5.6 NOISE

This section of the Draft Environmental Impact Report (EIR) evaluates the potential for implementation of the proposed Master Plan to result in noise and vibration impacts at nearby noise and vibration sensitive receptors. This section discusses the fundamentals of sound; examines state and local noise guidelines, policies, and standards; characterizes existing noise levels in the project area; and evaluates potential noise and vibration impacts associated with the proposed Master Plan. Noise modeling worksheets are in Appendix K of this Draft EIR.

5.6.1 Environmental Setting

5.6.1.1 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:

Technical Terminology

- **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 L_{eq} 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 L_{10} 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 L_{90} 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 (L_{dn} 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 (1×10^{-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 [dB]), 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 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, and 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, 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 be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). 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

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NOISE

body tensions, and thereby affecting blood pressure, 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 5.6-1, *Typical Noise Levels*, shows typical noise levels from familiar noise sources.

Table 5.6-1 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 can be described in terms of peak particle velocity, which is the maximum instantaneous peak of the vibration signal. Peak particle velocity (PPV) is appropriate for evaluating potential building damage. 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.

5.6.1.2 REGULATORY BACKGROUND

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a general plan that includes a noise element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. The purpose of the noise element is to "limit the exposure of the community to excessive noise levels."

CALGreen

The California Green Building Standards Code (CALGreen) has requirements for insulation that affect exterior-interior noise transmission for non-residential structures. Pursuant to CALGreen Section 5.507.4.1, Exterior Noise Transmission, an architectural acoustics study may be required when a project site is within a 65 dBA CNEL or L_{dn} noise contour of an airport, freeway or expressway, railroad, industrial source or fixed-guideway source. Where noise contours are not readily available, if buildings are exposed to a noise level of 65 dBA L_{eq} during any hour of operation, specific wall and ceiling assembly and sound-rated windows may be necessary to reduce interior noise to acceptable levels. Under the prescriptive method, wall and roof-ceiling assemblies exposed to the noise source making up the building and windows shall meet specific composite sound transmission class ratings or a composite outdoor-indoor transmission class ratings. Under the performance method, wall and roof-ceiling assemblies and windows are required to be constructed to provide an interior noise environment that does not exceed an hourly L_{eq} of 50 dBA.

General Plan Guidelines

The State of California's 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 occur 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 setting. The City of Fontana has not adopted its own noise and land use compatibility standards. Therefore, the Governor's Office of Planning and Research noise and land use compatibility table is referenced in Table 5.6-2, *State Community Noise and Land Use Compatibility*.

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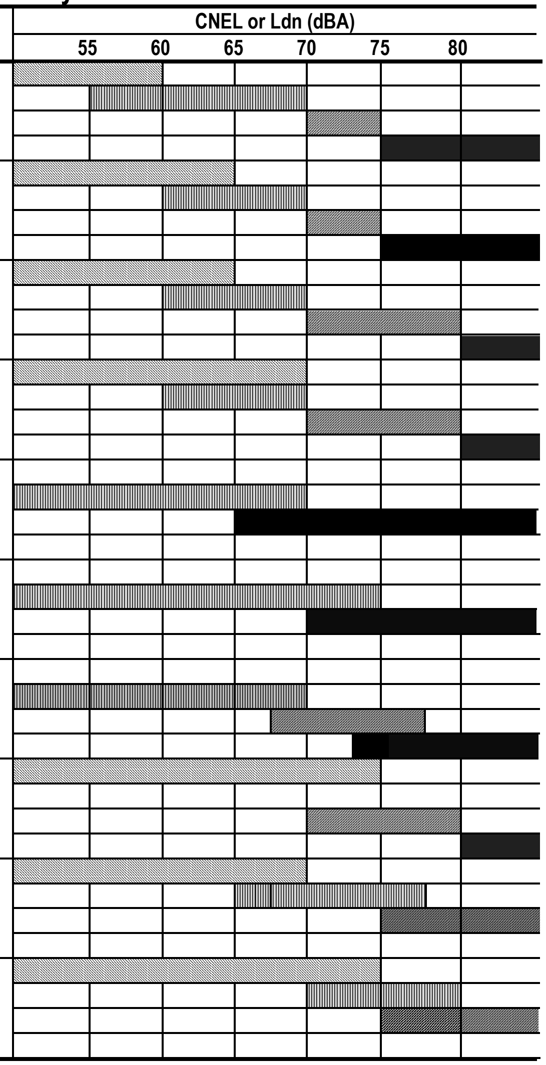
Table 5.6-2 State Community Noise and Land Use Compatibility

