5.13 NOISE

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential for implementation of the Brea 265 Specific Plan to result in noise impacts in the City of Brea. This section discusses the fundamentals of sound; examines federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing receptor locations; evaluates potential noise and vibration impacts associated with the proposed plan; and provides mitigation to reduce noise impacts at sensitive receptor locations. This evaluation uses procedures and methodologies as specified by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) and is based in part on the noise modeling data in Appendix L of this DEIR.

5.13.1 Environmental Setting

Noise and Vibration Fundamentals

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." The following are brief definitions of terminology used in this section:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- **Decibel (dB).** A unitless measure of sound on a logarithmic scale.

- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the Leq metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.

- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L50 level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L10 level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L90 is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Day-Night Sound Level (Ldn or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 pm to 7:00 am.

- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 pm to 10:00 pm and 10 dB from 10:00 pm to 7:00 am. For general community/environmental noise, CNEL and Ldn values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive, that is, higher than the Ldn value). As a matter of practice, Ldn and CNEL values are interchangeable and are treated as equivalent in this assessment.

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second (1x10-6 in/sec).

Sound Fundamentals

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A 3 dBA change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dBA is readily discernable to most people in an exterior environment whereas a 10 dBA change is perceived as a doubling (or halving) of the sound.

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Sound Measurement

Sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, while 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single point source, sound levels decrease by approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dBA for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases by 4.5 dBA for each doubling of distance.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8, and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. These "L" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, an artificial dB increment is added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (Ldn). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 pm to 10:00 pm, and 10 dBA for the hours from 10:00 pm to 7:00 am. The Ldn descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 pm and 10:00 pm. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher).

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling

sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. Table 5.13-1 shows typical noise levels from familiar noise sources.

Table 5.13-1 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three 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		
	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: Caltrans 2013.

Vibration Fundamentals

Vibration is an oscillating motion in the earth. Like noise, vibration is transmitted in waves, but in this case through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal, and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage and RMS (typically expressed in VdB) for potential annoyance. The units for PPV are normally inches per second (in/sec). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

5.13.1.1 REGULATORY BACKGROUND

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, and municipalities in the state have established standards and ordinances to control noise.

Federal

US Department of Housing and Urban Development

The US Department of Housing and Urban Development (HUD) has set a goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted in California.) Though HUD does not specify acceptable interior noise levels, residential dwellings constructed under Title 24 standards typically provide in excess of 20 dBA of attenuation with the windows closed. Based on this premise, the interior L_{dn} should not exceed 45 dBA.

State

California Building Code

The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

Residential structures within 60 dBA L_{dn}/CNEL noise contours require an acoustical analysis showing that the structure has been designed to limit intruding noise to the prescribed allowable levels. To comply with these regulations, applicants of new residential projects are required to submit an acoustical report in areas where

noise and land use compatibility is a concern. The report is required to analyze exterior noise sources affecting the proposed dwelling site; predicted noise spectra at the exterior of the proposed dwelling structure, considering present and future land usage; basis for the prediction (measured or obtained from published data); noise attenuation measures to be applied; and an analysis of the noise insulation effectiveness of the proposed construction, showing that the prescribed interior noise level requirements are met. If interior allowable noise levels are met by requiring that windows be inoperable or closed, the design for the structure must also specify the means that will provide ventilation and cooling, if necessary, to provide a habitable interior environment.

The State of California's noise insulation standards for nonresidential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (Section 5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

General Plan Guidelines

The State of California, through its general plan guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can proceed with no special noise reduction requirements. Local municipalities adopt these compatibility standards as part of their general plans and modify them as appropriate for their local environmental settings. The City of Brea standards are discussed below.

Local Noise Standards

City of Brea General Plan

The Public Safety chapter of the City of Brea General Plan includes noise goals and policies that aim to minimize the impact of noise sources in the city. The relevant noise goals and policies are listed here.

Goal PS-9: Minimize the impact of point source noise and ambient noise levels throughout the community.

- **Policy PS-9.1.** Evaluate the need to require acoustical studies for development proposals that address both direct and indirect, particularly traffic, noise impacts, and require such studies, with appropriate mitigation included, as warranted.

- **Policy PS-9.3.** Ensure that acceptable noise levels are maintained near schools, hospitals, convalescent homes, and other noise sensitive areas in accordance with the City's Municipal Code and noise standards contained in the General Plan.

- **Policy PS-9.5.** Avoid placing high-noise activity centers near residential areas.

Goal PS-2: Minimize the impacts of transportation-related noise.

- **Policy PS-2.1.** Reduce transportation noise by imposing traffic restrictions where necessary.

Goal PS-3: Minimize noise impacts from sources other than transportation.

- **Policy PS-3.1.** Require the inclusion of noise mitigation measures, techniques, and design features in the planning, design, and construction of future development and redevelopment projects.

- **Policy PS-3.3.** Minimize stationary noise sources and noise emanating from construction activities and special events.

