources to be perceptible, as trucks and buses typically generate vibration velocity levels of approximately 63 vibration velocity decibels (VdB) at 50 feet (Federal Transit Administration [FTA] 2018). Normally, 75 VdB is defined as the dividing line between barely perceptible and distinctly perceptible (FTA 2018). Therefore, it is expected that the existing ground-borne vibration levels at the project vicinity would be below the perceptible level.

5.11.2 Regulatory Setting

5.11.2.1 Federal

There are no federal noise standards or regulations that directly regulate environmental noise related to the construction or operation of the proposed project.

As well, no standards or limits applicable to potential building damage from ground-borne vibration have been adopted by a federal agency. However, the FTA has guidelines available to assess potential impacts on buildings and structures due to ground-borne vibration. The FTA's *Transit Noise and Vibration Impacts Assessment Manual* provides impact criteria concerning building damage during construction activities (FTA 2018). Table 5.11-7 includes the FTA vibration criteria for construction activities.

Table 5.11.7. Construction Vibration Impact Criteria for Building Damage

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

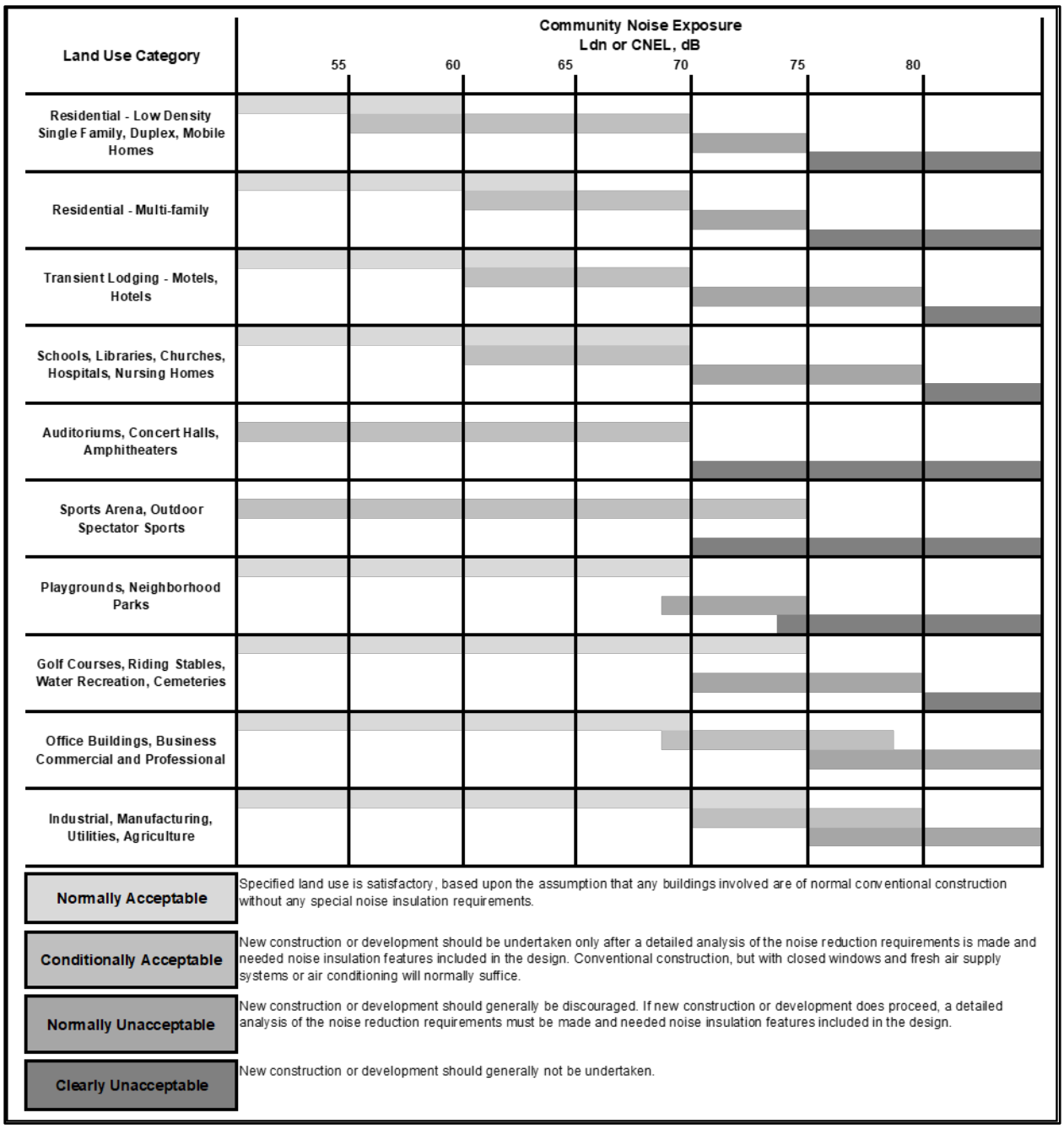
Source: FTA (2018)
PPV = peak particle velocity; in/sec = inch(es) per second

5.11.2.2 State

The State of California has not adopted statewide regulations or standards for noise. However, the *State of California General Plan Guidelines*, published and updated by the Governor's Office of Planning and Research (OPR), provides standards and the acceptable noise categories for different land uses (OPR 2017). Figure 5.11-2 provides the exterior noise standards associated with the different land uses evaluated by the State.

California also requires each local government entity to perform noise studies and implement a noise element as part of its general plan. The purpose of the noise element is to limit the exposure of the community to excessive noise levels; the noise element must be used to guide decisions concerning land use.

There are no state ground-borne vibration standards that directly apply to the project.



Source: OPR (2017)

Figure 5.11-2. Land use compatibility for exterior community noise exposure.

5.11.2.3 County of Los Angeles

COUNTY OF LOS ANGELES NOISE CONTROL ORDINANCE

The County of Los Angeles Noise Control Ordinance (Section 12.08 of the Los Angeles County Code [County Code]) identifies noise standards for exterior noise sources (Table 5.11-8). Regarding maximum exterior noise levels, County Code Section 12.08.390 states that exterior operational noise levels caused

by fixed noise sources shall not exceed the levels listed in Table 5.11-8, or the existing ambient noise level, whichever is greater (measured in dB).