Land Uses
Residential-Low Density Single Family, Duplex, Mobile Homes
Residential- Multiple Family
Transient Lodging: Hotels and Motels
Schools, Libraries, Churches, Hospitals, Nursing Homes
Auditoriums, Concert Halls, Amphitheaters
Sports Arena, Outdoor Spectator Sports
Playground, Neighborhood Parks
Golf Courses, Riding Stables, Water Recreation, Cemeteries
Office Buildings, Businesses, Commercial and Professional
Industrial, Manufacturing, Utilities, Agricultural



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

Source: OPR 2017.

Local Noise Standards

City of Fontana General Plan

The Noise and Safety Element of the Fontana General Plan provides goals, policies, and actions aimed to reduce intrusive and excessive environmental noise associated with the future development. The primary source of noise identified in the Noise and Safety Element is roadway noise. Second to traffic noise in the City of Fontana is airport noise from the LA/Ontario International Airport operations. Other noise sources to consider are stationary noise sources including, industrial (e.g., loading docks), construction, playgrounds, outdoor sports facilities, landscaping, mechanical equipment, and typical residential noises (power tools, barking dogs, etc.)

Applicable goals include Noise and Safety Goal 8, which states that the City of Fontana protects sensitive land uses from excessive noise by diligent planning. This goal includes the following policies and actions:

Policies

- New sensitive land uses shall be prohibited in incompatible areas.
- Noise-tolerant land uses shall be guided into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors.
- Where sensitive uses are to be placed along transportation routes, mitigation shall be provided to ensure compliance with state- mandated noise levels.
- Noise spillover or encroachment from commercial, industrial and educational land uses shall be minimized into adjoining residential neighborhoods or noise-sensitive uses.

Actions

- The following uses shall be considered noise-sensitive and discouraged in areas in excess of 65 L_{eq}(12hr): Schools; Libraries; Places of Worship; and Passive Recreation Uses.
- The State of California Office of Planning and Research General Plan Guidelines shall be followed with respect to acoustical study requirements.

City of Fontana Municipal Code

Section 30-469, Noise*,* under Division 6, Performance Standards, of the City of Fontana Municipal Code establishes daytime (7:00 am to 10:00 pm) and nighttime (10:00 pm to 7:00 am) exterior noise standards of 65 dBA for residential-zoned property.[1] Section 30-470, Vibration, states that no person shall create or cause

[1] Noise standard *level,* as defined in Sec.30-12, List of Definitions, means the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of 20 micropascals. The unit of measurement shall be designated as dBA.

to be created any activity which causes vibration which can be felt beyond the property line with or without aid of an instrument.

Article II, Noise*,* Section 18-63(b)(7)*,* under Chapter 18, Nuisances, prohibits the erection (including excavating), demolition, alteration or repair of any building or structure outside the hours 7:00 am to 6:00 pm on weekdays and 8:00 am to 5:00 pm on Saturdays. This also includes pile drivers, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other appliance which is loud, excessive, impulsive or intrusive noise.

Article II, Noise, Section 18-63(b)(11), Blowers. The operation of any noise-creating blower or power fan or any internal combustion engine other than from the hours of 7:00 am and 6:00 pm on a weekday and the hours of 8:00 am and 5:00 pm on a Saturday, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device sufficient to deaden such noise.

Chapter 18, Article II, Noise, Section 18-63 (6*)* Loading, Unloading or Opening Boxes, prohibits the creation of a loud, excessive, impulsive, or intrusive and excessive noise in connection with loading or unloading of any vehicle, or the opening and destruction of bales, boxes, crates, and containers.