The City of Brea's primary goal is to minimize the exposure of residents to unhealthy and excessive noise levels. The City has adopted noise and land use compatibility guidelines, shown in Table 5.13-2, *Noise and Land Use Compatibility: City of Brea.*

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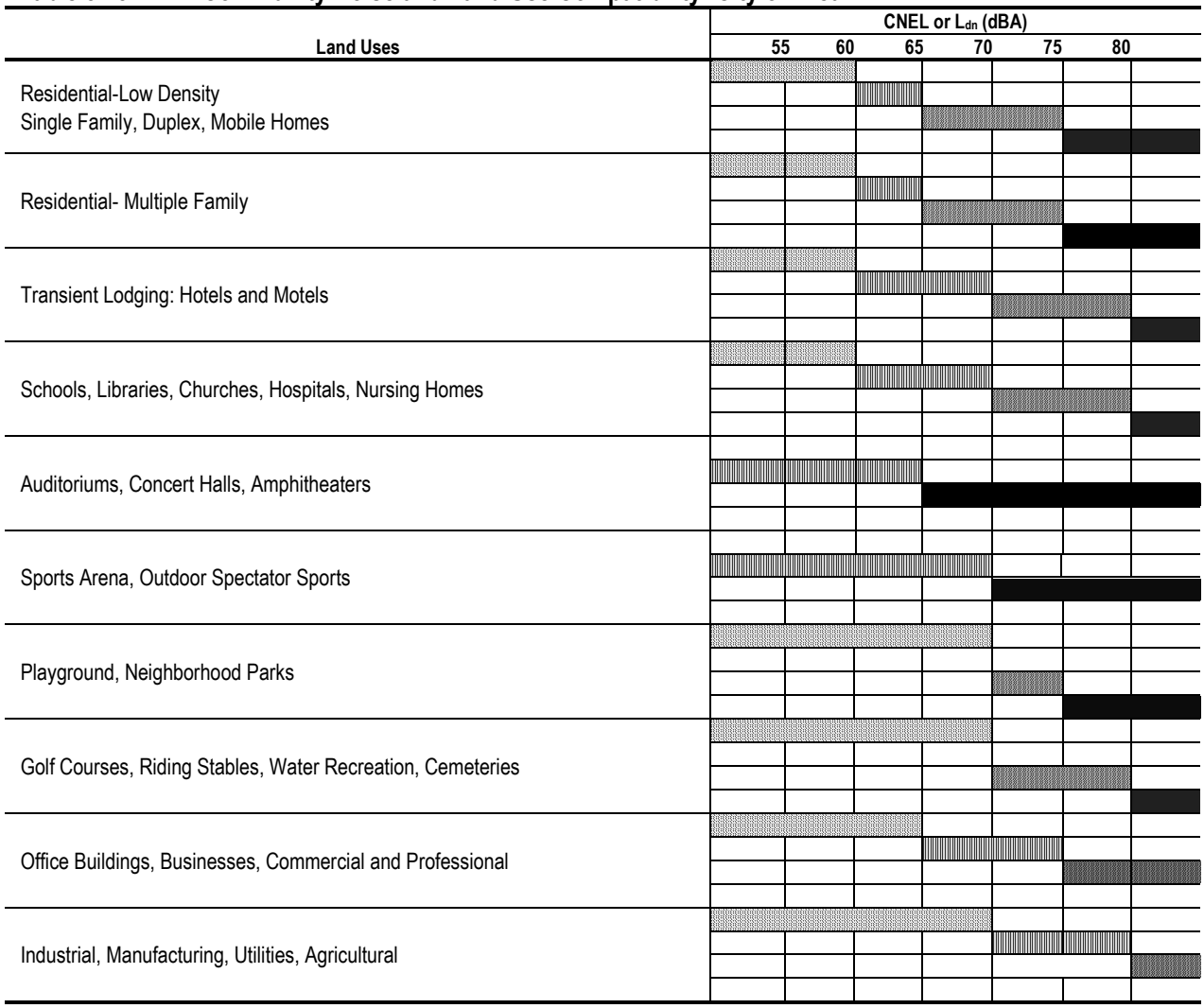
Table 5.13-2 Community Noise and Land Use Compatibility: City of Brea



Explanatory Notes

Normally Acceptable:
Specified land use is satisfactory, based on the assumption that any buildings 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 noise reduction requirements is made and needed noise insulation features included in 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 noise reduction requirements must be made and needed noise insulation features included in design.

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

Source: City of Brea General Plan.

City of Brea Municipal Code

City of Brea Municipal Code Chapter 8.20, Noise Control, provides exterior standards for all Zone 1 residential properties. Table 5.13-3 summarizes allowable noise levels at the receiving property lines of residences. According to Municipal Code Section 8.20.090, the noise standards also apply to schools, hospitals, and churches while they are in use.