Table 5.11.8. County of Los Angeles Exterior Operational Noise Standards

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
		7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime)	55
		7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

Source: Los Angeles County Code 12.08.390 - Exterior noise standards.

Section 12.08.390 of the County Code also states that no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

> **Standard No. 1** shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level; or, if the ambient noise level exceeded for 50% of the time of the measurement duration (L_{50}) exceeds the foregoing level, then the ambient L_{50} becomes the exterior noise level for Standard No. 1.
>
> **Standard No. 2** shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level plus 5 dB; or, if the ambient noise level exceeded for 25% of the time of the measurement duration (L_{25}) exceeds the foregoing level, then the ambient L_{25} becomes the exterior noise level for Standard No. 2.
>
> **Standard No. 3** shall be the exterior noise level which may not be exceeded for a cumulative period of more than 5 minutes in any hour. Standard No. 3 shall be the applicable noise level plus 20 dB; or, if the ambient noise level exceeded for 8.3% of the time of the measurement duration ($L_{8.3}$) exceeds the foregoing level, then the ambient $L_{8.3}$ becomes the exterior noise level for Standard No. 3.
>
> **Standard No. 4** shall be the exterior noise level which may not be exceeded for a cumulative period of more than 1 minute in any hour. Standard No. 4 shall be the applicable noise level plus 15 dB; or, if the ambient noise level exceeded for 1.7% of the time of the measurement duration ($L_{1.7}$) exceeds the foregoing level, then the ambient $L_{1.7}$ becomes the exterior noise level for Standard No. 4.
>
> **Standard No. 5** shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level plus 20 dB; or, if the highest ambient noise level that occurred at the site (L_0) exceeds the foregoing level, then the ambient L_0 becomes the exterior noise level for Standard No. 5.

The County Noise Control Ordinance also identifies specific restrictions regarding construction noise. Construction noise limits are included in Chapter 12.08.440, Noise Control, of the Los Angeles County Code of Ordinances. Pursuant to the County Noise Control Ordinance, the operation of equipment used in construction, repair, alteration, drilling, or demolition work is prohibited between the hours of 7:00 p.m. and 7:00 a.m., Monday through Friday; before 8:00 a.m. or after 6:00 p.m. on Saturday; and anytime on Sundays or legal holidays if such noise would create a noise disturbance across a residential or commercial real-property line. Table 5.11-9 identifies the maximum noise levels at the affected buildings allowed by the County Noise Control Ordinance.

Table 5.11.9. County of Los Angeles Construction Noise Limits

Time	Single-Family Residential	Multi-Family Residential	Semi-Residential/ Commercial
At Residential Structures			
Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:			
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m., and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA
Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:			
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA
At Business Structures			
Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment:			
Daily, including Sundays and legal holidays, all hours		85 dBA (All structures)	

Source: Los Angeles County Code 12.08.440 - Construction noise.
dBA = A-weighted decibel(s)

Section 12.08.560 of the County Noise Control Ordinance provides a ground-borne vibration limit as to not exceed the vibration human perception threshold of 0.01 in/sec (80 VdB).

5.11.2.4 City of Los Angeles

While the project site is located within the city of Los Angeles, it is owned by the County. Accordingly, the project is subject to the regulatory controls of the County of Los Angeles and not the City of Los Angeles (City). Nonetheless, the policy and regulatory documents of the City are provided herein. As described in Section 5.11.4, because the areas surrounding the project site are within the jurisdiction of the City of Los Angeles, the noise analysis considers both City and County criteria and regulations, with the more restrictive provisions applied regardless of whether the provisions are requirements or only considered advisory given they are not explicitly required of the project by regulation or ordinance.

NOISE ELEMENT OF THE CITY OF LOS ANGELES GENERAL PLAN

The *Noise Element of the City of Los Angeles General Plan* (City of Los Angeles 1999) addresses noise sources and noise mitigation strategies and regulations and provides objectives and policies that ensure

that noise from various sources does not create an unacceptable noise environment. The goal, objectives, and policies of the Noise Element that are relevant to the project are provided below for informational purposes and are used to inform the criteria by which the noise impacts of the proposed La Brea Tar Pits Master Plan are considered.

Goal – A city where noise does not reduce the quality of urban life.

Objectives and Policies –

> ***Objective 2 (Non-airport) -*** Reduce or eliminate non-airport-related intrusive noise, especially relative to noise-sensitive uses.
>
> > ***Policy 2.2.*** Enforce and/or implement applicable city, state, and federal regulations intended to mitigate proposed noise-producing activities, reduce intrusive noise, and alleviate noise that is deemed a public nuisance.
>
> ***Objective 3 (Land Use Development) -*** Reduce or eliminate noise impacts associated with proposed development of land and changes in land use.
>
> > ***Policy 3.1.*** Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

The City's noise compatibility guidelines are based on the State's *General Plan Guidelines* (OPR 2017).

CITY OF LOS ANGELES MUNICIPAL CODE

Section 41.40(a) of the Los Angeles Municipal Code (LAMC) prohibits the use, operation, repair, or servicing of construction equipment, as well as job-site delivery of construction materials, between the hours of 9:00 p.m. and 7:00 a.m., where such activities would disturb "persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence." In addition, Section 41.40(c) prohibits construction, grading, and related job-site deliveries on or within 500 feet of land developed with residential structures before 8:00 a.m. or after 6:00 p.m. on any Saturday or national holiday or at any time on Sunday.

Section 112.05 of the LAMC places a noise level limit of 75 dBA at 50 feet for powered equipment or tools, which includes construction equipment in, or within 500 feet of, any residential zone between the hours of 7:00 a.m. and 10:00 p.m. Under the code, such limits shall not apply where compliance is technically infeasible. Technical infeasibility means that the noise limit cannot be achieved despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques during operation of the equipment.

Chapter XI of the LAMC (Noise Regulation) regulates noise from non-transportation noise sources such as commercial or industrial operations, mechanical equipment, or residential activities. These regulations do not apply to vehicles operating on public rights-of-way but do apply to noise generated by vehicles on private property, such as in parking lots or parking structures. The allowable noise levels are determined relative to the existing ambient noise levels at the affected location. Section 111.01(a) of the LAMC defines ambient noise as "the composite of noise from all sources near and far in a given environment, exclusive of occasional and transient intrusive noise sources and the particular noise source or sources to be measured. Ambient noise shall be averaged over a period of at least 15 minutes."