The City of Fontana does not establish quantified thresholds for temporary construction noise and vibration. Therefore, to determine impact significance, the Federal Transit Administration (FTA) criteria for vibration annoyance are used and are summarized below in Section 5.6.2, *Thresholds of Significance*.

5.6.1.3 EXISTING CONDITIONS

Ambient Noise Monitoring

To determine baseline noise levels within the project area, ambient noise monitoring was conducted in the vicinity of the proposed project in the City of Fontana. PlaceWorks' staff conducted noise monitoring at nearby neighborhoods of the project site from December 6, 2021, through December 8, 2021. Noise measurements consisted of four short-term (15-minute) locations during peak traffic hours of 3:00 pm to 6:00 pm and one long-term (48-hours) location.

The primary noise source at all measurement locations was traffic. Urban and residential activity (such as dogs barking, and garage doors opening and closing) and aircraft overflights were secondary noise sources. Meteorological conditions during the measurement period were favorable for outdoor sound measurements and were noted to be representative of the typical conditions for the season. Generally, conditions included clear and partly cloudy skies with temperatures varying between 43 to 73 degrees Fahrenheit (°F) with calm winds (less than 1 mph) during the monitoring period.[2] All sound level meters were equipped with a windscreen during measurements.

[2] Source: Weather Underground History. Nearest weather station to project site is Ontario International Airport Station.

Figure 5.6-1 - Approximate Noise Monitoring Locations

Source: Nearmap, 2021

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All sound level meters used (Larson Davis LxT) for noise monitoring satisfy the American National Standards Institute (ANSI) standard for Type 1 instrumentation. All sound level meters were set to "slow" response and dBA. The meters were calibrated prior to and after the monitoring period. All measurements were at least 5 feet above the ground and away from reflective surfaces. Approximate noise measurement locations are described below; shown on Figure 5.6-1, *Approximate Noise Monitoring Locations*; and results are summarized in

Table 5.6-3, *Long-Term Noise Measurement Summary*, and Table 5.6-4, *Short-Term Noise Measurements Summary in A-weighted Sound Levels*. Long-term measurement graphs can also be found in Appendix K.

- **Long-Term Location 1 (LT-1)** was mounted along Sierra Avenue near 11020 White Oak Lane (residence) approximately 20 feet east from the nearest northbound travel lane centerline. A 48-hour noise measurement was conducted, beginning at 3:00 pm on Monday, December 6, 2021. The noise environment is characterized primarily by traffic along Sierra Avenue.

- **Short-Term Location 1 (ST-1)** was along Santa Ana Avenue, near 10895 Nuevo Drive (residence). The measurement location was approximately 20 feet north of the nearest westbound travel lane centerline. A 15-minute noise measurement began at 4:52 pm on Monday, December 6, 2021. The noise environment is characterized primarily by Santa Ana Avenue traffic. Traffic noise levels generally ranged from 70 dBA to 80 dBA. Secondary noise sources included a dog barking.

- **Short-Term Location 2 (ST-2)** was east of the project site near 11068 Post Oak Lane(residence) inside a residential neighborhood. A 15-minute noise measurement began at 4:30 pm on Wednesday, December 8, 2021. The noise environment is characterized primarily by traffic noise from Sierra Avenue and aircraft overflights. Secondary noise sources included occasional car pass-bys on Post Oak Lane. Aircraft overflight noise levels generally ranged from 60 dBA to 70 dBA and noise levels from traffic on Sierra Avenue ranged between 54-56 dBA.

- **Short-Term Location 3 (ST-3)** was on-site at the southwest corner of the project site. A 15-minute noise measurement began at 3:50 pm on Monday, December 6, 2021. The noise environment is characterized primarily by the birds chirping and distant traffic from Sierra Avenue and Jurupa Avenue. With birds chirping and traffic present in the background, noise levels were generally around 52 dBA. One aircraft overflight was observed during ST-3 with noise levels reaching up to 57 dBA.