Table 5.13-3 City of Brea Exterior Noise Standards

Zone 1	Time Period	Exterior Noise Level, dBA				
		L_{50} [1]	L_{25} [2]	L_8 [3]	L_2 [3]	L_{max} [5]
Residential Daytime	7:00 am–10:00 pm	55	60	65	70	75
Residential Nighttime	10:00 pm–7:00 am	50	55	60	65	70

Source: City of Brea Municipal Code, Section 8.20.050, Exterior Noise Standards.
Notes: A 5 dBA penalty shall be applied in the event of an alleged offensive noise such as impact noise, simple tones, speech, music, or any combination thereof.
The standards are based on the following:
[1] The noise standard for a cumulative period of more than 30 minutes in any hour.
[2] The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.
[3] The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
[4] The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour.
[5] The noise standard plus 20 dBA for any period of time.

Under Municipal Code Section 8.20.070, Special Provisions, the following are exempt from the provisions of the municipal code:

- Noise associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 7:00 pm and 7:00 am on weekdays, including Saturday, or at any time on Sunday or a federal holiday.
- Outdoor gatherings, public dances and shows, provided said events are conducted pursuant to a City permit.
- Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.
- Noise sources associates with the maintenance of real property, provided the activities take place between 7:00 am and 7:00 pm.

Municipal Code Section 20.20.040, limits ground vibration to no more than 0.003 inch/second (in/sec). This criterion is equivalent to approximately 70 VdB (root-mean-square vibration decibel level).

5.13.1.2 EXISTING CONDITIONS

Sensitive Receptors

Certain land uses are particularly sensitive to noise and vibration. Sensitive receptors include residences, senior housing, schools, hospitals, places of worship, and recreational areas. These uses are regarded as sensitive

because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, working from home, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not particularly sensitive to noise or vibration. The Brea 265 Specific Plan is a 262.1-acre area bordered by Lambert Road/Carbon Canyon Road to the north, Blake Road and residential uses to the south, Carbon Canyon Regional Park to the east, and residential uses and Valencia Avenue and Rose Drive to the west. The project site is near or adjacent to sensitive receptors—existing residential in all directions, the Brea Sports Park and Olinda Elementary School north of Birch Street, and the Carbon Canyon Regional Park east of the project site.

Ambient Noise Measurements

To determine an existing baseline throughout the project site, ambient noise monitoring was conducted by PlaceWorks. Six short-term measurements (15 minutes) were conducted Wednesday, March 13, 2019, during the morning commute hours of 7:00 am to 10:00 am, and three long-term measurements (48 hours) were conducted Wednesday, March 13, 2019, through Friday, March 15, 2019. The primary noise source at the measurement locations was vehicle traffic. Secondary noise sources varied by site, as described below.

Meteorological conditions during the measurement period were favorable for outdoor sound measurements and were noted to represent typical conditions for the season. Generally, conditions included clear skies with morning temperatures of 50 degrees Fahrenheit (°F) and average wind speeds of 1.5 miles per hour. Temperatures increased throughout the morning during short-term monitoring and measured up to 66 degrees Fahrenheit (°F). All sound level meters were equipped with a windscreen during measurements.

All sound level meters used for noise monitoring satisfy the American National Standards Institute (ANSI) standard for Type 1 instrumentation.[1] The sound level meters were set to "slow" response and "A" weighting (dBA). The meters were calibrated prior to and after the monitoring period. All measurements were at least five feet above the ground and away from reflective surfaces. Noise measurement locations are described below and shown in Figure 5.13-1, *Approximate Noise Monitoring Locations.*

[1] Monitoring of ambient noise was performed using Larson-Davis model LxT and 820 sound level meters.

Figure 5.13-1 - Approximate Noise Monitoring Locations

Specific Plan Boundary

ST-1 Short-Term Noise Measurement Locations (6)

LT-1 Long-Term Noise Measurement Locations (3)

0 1,000
Scale (Feet)

Source: Google Earth Pro, 2019

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The following describes individual noise monitoring locations and observations made during measurements.

- **Long-Term Location 1 (LT-1)** was off Valencia Avenue, approximately 250 feet north of Carbon Canyon Road and approximately 40 feet east of the nearest northbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at 12:00 noon on Wednesday, March 13, 2019. The noise environment of this location is characterized primarily by roadway traffic on Valencia Avenue. Valencia Avenue north of Carbon Canyon Road experiences heavy-duty truck traffic en route to the Olinda Landfill. Noise from dump trucks and semitrailers were noticeably higher than other roadway vehicle traffic.

- **Long-Term Location 2 (LT-2)** was off Carbon Canyon Road, west of Olinda Ranch Neighborhood Park, approximately 0.25 mile east of Valencia Road and approximately 35 feet north of the nearest westbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at 12:00 noon on Wednesday, March 13, 2019. The noise environment of this location is characterized primarily by roadway traffic on Carbon Canyon Road.

- **Long-Term Location 3 (LT-3)** was off North Rose Drive, approximately 0.15 mile northwest of Vesuvius Drive and approximately 30 feet southwest of the nearest southbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at 1:00 pm on Wednesday, March 13, 2019. The noise environment of this location is characterized primarily by roadway traffic on North Rose Drive.