The Noise Regulation indicates that in cases where the actual ambient conditions are not measured, the City's presumed daytime and nighttime ambient noise levels, as defined in the LAMC Section 111.03, should be used (Table 5.11-10).

Table 5.11.10. City of Los Angeles Presumed Ambient Noise Levels

	Daytime (7:00 a.m. to 10:00 p.m.), L_{eq}	Nighttime (10:00 p.m. to 7:00 a.m.), L_{eq}
Zone	dBA	dBA
Residential, school, hospitals, hotels	50	40
Commercial	60	55
Manufacturing (M1, MR1, MR2)	60	55
Heavy manufacturing (M2, M3)	65	65

Source: City of Los Angeles Municipal Code, Section 111.03

L_{eq} = equivalent noise level

Section 111.02 states that under conditions where noise alleged to be offending occurs for more than 5 minutes but less than 15 minutes in any 1-hour period between the hours of 7:00 a.m. and 10:00 p.m. of any day, a 5-dBA allowance should be provided to the noise source. Additionally, under conditions where the offending noise occurs for 5 minutes or less in any 1-hour period between the hours of 7:00 a.m. and 10:00 p.m. of any day, an additional 5-dBA allowance can be provided to the noise source. Section 114.02 of the LAMC also provides noise regulations with respect to vehicle-related noise and prohibits the operation of any motor-driven vehicles upon any property within the city in a manner that would exceed the ambient noise level by more than 5 dBA.

CITY OF LOS ANGELES CEQA THRESHOLDS GUIDE

The *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles* (City of L.A. Thresholds Guide; City of Los Angeles 2006) is a guidance document that draws together practical information useful to City staff, project proponents, and the public involved in the environmental review of projects in the city of Los Angeles subject to CEQA.

The City of L.A. Thresholds Guide defines "noise sensitive" as residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks. The City of L.A. Thresholds Guide includes a set of criteria to evaluate project impacts. The significance thresholds assist in determining whether a project's impacts would be presumed significant under normal circumstances and, therefore, require mitigation to be identified.

A project under CEQA would normally have a significance impact on noise levels from construction if:

- Construction activities lasting more than 1 day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise-sensitive use;
- Construction activities lasting more than 10 days in a 3-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise-sensitive use; or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise-sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday.

A project would normally have a significant impact on noise levels from project operations if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA CNEL to or within the "normally unacceptable" or "clearly unacceptable" category, or any 5-dBA or greater noise increase (see Figure 5.11-2).

5.11.3 Thresholds of Significance

The following thresholds of significance are based on the Environmental Checklist contained in Appendix G of the State CEQA Guidelines. A project would result in significant adverse impacts related to noise if it would:

- Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Result in generation of excessive groundborne vibration or groundborne noise levels.
- Be located within the vicinity of a private airstrip or within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and if so, the project would expose people residing or working in the project area to excessive noise levels.

5.11.4 Impact Assessment Methodology

The following impact analysis is based, in part, on the *Noise and Ground Vibration Technical Report for the La Brea Tar Pits Master Plan* (SWCA 2022; see Appendix I).

While the project site is located within the city of Los Angeles, it is owned by the County of Los Angeles. Accordingly, the project is not subject to the regulatory controls of the City of Los Angeles; however, the areas surrounding the project site are within the City's jurisdiction. As such, the following analysis considers both City and County criteria and regulations, with the more restrictive provisions applied.

The following analysis evaluates the potential change in the existing noise levels at the project site and surrounding area due to an increase in noise and ground-borne vibration during both construction and operation of the project. The evaluation of potential impacts is based on the following criteria.

SHORT-TERM CONSTRUCTION NOISE CRITERIA

The County Noise Control Ordinance (Section 12.08.440 of the County Code) identifies noise standards for construction activities. The County's construction noise limit is 65 dBA for multi-family residential uses and 85 dBA for business structures. Similarly, the LAMC limit for construction noise lasting more than 10 days is 5 dBA above ambient levels. The following significance criteria are applied to the project, as set forth in the LAMC, the City of L.A. Thresholds Guide, and the County of Los Angeles Ordinance, with the more restrictive provisions applied:

- Construction activities would exceed the ambient noise level by 5 dBA (L_{eq}) or more at a noise-sensitive use.

SHORT-TERM CONSTRUCTION VIBRATION CRITERIA

Because there are currently no local regulatory standards for ground-borne vibration that are applicable to the project, then, based on FTA impacts with respect to building damage (see Table 5.11-7), ground-borne vibration would be considered significant if

- Ground-borne vibration levels from construction activities exceed 0.5 PPV at the nearest off-site reinforced-concrete, steel, or timber building; or
- Ground-borne vibration levels from construction activities exceed 0.3 PPV at the nearest off-site engineered concrete building; or
- Ground-borne vibration levels from construction activities exceed 0.2 PPV at the nearest off-site non-engineered timber and masonry building; or
- Ground-borne vibration levels from construction activities exceed 0.12 PPV at buildings extremely susceptible to vibration damage (e.g., historic buildings).

With respect to human annoyance, Section 12.08.560 of the Los Angeles County Noise Control Ordinance presents a threshold of 0.01 in/sec (80 VdB). Therefore, construction vibration impacts associated with human perception would be significant if:

- Ground-borne vibration levels from construction activities exceed 80 VdB at the off-site receptor.

LONG-TERM OPERATIONAL NOISE CRITERIA

Per Chapter XI of the LAMC, a noise level increase of 5 dBA over the ambient noise level at an adjacent property line is considered a noise violation for most operational noise sources. The Los Angeles County Noise Control Ordinance states that the exterior operational noise level caused by project-related on-site fixed sources shall not exceed the levels presented in Table 5.11-8 or the ambient noise level, whichever is greater. Therefore, project-related operational on-site (i.e., non-roadway) noise sources, such as outdoor building mechanical/electrical equipment, outdoor activities, or parking facilities, would be significant if

- Operational on-site activities would exceed the ambient noise level by 5 dBA (L_{eq}) or more at a noise-sensitive use.

TRAFFIC NOISE CRITERIA

Relating to roadway noise, a 24-hour average noise level metric (i.e., dBA CNEL) was used to assess noise impacts associated with the project based on the City's land use/noise compatibility guidelines and the City of L.A. Thresholds Guide (City of Los Angeles 2006). An increase of 3 dBA CNEL at noise-sensitive uses with ambient noise levels within the "normally unacceptable" or "clearly unacceptable" category (see Figure 5.11-2), or any 5-dBA or greater noise increase if the ambient noise level at the affected sensitive land use is within the "normally acceptable" or "conditionally acceptable" category, would be considered significant.