- **Short-Term Location 4 (ST-4)** was south of the project site along Sierra Avenue near 11204 Sierra Avenue (residence). A 15-minute noise measurement began at 4:10 pm on Monday, December 6, 2021. The noise environment is characterized primarily by traffic along Sierra Avenue. Traffic noise levels generally ranged between 73 to 77 dBA. One aircraft overflight was observed during ST-4 with noise levels reaching up to 70 dBA.

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Table 5.6-3 Long-Term Noise Measurement Summary

Monitoring Location	Description	15-minute Noise Level, dBA		
		CNEL	Lowest L_{eq}(1hr)	Highest L_{eq}(1hr)
LT-1	Along Sierra Avenue near 11020 White Oak Lane property line 12/06/2021, 3:00 pm	77	64.0	75.2

Table 5.6-4 Short-Term Noise Measurements Summary in A-weighted Sound Levels

Monitoring Location	Description	15-minute Noise Level, dBA						
		L_{eq}	L_{max}	L_{min}	L_{25}	L_{16}	L_8	L_2
ST-1	Along Santa Ana Avenue near 10895 Nuevo Drive (residence) 12/06/2021, 4:52 pm	70.0	85.8	53.1	69.1	72.2	75.7	78.2
ST-2	At 11068 Post Oak Lane (residence) 12/08/2021, 4:30 pm	57.7	72.8	44.9	56.1	58.3	62.1	67.3
ST-3	Southwest corner of project site (on-site) 12/6/21, 3:50 pm	53.5	61.7	49.4	54.1	54.6	55.4	57.0
ST-4	Along Sierra Avenue near 11204 Sierra Avenue (residence) 12/6/21 4:10 pm	69.2	78.1	55.0	70.9	72.0	73.4	75.3

Sensitive Receptors

Certain land uses, such as residences, schools, and hospitals, are particularly sensitive to noise and vibration. Sensitive receptors include residences, senior housing, schools, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities that 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 closest sensitive receptors to the project site are residences to the east across Sierra Avenue. The project would also be adjacent to future residential uses to the south. Additional residential uses are further to the north and south of the project site.

5.6.2 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.

5.6.2.1 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 for 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 under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an outdoor environment. Based on this, a significant impact would occur if traffic noise increases the existing noise environment by the following:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher.
- 3 dBA or more for ambient noise environments of 60 to 64 CNEL.
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

5.6.2.2 STATIONARY NOISE THRESHOLDS

As discussed above in Section 5.6.1.2, *Regulatory Background*, the City's Municipal Code establishes exterior residential noise standards in Section 30-469, Noise. For the purposes of this analysis, these exterior noise standards are used to determine potentially significant stationary noise impacts.

5.6.2.3 CONSTRUCTION NOISE THRESHOLDS

The City of Fontana does not have an established construction noise threshold. Therefore, the Federal Transit Administration's (FTA) criteria for temporary construction noise is used. The FTA recommends a noise limit of 80 dBA L_{eq} at receiving residential receptor property lines. A significant impact would occur if construction noise would exceed 80 dBA L_{eq} at residential receptors.

5.6.2.4 VIBRATION THRESHOLDS

The City of Fontana does not provide a quantified vibration perception (human annoyance) standard, nor does it establish a specific vibration damage standard. The FTA criterion for vibration annoyance is 72 VdB for residential uses and acceptable vibration damage levels for various types of buildings are shown in Table 5.6-5, *Groundborne Vibration Damage Criteria*.

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Table 5.6-5 Groundborne Vibration Damage Criteria

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

5.6.3 Plans, Programs, and Policies

Plans, programs, and policies (PPP), including applicable regulatory requirements and project design features for air quality, are identified below.

PPP N-1 The Chaffey Community College District will comply with the City of Fontana's exterior noise standard of 65 dBA as presented in Section 30-469 of the City's Municipal Code.