- **Short-Term Location 1 (ST-1)** was adjacent to 3186 East Piru Lane in a vacant lot north of East Lambert Road. A 15-minute noise measurement was conducted beginning at 7:10 am on Wednesday March 13, 2019. The noise environment is characterized primarily by roadway traffic on East Lambert Road and bird calls. Background noise levels in the absence of traffic flow and bird calls measured at 52 dBA. Traffic noise levels generally ranged from 56 to 64 dBA, and bird calls were noted to be 53 to 54 dBA.

- **Short-Term Location 2 (ST-2)** was off East Lambert Road, approximately 550 feet east of Sunflower Street and 50 feet north of the nearest westbound travel lane centerline. A 15-minute noise measurement was conducted beginning at 7:38 am on Wednesday, March 13, 2019. The noise environment is characterized primarily by roadway traffic on East Lambert Road. Background noise levels ranged between 52 to 54 dBA in the absence of roadway traffic. Traffic noise levels were generally 70 to 82 dBA.

- **Short-Term Location 3 (ST-3)** was in front of 120 South Flower Hill Street. A 15-minute noise measurement was conducted beginning at 8:07 am on Wednesday, March 13, 2019. The noise environment is characterized primarily by aircraft overflights, birds, and neighborhood activities such as car doors shutting. Light vehicle pass-bys also contribute to the ambient noise environment. Background noise levels ranged from 46 to 47 dBA. Aircraft overflights were generally 53 dBA, vehicles pass-bys were 56 dBA, and birds were 50 to 52 dBA.

- **Short-Term Location 4 (ST-4)** was in front of Olinda Elementary School off East Birch Street, approximately 150 feet west of Voyager Avenue and 20 feet north of the nearest westbound travel lane centerline. A 15-minute noise measurement was conducted beginning at 8:35 am on Wednesday, March 13,

2019. The noise environment is characterized primarily by roadway traffic from East Birch Street. Background noise levels were generally 51 dBA, and traffic flow ranged from 74 to 79 dBA.

- **Short-Term Location 5 (ST-5)** was at Brea Sports Park in the courtyard between the soccer field and baseball field. A 15-minute noise measurement was conducted beginning at 9:03 am on Wednesday, March 13, 2019. The noise environment is characterized primarily by traffic noise from East Birch Street and birds. Background noise levels were generally 48 dBA. Traffic noise was generally 60 to 62 dBA, and birds were 52 dBA.

- **Short-Term Location 6 (ST-6)** was conducted across from 3664 Azalea Way, approximately 20 feet south of the nearest eastbound travel lane centerline. A 15-minute noise measurement was conducted beginning at 9:38 am. The noise environment is characterized primarily by distant construction activity for new housing development along Camelia Lane, minimal vehicle pass-bys, and aircraft overflights. Background noise levels generally ranged from 36 to 38 dBA. Vehicle pass-bys were generally 55 to 61 dBA, distant construction was 41 to 43 dBA, and aircraft overflights were 45 to 65 dBA.

Ambient Noise Results

During the ambient noise survey, the noise levels at monitoring locations ranged from 72 to 76 dBA CNEL. The long-term noise measurement results are summarized in Table 5.13-4, *Long-Term Noise Measurement Levels*. A summary of the daily trend during long-term noise measurements is provided in Appendix L. The short-term noise measurement results are summarized in Table 5.13-5, *Short-Term Noise Measurement Levels*.

Table 5.13-4 Long-Term Noise Measurement Levels (dBA)

Monitoring Location	Description	CNEL	Lowest $L_{eq, 1\text{-}hr}$	Highest $L_{eq, 1\text{-}hr}$
LT-1	Valencia Avenue: Approximately 40 feet east of nearest NB travel lane CL	72	50.1	74.5
LT-2	Carbon Canyon Road: Approximately 35 feet north of nearest WB travel lane CL	76	57.3	74.5
LT-3	North Rose Drive: Approximately 30 feet southwest of nearest SB travel lane CL	74	54.7	77.2

Notes: Noise monitoring conducted between March 13, 2019, and March 15, 2019.
NB = northbound
WB = westbound
SB = southbound
CL = centerline

Table 5.13-5 Short-Term Noise Measurement Levels (dBA)

Monitoring Site	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}
ST-1, 03/13/19	56.6	64.7	50.1	59.6	58.8	57.6	56.3
ST-2, 03/13/19	71.9	83.9	52.3	77.9	75.1	72.9	70.5
ST-3, 03/13/19	50.0	59.3	46.1	55.1	52.7	50.3	48.8
ST-4, 03/13/19	70.8	81.2	50.9	78.8	76.2	71.5	65.9
ST-5, 03/13/19	53.5	63.2	47.4	59.7	56.4	53.6	52.2
ST-6, 03/13/19	49.0	65.1	36.2	60.1	52.3	43.0	39.7

Note: Noise monitoring conducted on March 13, 2019, during the hours of 7:00 am–10:00 am.