5.11.5 Environmental Impact Analysis

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?

CONSTRUCTION NOISE

Worker vehicles and haul trucks transporting equipment and materials to and from the project site during construction would increase noise levels on the local roads in the project site. It is expected that construction trucks would typically access the project site from the nearby Interstate (I-) 10, taking the La Brea Avenue exit from the westbound I-10. Trucks would travel northbound to Wilshire Boulevard, continue westbound on Wilshire Boulevard, then northbound on Curson Avenue to the project site. The construction worker vehicles would not be restricted to travel exclusively on this haul route and instead are allowed to access the project site via other routes. However, to perform a conservative traffic noise analysis, all traffic for the project (i.e., worker and truck trips) is assumed to travel on this haul route.

The grading phase would be the peak period of construction with the highest number of construction trucks. There would be a maximum of 127 construction trucks (e.g., vendor, hauling), totaling 254 trips per day. The hourly truck trips were estimated based on 8-hour workdays and assuming a uniform distribution of trips. The hourly worker trips were estimated, assuming half of the workers would arrive in 1 hour, resulting in 38 worker trips per hour. The estimated roadway noise levels resulting from the addition of the project's construction-related traffic on these roadway segments are shown in Table 5.11-11. As shown in Table 5.11-11, the estimated noise levels generated by off-site construction traffic would be below the existing daytime ambient noise level at the noise-sensitive receptors along the haul routes.

Table 5.11.11. Off-site Construction Traffic Noise Levels

Construction Phase	Estimated Off-Site Construction Noise Levels along the Project Haul Routes, L_{eq} (Wilshire Boulevard / La Brea Avenue / Curson Avenue) dBA
Demolition	57.1
Site preparation	51.4
Grading	64.5
Building construction	59.6
Paving	52.8
Architectural coating	55.9
Existing ambient noise levels along the project haul routes, L_{eq}*	72.4 / 73.3 / 68.6
Significance threshold, L_{eq}†	68.6

Source: SWCA (2022)
* La Brea Avenue noise levels were taken from County of Los Angeles (2017:Table IV.I-14).
† Significance thresholds are equivalent to the existing daytime noise levels.

During project construction, noise from construction activities may intermittently dominate the noise environment in the immediate project site. Table 5.11-12 shows the noise levels from standard construction equipment at 50 feet from the source.

Table 5.11.12. Noise Levels for Common Construction Equipment

Equipment Description	Typical Maximum Noise Levels at 50 Feet (dBA)
Auger drill rig	85
Backhoe	80
Chain saw	85
Compressor (air)	80
Concrete saw	90
Crane	85
Dozer	85
Drill rig truck	84
Drum mixer	80
Dump truck	84
Excavator	85
Flat-bed truck	84
Front-end loader	80
Generator	82
Grader	85
Impact pile driver	95
Jackhammer	85
Man lift	85
Paver	85
Pickup truck	55
Pneumatic tools	85
Pumps	77
Rock drill	85
Roller	85
Scraper	85
Tractor	84
Trencher	82
Vibratory concrete mixer	80
Vibratory pile driver	95
Welder/torch	73

Source: FHWA (2011)

Construction activities associated with the project were assessed to last approximately 4 years, with completion anticipated in 2027. This is the most conservative analysis from a noise perspective given the most equipment would be on the site at one time if the project was implemented during one phase. During this time, noise from equipment use and activities on-site would vary throughout the project site, depending on various stages of construction. The predicted noise from construction activity is presented as a worst-case (highest noise level) scenario, where it is assumed that all equipment is present and operating simultaneously on-site for each stage of construction. Table 5.11-13 shows the highest construction noise levels at each of the analyzed monitoring locations. As shown in Table 5.11-13, the

estimated construction noise levels at off-site receptors ST2, ST5, ST8, ST9, and ST10 would be below the significance threshold. However, the estimated noise levels at receptors ST3, ST6, and ST7 would exceed the significance threshold by 2.7 dBA at ST3, 4.6 at ST6, and 3.9 dBA at ST7. As a result, noise impacts resulting from project construction could be *significant*.

Table 5.11.13. Estimated Construction Noise Levels at Nearby Sensitive Receptors

	Measured Daytime Ambient Noise Levels, L_{eq}	Estimated Construction Noise Levels by Construction Phases (Ambient plus Construction), L_{eq}						Significance Threshold, L_{eq}*
		Demolition	Site Preparation	Grading	Building Const.	Paving	Arch. Coating	
Receptor	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**
ST2	67.5	68.8	69.2	70.5	67.8	67.5	67.6	72.5
ST3	65.5	67.2	**70.8**	**73.2**	66.6	65.7	65.8	70.5
ST5	74.9	75.2	75.4	75.8	75.0	75.0	74.9	79.9
ST6	62.8	**68.8**	**70.0**	**72.4**	65.9	64	63.4	67.8
ST7	64.8	68.3	**71.2**	**73.7**	65.9	65.1	65	69.8
ST8	69.8	70.9	71.4	72.5	70.0	69.8	69.8	74.8
ST9	74.6	75.1	75.4	76.0	74.7	74.6	74.6	79.6
ST10	67.1	67.7	67.6	68.0	67.3	67.1	67.1	72.1

Source: SWCA (2022)

Note: Values in **bold** exceed the significance threshold for that receptor.

* Threshold is equivalent to the measured daytime ambient noise levels plus 5 dBA.

NOI Impact 1

During project construction, the project could generate a substantial increase (5 dBA Leq) in ambient noise levels in the vicinity of the project, which could affect noise-sensitive land uses. As a result, the project could result in generation of a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of established standards. Therefore, noise impacts resulting from project construction could be significant.