PPP N-2 The Chaffey Community College District (District) will comply with nonresidential development standards set forth by the California Building Code, Title 24, Building Standards Administrative Code, Part 11, CALGreen, which requires that where ambient noise environments exceed 65 dBA CNEL (or 65 dBA L_{eq} where contours are not readily available), interior noise levels be reduced to 50 dBA L_{eq} or less. This would involve the District hiring a qualified acoustical consultant to prepare a detailed analysis with recommendations for building treatments to reduce school interior noise levels to 50 dBA L_{eq} (during the loudest hour) or lower. Treatments would include but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the District, along with the building plans and approved design, prior to issuance of a building permit.

PPP N-3 The Chaffey Community College District will ensure that project development will be constructed in accordance with Section 18-63(b)(7), of the City of Fontana's Municipal Code, which generally prohibits the erection (including excavating), demolition, alteration or repair of any building or structure outside the hours of 7:00 am to 6:00 pm on weekdays, 8:00 am to 5:00 pm Saturdays.

5.6.4 Environmental Impacts

5.6.4.1 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 Master Plan. Construction noise modeling is conducted using the

Federal Highway Administration (FHWA) Roadway Construction Noise Model. Traffic noise increases are calculated using a version of the FHWA RD-77-108 Traffic Noise Prediction Model. The model takes in the following inputs: average daily traffic volumes, vehicle mix, speeds, number of lanes, and day, evening, and night traffic splits. Model inputs were provided by Urban Crossroads. Project vibration impacts are addressed using reference vibration levels for construction equipment published by FTA (FTA 2018).

5.6.4.2 IMPACT ANALYSIS

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

Impact 5.6-1: Construction activities would result in temporary noise increases in the vicinity of the proposed project. [Threshold N-1]

Construction Vehicles

The transport of workers and materials to and from the construction site would incrementally increase noise levels along access roadways, including but not limited to Sierra Avenue south of I-10. Individual construction vehicle pass-bys and haul trucks may create momentary noise levels of up to 85 dBA (L_{max}) at 50 feet from the vehicle, but pass-bys would be temporary and generally short-lived. No haul truck trips are anticipated based on information provided by the District and CalEEMod modeling outputs.

Existing average daily trips south of I-10 range from 31,339 to 44,379 trips.[3] The project would generate up to 486 temporary construction worker and vendor trips during Phase 1 (and less during Phase 2). The addition of up to 486 temporary worker and vendor trips would result in a negligible temporary traffic noise increase of less than 0.1 dBA CNEL.[4] In addition, this would not exceed the most stringent transportation noise threshold of 1.5 dBA CNEL. Therefore, impacts would be less than significant.

Construction Equipment

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Each activity phase of construction involves the use of different construction equipment and therefore each activity phase has its own distinct noise characteristics. Noise levels from construction activities are dominated by the loudest piece of construction equipment. The dominant noise source is typically the engine, although work piece noise (such as dropping of materials) can also be noticeable. Construction is anticipated to be completed in two development phases. Phase 1 is anticipated to start in June of 2024 and be completed by June of 2026. Phase 2 is anticipated to start in June of 2027 and be completed by June of 2029.

The noise generated at each activity phase is determined by combining the L_{eq} contributions from each piece of equipment used at a given time. Construction activities associated with the proposed project would not require blasting or pile driving. Grading typically generates the highest noise levels because it requires the largest

[3] Existing average daily traffic provided by Urban Crossroads (see Table 5.6-7).
[4] Temporary noise increase due to construction trips = 10*log(existing trips + temporary worker and vendor trips/existing trips).

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equipment. Construction noise quite often exhibits a high degree of variability because factors such as noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction activity phase result in different noise levels at a given sensitive receptor. Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of 85 dBA at 50 feet. Since noise from construction equipment is intermittent and diminishes at a rate of 6 dBA per doubling distance,[5] the average noise levels at noise-sensitive receptors would be lower, because mobile construction equipment would move around the site with different loads and power requirements.

Noise levels from project-related construction activities were calculated from the simultaneous use of the three loudest pieces of construction equipment during each phase at spatially averaged distances (i.e., from the acoustical center of each disturbance area per phase) to the nearest receptors. Although construction may occur across the entire construction area, the area around the center of construction of each phase (e.g., grading, paving, building construction) best represents the potential average construction-related noise levels at the various sensitive receptors. Construction noise modeling was conducted for development Phase 1 and development Phase 2. As seen in Table 5.6-6, *Construction Nosie Levels*, construction noise would not exceed 80 dBA L_{eq} at the nearest noise sensitive receptors for either phase.