5.13.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would result in:

N-1 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.

N-2 Generation of excessive groundborne vibration or groundborne noise levels.

N-3 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, if the project would expose people residing or working in the project area to excessive noise levels.

5.13.2.1 CONSTRUCTION NOISE THRESHOLDS

The City of Brea does not have an established noise threshold for construction noise. The FTA provides criteria for acceptable construction noise levels and recommends a daytime noise threshold of 80 dBA $L_{eq(8hr)}$. For the purposes of this analysis, the FTA criterion is used for nearby sensitive receptors.

5.13.2.2 TRANSPORTATION NOISE THRESHOLDS

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels at adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually undetectable. A change of 5 dBA is readily audible to most people in an exterior environment. Based on the noise standards from Table 5.13-2, noise levels above 65 dBA CNEL are normally unacceptable at sensitive receptor locations such as residences, and noise environments in these areas would be considered degraded. Based on this, the following thresholds of significance are used to assess traffic noise impacts at sensitive receptor locations:

- Greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher.
- Greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL.

- Greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL.

5.13.2.3 STATIONARY NOISE THRESHOLDS

As discussed in Section 5.13.1.2, *Regulatory Background*, the City's noise ordinance establishes exterior noise levels at receiving residential property lines. According to Section 8.20.090, the noise standards also apply to schools, hospitals, and churches while they are in use. These exterior noise standards are used as stationary source thresholds for projects under the Specific Plan.

5.13.2.4 VIBRATION THRESHOLDS

Vibration Annoyance

The City of Brea establishes a vibration threshold of 0.003 in/sec (root-mean-square). This threshold is equivalent to 70 VdB, which is used for this analysis.

Architectural Damage

The City of Brea does not have specific limits or thresholds for vibration-induced architectural damage related to construction activities. The FTA provides criteria for acceptable levels of groundborne vibration for various types of buildings, which are used for this analysis. These criteria are shown in Table 5.13-6, *Groundborne Vibration Criteria: Architectural Damage*.

Table 5.13-6 Groundborne Vibration Criteria: Architectural 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.	Nonengineered timber and masonry buildings	0.2
IV.	Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018.
PPV = peak particle velocity

The Category III threshold of 0.2 in/sec PPV for nonengineered timber and masonry buildings would apply to surrounding residential structures.

5.13.3 Plans, Programs, and Policies

Regulatory Requirements

PPP N-1 Residential development must comply with the CBC, Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, Allowable Interior Noise Levels.

PPP N-2 Nonresidential development must comply with the CBC, Title 24, Building Standards Administrative Code, Part 11, CALGreen.

PPP N-3 The project will be constructed in accordance with Section 8.20, Noise Control, of Brea's Municipal Code, which generally prohibits construction, repair, remodeling, or grading of any real property between the hours of 7:00 pm and 7:00 am on weekdays and Saturday, or at any time on Sunday or a federal holiday.

PPP N-4 Project stationary sources will comply with the City of Brea's exterior noise standards in Section 8.20.050 of the Municipal Code (see Table 5.13-3).

PPP N-5 Project vibration levels will comply with the City of Brea's vibration standard of 0.003 in/sec root-mean-square (equivalent to 70 VdB) in Section 20.20.040 of the Municipal Code.

5.13.4 Environmental Impacts

5.13.4.1 METHODOLOGY

This section analyzes impacts related to short-term construction noise and vibration, as well as operational noise and vibration due to buildout of the Specific Plan. Noise increases from vehicular traffic were assessed using a version of the FHWA Traffic Noise Prediction Model and the traffic forecasts used in the Traffic Study (see Appendix N).

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects, it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal. 4th 369 (No. S 213478), December 17, 2015. As a result, while the noise from existing sources is taken into account as part of the baseline, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of a future project as a result of Specific Plan buildout is typically no longer a required topic for impact evaluation under CEQA. Generally, no determination of significance is required with the exception of certain school projects, projects affected by airport noise, and projects that would exacerbate existing conditions (i.e., projects that would have a significant operational impact). As required by the CBC, Title 24, and the General Plan's noise policies, noise levels will be considered in land use planning decisions to prevent future noise and land use incompatibilities. At the discretion of the City of Brea Building Division, a project applicant may be required to obtain a detailed acoustical report outlining any necessary noise reduction features in the final design to comply with City and CBC provisions for indoor and outdoor noise levels.

5.13.4.2 IMPACT ANALYSIS

The following impact analysis addresses the thresholds of significance; the applicable thresholds are identified in brackets after the impact statement.

Impact 5.13-1: Construction activities would result in temporary noise increases in the vicinity of the project site that could exceed standards. [Threshold N-1]

The Brea 265 Specific Plan would implement the objectives described in Chapter 3, *Project Description*, and result in development of the project site. The Specific Plan proposes to construct a residential community of

detached, attached, and multifamily residential neighborhoods, open space, and parks and recreational amenities linked by an extensive trial network.