(CEQA Checklist Appendix G Threshold XIII. a)

Mitigation Measures

NOI/mm-1.1 The following measures shall be implemented to reduce construction-related noise impacts:

a) *Operation of equipment used in construction, alteration, drilling, or demolition work shall be prohibited between the hours of 7:00 p.m. and 7:00 a.m., Monday through Friday; before 8:00 a.m. or after 6:00 p.m. on Saturday; and any time on Sundays or legal holidays.*

b) *A temporary and impermeable 12-foot-high temporary barrier designed to provide a 10-dBA noise reduction, shall be erected along the eastern and northern sides of the project site boundary. This barrier shall be constructed in one of the following ways:*

- *from acoustical blankets hung over or from a supporting frame, or*
- *from commercially available acoustical panels lined with sound-absorbing material, or*
- *from common construction materials such as plywood, provided that the barrier is designed with overlapping material at the seams to ensure that no gaps exist between the panels.*

NOI Impact 1
c) *Noise levels from powered equipment or powered hand tools at a distance of 50 feet from the noise source or within 500 feet of a residential zone will be limited to 75 dBA, such limits shall not apply where compliance is technically infeasible. Technical infeasibility means that the noise limit cannot be achieved despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques during operation of the equipment.* d) *All construction equipment shall be properly maintained per manufacturers' specifications and fitted with the best available noise-suppression devices.* e) *Pneumatic tools used at the site shall be equipped with an exhaust muffler on the compressed air exhaust to minimize noise levels.* f) *Stationary noise sources shall be located as far from adjacent sensitive receptors as possible and shall be muffled and enclosed within temporary sheds or insulated barriers when possible.* g) *Prior to commencement of construction, a designated project contact person will directly notify the management of any surrounding residential properties located within 100 feet of the project site about the construction schedule and activities and provide a contact number to address any noise-related complaints during construction.* h) *A designated point of contact shall be identified to address noise-related complaints during construction. The noise disturbance coordinator will be responsible for responding to any local complaints about construction noise.*
Impacts Following Mitigation
With implementation of NOI/mm-1.1, construction impacts would be less than significant as demonstrated by the analysis conducted to calculate the effectiveness of the mitigation measures, shown in Table 5.11-14.

Table 5.11-14 shows the highest construction noise levels at each of the analyzed monitoring locations after implementation of Mitigation Measure NOI/mm-1.1. As shown in Table 5.11-14, implementation of the recommended mitigation measures would reduce construction-related noise to less than the significance threshold at the off-site sensitive uses.

Table 5.11.14. Estimated Construction Noise Levels at Nearby Sensitive Receptors after Mitigation

	Measured Daytime Ambient Noise Levels, L_{eq}	Estimated Construction Noise Levels by Construction Phases (Ambient plus Construction), L_{eq} †						Significance Threshold, L_{eq}*
		Demolition	Site Preparation	Grading	Building Const.	Paving	Arch. Coating	
Receptor	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**
ST2	67.5	67.6	67.7	67.9	67.5	67.5	67.5	72.5
ST3	65.5	65.7	66.4	67.2	65.6	65.5	65.5	70.5
ST5	74.9	74.9	75.0	75.0	74.9	74.9	74.9	79.9
ST6	62.8	63.9	64.3	65.4	63.2	62.9	62.9	67.8
ST7	64.8	65.7	66.1	67.0	64.9	64.8	64.8	69.8
ST8	69.8	70.9	71.4	72.5	70.0	69.9	69.8	74.8
ST9	74.6	75.1	75.4	76.0	74.7	74.6	74.6	79.6
ST10	67.1	67.7	67.6	68.0	67.3	67.1	67.1	72.1

Source: SWCA (2022)

* Threshold is equivalent to the measured daytime ambient noise levels plus 5 dBA.

† Assumes an estimated noise reduction of 10 dBA due to noise barrier/wall.

OPERATIONAL NOISE

Once operational, the project would establish stationary on-site noise sources at the project site as well as contribute to off-site roadway traffic noise. New stationary noise sources would include the parking facilities, mechanical equipment (i.e., dry coolers and emergency generators), loading and waste compacting activities, and activities associated with the use of outdoor spaces (e.g., outdoor café located on the center terrace on the west side of the George C. Page Museum [Page Museum]; and Pit 91 outdoor classroom), and roadway traffic noise sources.

On-Site Stationary Noise Sources

Mechanical Equipment

As part of the project, noise-generating mechanical equipment at the project site would include numerous heating, ventilation, and air-conditioning (HVAC) equipment located in mechanical rooms throughout the Page Museum building, the new museum building, and the support building, rooftop dry coolers, and emergency generators. All mechanical rooms within the project buildings would be outfitted with sound attenuation measures to reduce noise levels at neighboring properties. The mechanical equipment that may be audible at nearby sensitive receptors would be the dry coolers (located on the rooftops of the buildings) and three emergency generators (located on the ground floor of each building). Table 5.11-15 shows the estimated noise levels at the evaluated off-site receptors from the operation of the proposed mechanical noise sources. As shown in Table 5.11-15, the estimated noise levels from the operation of the mechanical equipment would fall below the significance threshold of existing daytime ambient noise levels plus 5 dBA.

Table 5.11.15. Estimated Noise Levels from Mechanical Equipment

Off-Site Receptor	Existing Daytime Ambient Noise Levels, L_{eq}	Estimated Noise Levels from Mechanical Equipment, L_{eq}	Ambient plus Project Noise Levels, L_{eq}	Significance Threshold*
	dBA	dBA	dBA	dBA
ST2	67.5	50.1	67.6	72.5
ST3	65.5	59.2	66.4	70.5
ST5	74.9	53.1	74.9	79.9
ST6	62.8	57.2	63.9	67.8
ST7	64.8	56.4	65.4	69.8
ST8	69.8	52.1	69.9	74.8
ST9	74.6	52.0	74.6	79.6
ST10	67.1	47.3	67.1	72.1

Source: SWCA (2022)

* Significance thresholds are assumed to be equal to the measured daytime noise levels plus 5 dBA.

Parking Noise

The existing parking lot would be expanded from 63,000 square feet to 65,000 square feet and shifted to the northeast corner of the site. The parking lot would hold approximately 170 vehicle parking spaces, an increase of approximately 15 spaces. Sources of noise within the parking lot would primarily include car movements, doors opening and closing, people talking, and car alarms. Table 5.11-16 shows the estimated noise levels from parking activities at the off-site sensitive receptors. As shown in Table 5.11-

16, the estimated noise levels at all off-site locations would be below the project significance threshold (i.e., an increase of 5 dBA Leq over existing ambient noise levels).