Table 5.6-6 Construction Noise Levels

Activity Phase	RCNM Reference Noise Level (dBA L_{eq})	Noise Level at Residences to East (dBA L_{eq})	Noise Level at Future Residences to South (dBA L_{eq})
Phase 1 Construction Noise Levels			
Distance in feet	***50 ft***	***447 ft***	***525 ft***
Site Preparation	83	64	62
Fine Grading	85	66	65
Rough Grading	85	66	65
Distance in feet	***50 ft***	***545 ft***	***900 ft***
Building Construction	83	62	58
Architectural Coating	74	53	49
Distance in feet	***50 ft***	***450 ft***	***115 ft***
Paving	84	64	76
Distance in feet	***50 ft***	***135 ft***	***NA ft***
Utility Trenching	77	68	N/A
Phase 2 Construction Noise Levels			
Distance in feet	***50 ft***	***447 ft***	***523 ft***
Grading	85	66	65
Distance in feet	***50 ft***	***545 ft***	***900 ft***
Building Construction	82	61	57
Architectural Coating	74	53	49
Distance in feet	***50 ft***	***450 ft***	***115 ft***
Paving	83	63	75

Source: RCNM & CalEEMod Equipment Defaults.
Notes: NA=Not Applicable

5 The sound attenuation rate of 6 dBA is generally conservative and does not consider additional attenuation provided by existing buildings, structures, and natural landscapes around the project site.

Level of Significance Before Mitigation: Less than significant impact.

Impact 5.6-2 Project implementation would result in long-term operation-related noise that would not exceed standards. [Threshold N-1]

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for 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 indiscernible. A change of 5 dBA is readily discernible to most people in an exterior environment. Based on this, the following thresholds of significance, similar to those recommended by the Federal Aviation Administration, are used to assess traffic noise impacts at sensitive receptor locations. As discussed in Section 5.13.2, *Thresholds of Significance*, a significant impact would occur if traffic noise increases the existing noise environment by the following:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher.
- 3 dBA or more for ambient noise environments of 60 to 64 CNEL.
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

As shown in Table 5.6-7, *Traffic Noise Levels for Existing and Project Buildout Conditions*, project-related noise increase would be up to 1.1 dBA CNEL; therefore, impacts would be less than significant. Cumulative traffic noise impacts are discussed in Section 5.6.5, *Cumulative Impacts*.

Table 5.6-7 Traffic Noise Levels for Existing and Project Buildout Conditions

	Traffic Volumes (average daily trips)			Traffic Noise Increase (dBA CNEL)		
Roadway Segment	Existing No Project	2030 No Project	2030 With Project	Project Noise Increase	Cumulative Plus Project Noise Increase	Project Contribution to Cumulative Noise Increase
Sierra Avenue - north of I-10 Ramps	53,829	61,724	61,724	0.6	0.6	0.0
Sierra Avenue - south of I-10 Ramps	44,379	54,745	54,745	0.2	0.9	0.0
I-10 Ramps - east of Sierra Avenue	21,128	26,095	26,095	1.1	0.9	0.0
I-10 Ramps - west of Sierra Avenue	27,400	31,245	31,245	0.7	0.6	0.0
Sierra Avenue - north of Slover Avenue	47,331	58,018	58,976	0.2	1.0	0.1
Sierra Avenue - south of Slover Avenue	32,339	37,492	39,431	0.4	0.9	0.2
Slover Avenue - east of Sierra Avenue	32,248	37,071	37,096	0.0	0.6	0.0
Slover Avenue - west of Sierra Avenue	20,049	27,812	27,837	0.1	1.4	0.0
Sierra Avenue - north of Santa Ana Avenue	32,943	38,161	40,100	0.4	0.9	0.2
Sierra Avenue - south of Santa Ana Avenue	33,135	38,101	41,023	0.5	0.9	0.3
Santa Ana Avenue - east of Sierra Avenue	7,298	8,808	8,833	0.2	0.8	0.0
Santa Ana Avenue - west of Sierra Avenue	9,118	10,871	10,896	0.1	0.8	0.0
Sierra Avenue - north of Driveway 1	32,173	37,034	39,957	0.5	0.9	0.3
Sierra Avenue - south of Driveway 1	32,173	37,034	39,957	0.5	0.9	0.3