Two types of temporary noise impacts could occur during construction. First, the transport of workers and movement of materials to and from the site could incrementally increase noise levels along local access roads. The second type of temporary noise impact is related to construction activities during the implementation of the proposed project. Construction is performed in distinct steps, each of which has its own mix of equipment, and, consequently, its own noise characteristics. Table 5.13-7, *Construction Equipment Noise Emission Levels*, lists typical construction equipment noise levels recommended for noise-impact assessments, based on a distance of 50 feet from the equipment.

Table 5.13-7 Construction Equipment Noise Emission Levels

Construction Equipment	Typical Noise Levels at 50 feet, dBA
Air Compressor	80
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-Driver (Impact)	101
Pile-Driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Rail Saw	90
Rock Drill	85
Roller	85

Table 5.13-7 Construction Equipment Noise Emission Levels

Construction Equipment	Typical Noise Levels at 50 feet, dBA
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	84

Source: FTA 2018.

As shown in Table 5.13-7, construction equipment generates high levels of noise, generally ranging from 76 dBA to 101 dBA at a distance of 50 feet. Construction of developments associated with the implementation of the Specific Plan would temporarily increase the ambient noise environment and would have the potential to affect noise-sensitive receptors in the vicinity of an individual project.

Noise generated by on-site construction equipment is based on the type of equipment used, its location relative to sensitive receptors, and the timing and duration of noise-generating activities. Each phase of construction involves different types of equipment and has distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest several pieces of equipment. The dominant equipment noise source is typically the engine, although work-piece noise (such as dropping of materials) can also be noticeable.

The noise produced during each construction phase is determined by combining the L_{eq} contributions from each piece of equipment used at a given time, while accounting for the ongoing time variations of noise emissions (commonly referred to as the usage factor). Overall noise emissions vary considerably, depending on the specific activity being performed at any given moment. Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground effects, and shielding effects), the average noise levels at noise-sensitive receptors could vary considerably, because mobile construction equipment would move around the site and would have different loads and power requirements.

Because specific project-level information is not yet available, it is not possible to quantify the estimated construction noise levels at specific sensitive receptors due to a given project under the Specific Plan. In most cases, construction of individual developments associated with implementation of the Specific Plan would temporarily increase the environment's ambient noise in the vicinity of each individual project, potentially affecting existing and future nearby sensitive uses, such as residences, outdoor recreational areas and park, and

Olinda Elementary School. Although it is not anticipated at this time that pile driving would be necessary for projects under the Specific Plan, if condition changes in the future, pile driving could be necessary. Construction noise could potentially exceed the FTA 80 dBA L_{eq} threshold.

Level of Significance Before Mitigation: Potentially significant.

Impact 5.13-2 Implementation of the proposed project would result in long-term operation-related noise that would not exceed standards. [Threshold N-1]

Mobile Source Noise

As discussed above, traffic noise increases were calculated using a version of the FHWA's Traffic Noise Prediction Model based on existing and future traffic volumes and vehicle mix (auto, medium-duty trucks, and heavy-duty trucks) provided by the project traffic consultant (LLG 2022). The FHWA model predicts noise levels through a series of adjustments to a reference sound level. These adjustments account for distances from the roadway, traffic volumes, vehicle speeds, vehicle mix, time of day splits, and number of lanes. Table 5.13-8, *Project-Related Increase in Traffic Noise*, shows the existing and future predicted noise levels at 50 feet from the nearest travel centerline, as well as the predicted traffic noise increase with implementation of the Specific Plan. Appendix L of the DEIR contains the traffic noise modeling inputs and outputs.

As shown in Table 5.13-8, there are no roadway segments that would experience a traffic noise increase of greater than 1.5 dBA CNEL with buildout of the Specific Plan. The highest traffic noise increase is predicted to be 1.5 dBA CNEL along Lambert Road between Valencia Avenue and Kraemer Boulevard. Therefore, traffic noise impacts due to buildout of the Specific Plan would be less than significant.

Table 5.13-8 Project-Related Increase in Traffic Noise

	Average Daily Traffic Volumes			dBA CNEL at 50 Feet			Buildout Noise Increase, CNEL
Roadway Segment	Existing	2045 Without Project	2045 With Project	Existing	2045 Without Project	2045 With Project	
Lambert Road, east of State College Boulevard	60,748	79,604	80,451	76.5	77.7	77.8	1.2
Lambert Road, west of Pointe Drive	45,297	55,675	58,220	75.2	76.1	76.3	1.1
Lambert Road, east of Associated Road	34,533	42,374	44,931	76.2	77.1	77.4	1.1
Lambert Road, west of Santa Fe Road/Kraemer Boulevard	34,067	41,750	44,307	76.2	77.1	77.3	1.1
Lambert Road, east of Kraemer Boulevard	20,241	24,831	28,343	73.8	74.7	75.3	1.5
Lambert Road, west of Valencia Avenue	19,822	24,210	28,231	73.7	74.5	75.2	1.5
Carbon Canyon Road, east of Santa Fe Road	20,709	27,326	27,795	72.8	74.0	74.1	1.3
Kraemer Boulevard, south of Lambert Road	17,067	20,065	21,299	71.9	72.6	72.9	1.0