Table 5.11.16. Estimated Noise Levels from Parking Activities

Off-Site Receptor	Existing Daytime Ambient Noise Levels, L_{eq}	Estimated Noise Levels from Parking Activities, L_{eq}	Ambient plus Project Noise Levels, L_{eq}	Significance Threshold*
	dBA	dBA	dBA	dBA
ST2	67.5	29.0	67.5	72.5
ST3	65.5	37.1	65.5	70.5
ST5	74.9	42.2	74.9	79.9
ST6	62.8	43.8	62.9	67.8
ST7	64.8	33.4	64.8	69.8
ST8	69.8	26.2	69.8	74.8
ST9	74.6	28.2	74.6	79.6
ST10	67.1	24.5	67.1	72.1

Source: SWCA (2022)

* Significance thresholds are assumed to be equal to the measured daytime noise levels plus 5 dBA.

Loading and Trash Compactor Activities

Two loading and service areas would accommodate deliveries for laboratories, exhibition material, food service, events, and staff offices. One of the loading areas would be located at the new museum building on the north side, and the second loading area would be located at the Page Museum, also on the north side. The project would include one waste compactor at each of the proposed loading areas. Table 5.11-17 shows the estimated noise levels from loading and trash compactor activities at the off-site sensitive receptors. As shown in Table 5.11-17, the estimated noise levels from the operation of the loading docks and the trash compactors would fall below the significance threshold of ambient noise levels plus 5 dBA L_{eq}.

Table 5.11.17. Estimated Noise Levels from Loading and Trash Compactor Operations

Off-Site Receptor	Existing Daytime Ambient Noise Levels, L_{eq}	Estimated Noise Levels from Loading and Trash Compactor Operations, L_{eq}	Ambient plus Project Noise Levels, L_{eq}	Significance Threshold*
	dBA	dBA	dBA	dBA
ST2	67.5	48.8	67.6	72.5
ST3	65.5	54.4	65.8	70.5
ST5	74.9	57.2	75.0	79.9
ST6	62.8	59.2	64.4	67.8
ST7	64.8	55.1	65.2	69.8
ST8	69.8	51.9	69.9	74.8
ST9	74.6	52.3	74.6	79.6
ST10	67.1	48.1	67.2	72.1

Source: SWCA (2022)

* Significance thresholds are assumed to be equal to the measured daytime noise levels plus 5 dBA.

Outdoor Areas

Outdoor areas (e.g., outdoor café located on the center terrace on the west side of the Page Museum; and Pit 91 outdoor classroom) would consist primarily of people congregating and conversing in those areas. Pit 91 would continue to be a key research and interpretation destination in the park. The project would demolish the current viewing station overlooking Pit 91 and construct a shaded outdoor classroom with canopy (2,880 square feet). The second floor of the Page Museum would contain two classrooms and a multipurpose space. An outdoor café would be located next to these spaces on the center terrace on the west side of the Page Museum (8,234 square feet). It should be noted that an outdoor sound system is not currently used at the Tar Pits site and the project would not include implementation of a sound system. However, consistent with existing conditions, a tour guide microphone and sound pack could be used during classroom activities and/or tours of the second-floor multipurpose space as needed.

Table 5.11-18 shows the estimated noise levels resulting from the use of outdoor areas at the off-site sensitive receptors. As shown in Table 5.11-18, the estimated noise levels at all analyzed receptors would not exceed the significance threshold of ambient noise levels plus 5 dBA L_{eq}.

Table 5.11.18. Estimated Noise Levels from Outdoor Uses

Off-Site Receptor	Existing Daytime Ambient Noise Levels, L_{eq}	Estimated Noise Levels from Outdoor Uses, L_{eq}	Ambient plus Project Noise Levels, L_{eq}	Significance Threshold*
	dBA	dBA	dBA	dBA
ST2	67.5	42.7	67.5	72.5
ST3	65.5	46.9	65.6	70.5
ST5	74.9	47.9	74.9	79.9
ST6	62.8	51.8	63.1	67.8
ST7	64.8	50.7	65.0	69.8
ST8	69.8	46.4	69.8	74.8
ST9	74.6	46.7	74.6	79.6
ST10	67.1	42.0	67.1	72.1

Source: SWCA (2022)

* Significance thresholds are assumed to be equal to the measured daytime noise levels plus 5 dBA.

Off-Site Traffic Noise

The project would generate new vehicle trips that would incrementally add to the existing traffic levels on surrounding streets and could result in an increase in the associated traffic noise levels. Based on the transportation assessment prepared for the project (Appendix J), the project would generate an estimated 1,293 new trips during the weekdays and 1,679 net new trips during the weekend.[1]

Based on the traffic noise modeling conducted for the project, the project would result in a maximum CNEL increase of 0.3 dBA during a weekday, and an estimated increase of 0.4 dBA during the weekend, between 6th Street and Wilshire Boulevard in comparison to existing traffic conditions. Therefore, the estimated off-site traffic noise level increase would be below the 3-dBA CNEL significance threshold based on the City's land use/noise compatibility guidelines and the City of L.A. Thresholds Guide.

[1] All trips are one-way.

Further analysis was prepared to determine the potential noise impacts associated with the project operation compared to the future noise conditions. Based on the traffic noise modeling conducted for the project, the project would result in a maximum CNEL increase of 0.4 dBA during weekdays along the road segment between Fairfax Avenue and Ogden Drive, and an estimated increase of 0.4 dBA during the weekend between 6th Street and Wilshire Boulevard in comparison to projected future traffic conditions. Therefore, the estimated off-site traffic noise level increase would be below the City of L.A. Thresholds Guide.

Composite Noise Levels

In addition to considering the project's operational off-site and on-site noise generation, the composite noise levels (i.e., noise levels from all on-site and off-site noise sources combined) experienced by surrounding sensitive receptors due to the project's operational noise sources occurring concurrently with existing noise sources are also evaluated to assess the potential overall increase in ambient noise levels at the analyzed monitoring locations. These off-site monitoring locations would experience noise levels generated by the project's mechanical equipment, outdoor areas, parking facilities, off-site traffic, and loading operations in addition to ambient noise levels generated by surrounding land uses and roadways. The analysis of the composite operational noise levels in the project vicinity was evaluated using the CNEL noise metric and is conducted using the following assumptions for each noise source:

- **Mechanical Noise:** Noise levels generated by the noise-generating mechanical equipment at the project site would occur continuously between 6:00 a.m. and 10:00 p.m.
- **Parking Facility:** Noise levels that would be generated at the project parking lot by peak-hour vehicle trips are assumed to occur continuously throughout the hours of 6:00 a.m. to 10:00 p.m.
- **Outdoor Activities:** Noise levels that would be generated at the outdoor areas are assumed to occur continuously throughout the hours of 7:00 a.m. to 7:00 p.m.
- **Off-Site Traffic:** Noise levels generated by off-site traffic are assumed to occur continuously for 24 hours per day.
- **Loading Area/Waste Compactor:** Noise levels generated by the project's loading areas and the waste compactors are assumed to occur for 3 hours between 7:00 a.m. and 10:00 p.m.