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Table 5.6-7 Traffic Noise Levels for Existing and Project Buildout Conditions

Roadway Segment	Traffic Volumes (average daily trips)			Traffic Noise Increase (dBA CNEL)		
	Existing No Project	2030 No Project	2030 With Project	Project Noise Increase	Cumulative Plus Project Noise Increase	Project Contribution to Cumulative Noise Increase
Sierra Avenue - north of Driveway 2	32,173	37,034	39,957	0.5	0.9	0.3
Sierra Avenue - south of Driveway 2	29,155	33,827	34,682	0.2	0.8	0.1
Sierra Avenue - north of Jurupa Avenue	27,288	31,668	32,522	0.2	0.8	0.1
Sierra Avenue - south of Jurupa Avenue	29,185	33,085	33,370	0.1	0.6	0.0
Jurupa Avenue - east of Sierra Avenue	10,131	11,570	11,595	0.1	0.6	0.0
Jurupa Avenue - west of Sierra Avenue	23,340	26,822	27,365	0.1	0.7	0.1
Maximum CNEL Increase				**1.1**	**1.4**	**0.3**
Potentially Significant?				**No**	**No**	**No**

Source: Urban Crossroads 2021.

Mechanical and Operational Noise

The Master Plan proposes to construct several new buildings throughout the campus. Buildings are anticipated to have heating, ventilation, and air conditioning (HVAC) systems which are anticipated to be installed on the rooftops. The nearest sensitive receptors to proposed buildings are the single-family homes approximately 250 feet to the east. Typical HVAC noise is 72 dBA at a distance of 3 feet. At a distance of 250 feet, noise levels would attenuate to 34 dBA, which is below the daytime and nighttime exterior noise standard of 65 dBA. Therefore, HVAC noise impacts would be less than significant.

Building 4 would be the operational and maintenance building. The maintenance building could involve the inspecting and repairing of electrical systems, HVAC systems, and other utility services. Some noise could be generated during certain activities at this building. However, this would be periodic and on as-needed basis. Furthermore, the nearest noise sensitive receptors to this building are residences approximately 700 feet to the east. Noise levels would greatly attenuate at that distance and increases to the existing ambient noise would not be substantial. Therefore, impacts would be less than significant.

Noise and Land Use Compatibility

The City's Noise and Safety Element, does not provide a noise and land use compatibility table but does provide an action under Goal 8 stating that schools shall be considered a noise-sensitive land use and discouraged in areas in excess of 65 L_{eq} (12-hour) and that the State of California General Plan Guidelines shall be followed with respect to acoustical requirements. The State of California General Plan noise and land use compatibility guidelines, summarized in Table 5.6-2, designate existing environments of up to 70 dBA CNEL to be Normally Acceptable for schools. Table 5.6-8, *Noise and Land Use Compatibility Levels*, shows the existing CNEL at a distance of 20 feet from the adjacent roadway, Sierra Avenue. Based on available site plans, the estimated distance from the nearest southbound travel lane centerline to the nearest proposed college building is 125 feet.

At 125 feet, the attenuated CNEL would be approximately 69 dBA CNEL. This would place the building in the Normally Acceptable category. However, the L_{eq} (12-hour) would attenuate to approximately 66 dBA, one decibel above the suggested level in the Noise and Safety Element. Therefore, this would potentially result in interior noise levels impacting the classroom learning environment. However, with implementation of PPP N-2, the project would comply with the CALGreen, and buildings would be constructed to achieve interior noise levels of 50 dBA L_{eq} or less. Impacts would be less than significant.