Table 5.13-8 Project-Related Increase in Traffic Noise

Roadway Segment	Average Daily Traffic Volumes			dBA CNEL at 50 Feet			Buildout Noise Increase, CNEL
	Existing	2045 Without Project	2045 With Project	Existing	2045 Without Project	2045 With Project	
Valencia Avenue, south of Lambert Road	25,503	27,943	31,322	73.7	74.1	74.6	0.9
Birch Street, east of State College Boulevard	25,204	31,685	32,224	73.7	74.7	74.7	1.1
Birch Street, east of S Associated Road	24,697	30,325	31,180	73.6	74.5	74.6	1.0
Birch Street, east of N Associated Road	21,141	26,047	26,902	73.9	74.9	75.0	1.0
Birch Street, east of Kraemer Boulevard	16,994	20,699	21,895	73.0	73.9	74.1	1.1
Kraemer Boulevard, south of Birch Street	20,279	24,038	24,890	73.9	74.7	74.8	0.9
Valencia Avenue, south of Birch Street/Rose Drive	13,142	15,387	17,101	72.9	73.6	74.1	1.1
Rose Drive, east of Valencia Avenue	20,986	24,472	27,848	70.5	71.2	71.7	1.2
Rose Drive, north of Imperial Highway	20,338	23,187	25,813	71.6	72.2	72.7	1.0
Imperial Highway, east of State College Boulevard	73,409	92,779	92,992	77.4	78.4	78.4	1.0
Imperial Highway, east of SR-57 NB Ramps	54,650	68,783	69,334	78.2	79.2	79.3	1.0
Imperial Highway, east of Associated Road	52,514	65,621	66,213	78.1	79.0	79.1	1.0
Imperial Highway, east of Castlegate Lane/Placentia Avenue	52,689	66,369	67,106	78.1	79.1	79.1	1.1
Imperial Highway, east of Kraemer Boulevard	45,608	56,325	57,311	78.0	78.9	79.0	1.0
Imperial Highway, east of Valencia Avenue	46,275	56,862	57,435	77.4	78.3	78.4	0.9
Kraemer Boulevard, south of Imperial Highway	20,280	24,282	25,022	72.7	73.5	73.6	0.9
Valencia Avenue, south of Imperial Highway	10,142	12,407	13,084	67.4	68.3	68.5	1.1

Source: Traffic data provided by Linscott, Law & Greenspan, 2022. Traffic noise modeled using the FHWA Traffic Noise Prediction Model methodology.

Stationary Source Noise

Stationary noise sources can be generated from residential development, such as heating and cooling mechanical systems (HVAC), human activity in open spaces and parks, and landscaping maintenance. In Section 8.20.070 of the Municipal Code, noise associated with activities conducted on any public park or playground is exempt from the City's exterior noise standards. Noise sources associated with the maintenance of real property, provided it takes place between 7:00 am and 7:00 pm, are also exempt. In PPP N-5, mechanical equipment such

as HVAC systems, as part of future projects under the Specific Plan, would be required to comply with the noise level standards in the City's Municipal Code Section 8.20.050. This would be achieved through proper equipment selection, setbacks, enclosures, and/or parapet walls.

A 13-acre sports park would be provided immediately north of the existing Brea Sports Park. The sports park would provide a baseball field, tennis courts, soccer field, pickleball courts, a full basketball court, tartan track with fitness stations, innovative play area, shade structure, concession stand (approx. 900 square feet), restrooms with drinking fountain and bike racks, team warmup field, and parking (approx. 134 spaces). Activities at the proposed sports park would be comparable to the existing Brea Sports Park and would not introduce new types of noise sources to the area. No permanent P.A. systems are proposed as part of the sports park. In addition, Section 8.20.070 of the Brea Municipal Code exempts activities conducted on public parks and playgrounds from the code noise standards.

Level of significance Before Mitigation: Less than significant.

Impact 5.13-3: Construction during plan buildout would generate construction vibration that could exceed standards. [Threshold N-2]

Construction Vibration Impacts

Construction activity at project sites in the Specific Plan would generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures, but can achieve the audible and perceptible ranges in buildings close to the construction site. However, groundborne vibration is almost never annoying to people who are outdoors, so it is usually evaluated in terms of indoor receivers (FTA 2018). Table 5.13-9, *Vibration Levels for Construction Equipment*, lists reference vibration levels for construction equipment.

Table 5.13-9 Vibration Levels for Construction Equipment

Equipment	Approximate RMS Vibration Level at 25 Feet (VdB)	Approximate PPV Vibration Level at 25 Feet (in/sec)
Pile Driver, Impact (Upper Range)	112	1.518
Pile Driver, Impact (Typical)	104	0.644
Pile Driver, Sonic (Upper Range)	105	0.734
Pile Driver, Sonic (Typical)	93	0.170
Vibratory Roller	94	0.210
Large Bulldozer	87	0.089
Caisson Drilling	87	0.089
Loaded Trucks	86	0.076
Jackhammer	79	0.035
Small Bulldozer	58	0.003

Source: FTA 2018.
Notes: RMS = root-mean-square, PPV = peak particle velocity.