Table 5.11-19 presents the estimated composite noise levels in terms of CNEL at the off-site receptors. As shown in Table 5.11-19, the project would have a maximum increase of 1.9 dBA CNEL (at receptor ST6) during project operation. Therefore, the composite noise levels due to the project operations would remain below the 3-dBA CNEL significance threshold set forth in the City of L.A. Thresholds Guide and the City's Noise Regulations for noise-sensitive uses within the "normally unacceptable" or "clearly unacceptable" category. Based on this analysis, the project would not generate operational noise above the thresholds used for this analysis. Therefore, impacts related to operational noise would be *less than significant*.

Table 5.11.19. Composite Operational Noise Impacts

Off-Site Monitoring Location	Estimated Noise Levels								
	Existing Ambient	Off-Site Traffic	Mechanical	Parking	Trash Compactor and Loading	Outdoor Activities	Project Composite	Ambient plus Project	Increase
	CNEL	CNEL	CNEL	CNEL	CNEL	CNEL	CNEL	CNEL	CNEL
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
ST2	68.1	52.9	51.3	30.2	46.0	39.7	55.8	68.3	0.2
ST3	66.4	43.9	60.4	38.3	51.6	43.9	61.1	67.5	1.1
ST5	75.1	50.8	54.3	43.4	54.4	44.9	58.5	75.2	0.1
ST6	64.4	54.1	58.4	45.0	56.4	48.8	61.7	66.3	1.9
ST7	65.9	54.7	57.6	34.6	52.3	47.7	60.4	67.0	1.1
ST8	70.2	54.7	53.3	27.4	49.1	43.4	57.8	70.4	0.2
ST9	74.8	53.9	53.2	29.4	49.5	43.7	57.5	74.9	0.1
ST10	67.8	52.3	48.5	25.7	45.3	39.0	54.5	68.0	0.2

NOI Impact 2
During project operation, the project would not generate a substantial increase in ambient noise in excess of applicable standards or thresholds; noise impacts during project operation would be less than significant. (CEQA Checklist Appendix G Threshold XIII. a)
Mitigation Measures
No mitigation is required.
Impacts Following Mitigation
Not applicable. Noise impacts related to project operation would be less than significant.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

CONSTRUCTION

The operation of heavy construction equipment at the project site would generate ground-borne vibration that could affect structures immediately adjacent to the project site or could also cause an annoyance to people at those locations. Based on the reference vibration levels for the different pieces of equipment and the distances from the primary project construction activities, construction vibration velocity levels were estimated at the different receptors. Table 5.11-20 shows the estimated PPVs at the off-site receptors and the estimated vibration impacts on buildings. Further, Table 5.11-21 shows the comparison between the estimated ground-vibration levels and the human annoyance threshold.

Table 5.11-20. Construction Vibration Impacts – Building Damage

Off-Site Receptor	Building Category	Estimated Vibration Velocity Levels at the Off-Site Receptors (PPV)						Significance Threshold, L_{eq}*
		Demolition	Site Preparation	Grading	Building Const.	Paving	Arch. Coating	
		in/sec	in/sec	in/sec	in/sec	in/sec	in/sec	in/sec
ST2	Non-engineered timber and masonry buildings	0.0051	0.0051	0.0051	0.0009	0.0016	0.0000	0.2
ST3	Non-engineered timber and masonry buildings	0.0021	0.0119	0.0119	0.0025	0.0038	0.0000	0.2
ST5	Non-engineered timber and masonry buildings	0.0029	0.0062	0.0062	0.0013	0.0095	0.0000	0.2
ST6	Engineered concrete and masonry buildings	0.0069	0.0107	0.0107	0.0025	0.0092	0.0000	0.3
ST7	Engineered concrete and masonry buildings	0.0070	0.0140	0.0140	0.0013	0.0043	0.0000	0.3
ST8	Engineered concrete and masonry buildings	0.0072	0.0072	0.0072	0.0006	0.0024	0.0000	0.3
ST9	Engineered concrete and masonry buildings	0.0088	0.0088	0.0088	0.0006	0.0025	0.0000	0.3
ST10	Engineered concrete and masonry buildings	0.0013	0.0013	0.0013	0.0006	0.0013	0.0000	0.3

Source: SWCA (2022)

* FTA construction vibration impact criteria for building damage (FTA 2018).

Table 5.11-21. Construction Vibration Impacts – Human Annoyance

Off-Site Receptor	Building Category	Estimated Vibration Velocity Levels at the Off-Site Receptors						Significance Threshold, L_{eq}*
		Demolition	Site Preparation	Grading	Building Const.	Paving	Arch. Coating	
		VdB	VdB	VdB	VdB	VdB	VdB	VdB
ST2	Non-engineered timber and masonry buildings	62	62	62	47	52	0	80
ST3	Non-engineered timber and masonry buildings	54	69	69	56	60	0	80
ST5	Non-engineered timber and masonry buildings	57	64	64	50	68	0	80
ST6	Engineered concrete and masonry buildings	65	69	69	56	67	0	80
ST7	Engineered concrete and masonry buildings	65	71	71	51	61	0	80

Off-Site Receptor	Building Category	Estimated Vibration Velocity Levels at the Off-Site Receptors						Significance Threshold, L_{eq}*
		Demolition	Site Preparation	Grading	Building Const.	Paving	Arch. Coating	
		VdB	VdB	VdB	VdB	VdB	VdB	VdB
ST8	Engineered concrete and masonry buildings	65	65	65	44	56	0	80
ST9	Engineered concrete and masonry buildings	67	67	67	44	56	0	80
ST10	Engineered concrete and masonry buildings	50	50	50	44	50	0	80

* FTA ground-borne vibration impact criteria for residences and buildings where people normally sleep for infrequent vibration events (FTA 2018).

As shown in Tables 5.11-20 and 5.11-21, vibration levels generated by the construction equipment at the project site during project construction would not exceed the vibration thresholds established for building damage or human annoyance at the surrounding structures. Therefore, construction impacts related to groundborne vibration would be *less than significant*.

OPERATION

During project operation, no anticipated uses of the project site would generate groundborne vibration or noise. Therefore, operational impacts related to groundborne vibration would be *less than significant*.

NOI Impact 3
The project would not generate excessive groundborne vibration or groundborne noise levels either during project construction or operation; impacts related to groundborne vibration and noise levels would be less than significant. (CEQA Checklist Appendix G Threshold XIII. b)
Mitigation Measures
No mitigation is required.
Impacts Following Mitigation
Not applicable. Impacts related to groundborne noise would be less than significant.

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 2 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?

The project site is not located within 2 miles of a private airstrip or public airport and is not within an airport land use plan. The nearest airport is Santa Monica Airport, located approximately 6 miles southwest of the project site. The project site does not include residential uses and therefore, no one resides on the project site. The project would not expose people working in the project site to excessive aircraft-related noise levels during either project construction or operation; therefore, *no impact* would occur.

NOI Impact 4
Because the project is not located in the vicinity of an airstrip or airport, the project would not expose people residing or working in the project site to excessive noise levels related to aircraft during either project construction or operation. No impact would occur. (CEQA Checklist Appendix G Threshold XIII. c)
Mitigation Measures
No mitigation is required.
Impacts Following Mitigation
Not applicable. No impact would occur.

5.11.6 Cumulative Impact Analysis

Cumulative noise or vibration impacts can occur when more than one project is under construction simultaneously or when a project is expected to generate operational noise or vibration at the same time. The potential for cumulative noise impacts to occur is specific to the distance between the related projects and their stationary sources.

ON-SITE CONSTRUCTION NOISE

Related projects in the vicinity of the proposed project considered in this analysis include construction activities that could occur simultaneously with the construction of the project. Construction-related noise levels from the related projects would be short-term and intermittent. Further, it is assumed that the projects within the incorporated area of the City of Los Angeles would be required to comply with the City's Noise Ordinance No. 144,331 and No. 161,574. In addition, each of the related projects would be subject to Section 41.40 of the LAMC, which limits the hours of allowable construction activities, and Section 112.05 of the LAMC, which prohibits any powered equipment or powered hand tool from producing noise levels that exceed 75 dBA at a distance of 50 feet from the noise source within 500 feet of a residential zone. Noise resulting from cumulative construction activities would be reduced to the extent reasonably and technically feasible through mitigation measures proposed for each project and compliance with locally enforced noise ordinances. Therefore, with the related projects also complying with City requirements regarding construction noise impacts, the proposed project construction-related noise would be less than cumulatively considerable and would be *less than significant*.

OFF-SITE CONSTRUCTION-RELATED NOISE

In addition to the cumulative impacts of on-site construction activities, off-site construction trucks and worker trucks for the project would potentially result in cumulative impacts if the trucks for the related projects use the same haul route. To exceed the ambient noise levels, the total truck trips from related projects would need to increase by an approximate factor of 2.6 (i.e., increase from 69 trips per hour to 179 trips per hour). Based on the proposed project's limited contribution of construction traffic trips and the limited number of anticipated future development projects that would use the same or a similar haul route, traffic associated with the construction of the project and other related projects would not cumulatively add up to 179 or more hourly trips along Wilshire Boulevard and La Brea Avenue. Therefore, cumulative noise impacts from off-site construction would not be cumulatively considerable and would be *less than significant*.

ON-SITE CONSTRUCTION-RELATED VIBRATION

Ground-borne vibration impacts due to construction activities are generally limited to buildings located close to the construction site. The closest related project is the Los Angeles County Museum of Art (LACMA) renovation project, which is located adjacent to the project site. While the LACMA project may complete construction before the La Brea Tar Pits Master Plan is implemented, a conservative assumption is that construction could be occurring concurrently. The LACMA Building for the Permanent Collection Draft Environmental Impact Report (County of Los Angeles 2017) indicates that the estimated vibration velocity levels (from all construction equipment) would be below the significance thresholds at all off-site building structures. Therefore, due to the rapid attenuation of the ground-borne vibration, no cumulative impact concerning ground-borne vibration would occur; these cumulative impacts would be *less than significant*.

OFF-SITE CONSTRUCTION-RELATED VIBRATION

Based on FTA data, the vibration generated by a typical truck would be approximately 63 VdB (0.006 PPV) at 50 feet (FTA 2018). The shortest distance between the haul route and the receptor is approximately 25 feet. Ground-borne vibration generated by a haul truck at this distance would be approximately 0.016 PPV, which is well below the most stringent building damage threshold of 0.12 PPV. Additionally, the estimated vibration levels along the haul route would be approximately 72 VdB, below the human annoyance threshold of 80 VdB. Trucks from related projects are expected to produce similar vibration levels as the project. Thus, the ground-borne vibration levels from haul trucks would be below the 0.12 PPV threshold. Therefore, potential cumulative vibration impacts from off-site construction would be *less than significant*.

ON-SITE STATIONARY NOISE SOURCES

The LAMC limits stationary source noise from mechanical equipment; therefore, potential noise levels from these sources are expected to be less than significant for each related project. Based on the distance of the related projects from the project site, cumulative stationary source noise impacts associated with the operation of the project and neighboring related projects would be *less than significant*.

OFF-SITE MOBILE NOISE SOURCES

Traffic volumes would be generated by the project and other related projects and would produce roadway noise. Cumulative noise impacts due to mobile sources were analyzed by comparing the projected increase in traffic noise levels from the Existing Conditions to Future Cumulative Conditions. According to the traffic noise modeling conducted for the project, cumulative traffic volumes would result in a maximum increase of 2.5 dBA during a typical weekday, and 2.5 dBA during a typical weekend (SWCA 2022). Therefore, the cumulative noise impacts due to mobile (off-site) noise sources associated with the project, future growth, and related projects would be *less than significant*.

NOI Impact 5 (Cumulative Impacts)
The project would not contribute considerably to cumulative noise and/or vibration impacts.
Mitigation Measures
No mitigation is required.
Impacts Following Mitigation
Not applicable. Impacts would be less than significant.