As shown in Table 5.13-9, vibration generated by construction equipment has the potential to be substantial, since it has the potential to exceed the City criteria for human annoyance of 70 VdB and FTA architectural damage thresholds shown in Table 5.13-6 (e.g., 0.2 in/sec PPV for nonengineered timber and masonry buildings such as most residences). Construction details and equipment for future, project-level developments under the Specific Plan are not known at this time but may cause vibration impacts. It is not anticipated, however, that pile driving would be necessary for projects under the Specific Plan. Nevertheless, this would be a potentially significant impact.

Operational Vibration Impacts

The Specific Plan proposes residential developments, including single-family detached, single-family attached, and multifamily housing. In addition to residential land uses, the Specific Plan proposes nonresidential land uses such as park/recreation areas, open space, and a network of trails. These proposed land uses would not be associated with substantial operational vibration, and therefore this impact would be less than significant.

Level of significance Before Mitigation: Potentially significant.

Impact 5.13-4: The proximity of the project site to an airport or airstrip would not result in exposure of future residents and workers to excessive airport-related noise. [Threshold N-3]

The nearest airport or private airstrip is Fullerton Municipal Airport, approximately eight miles southwest of the project site. Future residents and workers would not be exposed to excessive aircraft noise.

Level of Significance Before Mitigation: No impact.

5.13.5 Level of Significance Before Mitigation

Upon implementation of the plans, programs, and policies, the following impacts would be less than significant: 5.13-2 and 5.13-4.

Without mitigation, the following impacts would be **potentially significant**:

- **Impact 5.13-1** Construction activities associated with buildout of the proposed project would result in a temporary increase in noise levels at sensitive receptors.
- **Impact 5.13-3** Construction activities associated with buildout of the proposed project may expose sensitive uses to excessive levels of groundborne vibration.

5.13.6 Mitigation Measures

Impact 5.13-1

N-1 Prior to any construction activity such as grading, site preparation, or issuance of building permits, a note shall be provided on construction plans indicating that during construction activities and phasing the project applicant shall be responsible for requiring contractors to implement the following measures to limit construction-related noise to a performance standard of 80 dBA L_{eq} at the property line of the nearest sensitive receptor:

- Section 8.20.070 of the Brea Municipal Code limits construction activity to the daytime hours between 7:00 am to 7:00 pm on Monday through Saturday. Construction is not allowed on Sundays and federal holidays. If construction outside of these hours is necessary for construction of a project under the Specific Plan, construction noise shall be limited to the City of Brea exterior noise standards summarized in Table 5.13-3, *City of Brea Exterior Noise Standards*.
- During the entire active construction period, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Require that impact tools (e.g., jack hammers and hoe rams) be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment such as generators and air compressors shall be located as far as feasible from nearby noise-sensitive uses.
- Stockpiling shall be located as far as feasible from nearby noise-sensitive receptors.
- Construction traffic shall be limited—to the extent feasible—to approved haul routes established by the City.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction

days and hours as well as the telephone numbers of the City's and contractor's authorized representatives to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.

- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.

- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.

- Erect temporary noise barriers, where feasible, when construction noise is predicted to exceed the noise standards after other measures have been considered, or occur at nighttime, or when the anticipated construction duration is greater than is typical (e.g., two years or more).

Impact 5.13-3

N-2 Prior to issuance of a building permit for a project requiring pile driving within 135 feet of fragile structures such as historical resources, within 100 feet of nonengineered timber and masonry buildings (e.g., most residential buildings), or within 75 feet of engineered concrete and masonry (no plaster), or requiring a vibratory roller within 25 feet of any structure, the project applicant shall prepare a noise and vibration analysis to assess and mitigate potential noise and vibration impacts related to these activities. This noise and vibration analysis shall be conducted by a qualified and experienced acoustical consultant or engineer. The vibration levels shall not exceed Federal Transit Administration (FTA) architectural damage thresholds—e.g., 0.12 inch per second (in/sec) peak particle velocity (PPV) for fragile or historical resources, 0.2 in/sec PPV for nonengineered timber and masonry buildings, and 0.3 in/sec PPV for engineered concrete and masonry—or the City threshold of 0.003 in/sec root-mean-square (70 vibration decibel [VdB]). If vibration levels would exceed this threshold, alternative uses such static rollers and drilling piles as opposed to pile driving shall be used.

5.13.7 Level of Significance After Mitigation

The mitigation measures identified above would reduce potential impacts associated with noise and vibration to a level that is less than significant. Therefore, no significant unavoidable adverse impacts relating to noise and vibration remain.

5.13.8 References

Airnav, LLC. 2019. Airport Information. Accessed October 23, 2019. http://www.airnav.com/airports.

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