Table 5.6-8 Noise and Land Use Compatibility Levels

Scenario	LT-1 Measured Noise Level at 20 feet from the nearest travel late centerline	Attenuated Noise Level at 125 feet (nearest building façade)
Measured CNEL, dBA	77.0	69
Exceeds OPR's 70 dBA CNEL Normally Acceptable Category?		**No**
Measured L_{eq} (12-hour), 7:00 am – 7:00 pm	73.6	66
Exceeds City of Fontana's General Plan Goal 8, Action B, 65 dBA L_{eq} (12-hour) Guideline for schools?		**Yes**

Level of Significance Before Mitigation: Less than significant impact.

Impact 5.6-3: The project would not create short-term nor long-term operational groundborne vibration and groundborne noise that would exceed standards. [Threshold N-2]

Construction can 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 effects 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.

Vibration Damage

Table 5.6-9 summarizes vibration levels for typical construction equipment at a reference distance of 25 feet. Typical construction equipment can generate vibration levels ranging up to 0.21 in/sec PPV at 25 feet. Vibration levels at a distance greater than 25 feet would attenuate to 0.2 in/sec PPV or less. The nearest structures, as measured from the edge of the project site, are retail/commercial buildings to the north at approximately 50 feet. Commercial buildings would typically fall under building Category II, Engineered Concrete and Masonry (see Table 5.6-5), with a corresponding threshold of 0.3 in/sec PPV. The nearest residential structures are approximately 175 feet to the east. Residential buildings would typically fall under building Category III, Non-Engineered Timber and Masonry with a corresponding threshold of 0.2 in/sec PPV. As shown in Table 5.6-9, *Vibration Levels for Typical Construction Equipment*, at these distances, vibration levels would attenuate below 0.2 and 0.3 in/sec PPV, and vibration impacts would be less than significant.

Table 5.6-9 Vibration Levels for Typical Construction Equipment

Equipment	PPV (in/sec) at 25 feet	PPV (in/sec) at Commercial/Retail to north at 50 feet	PPV (in/sec) at residential to east at 175 feet
Vibratory Roller	0.21	0.074	0.011
Hoe Ram	0.089	0.031	0.005
Large Bulldozer	0.089	0.031	0.005
Caisson Drilling	0.089	0.031	0.005
Loaded Trucks	0.076	0.027	0.004
Jackhammer	0.035	0.012	0.002
Small Bulldozer	0.003	0.001	<0.001

Source: FTA 2018.

Vibration Annoyance

For vibration annoyance, attenuated vibration levels at the nearest sensitive receptors are determined by measuring from the acoustical center of various phases to the nearest sensitive receptors. Unlike architectural damage, which is typically in terms of peak particle velocity, vibration annoyance is typically measured in terms of vibration decibels (VdB), which corresponds best with the human response to vibration. Therefore, average VdB levels are determined similarly to that of construction noise. Table 5.6-10, *Vibration Annoyance Levels for Typical Construction Equipment*, summarizes vibration annoyance levels for typical construction equipment. As shown in Table 5.6-10, vibration levels would not exceed the 72 VdB threshold at sensitive receptors. Therefore, vibration annoyance impacts would be less than significant.

Table 5.6-10 Vibration Annoyance Levels for Typical Construction Equipment

Phase	Equipment	FTA Reference (VdB)	Residential to East (VdB)	Residential to South (VdB)
Grading/Site Preparation	Distance in feet	25 ft	475 ft	900 ft
	Large Bulldozer	87	49	40
	Loaded Trucks	86	48	39
	Small Bulldozer	58	20	11
Building Construction (Phase II)	Distance in feet	25 ft	700 ft	300 ft
	Caisson Drilling	87	44	55
	Loaded Trucks	86	43	54
Paving (Phase I)	Distance in feet	25 ft	450 ft	500 ft
	Vibratory Roller	94	56	55

Source: FTA 2018.

Operational Vibration

The proposed project would not have any significant sources of vibration. Such sources typically include above-ground or underground rail system such as a subway or railroad tracks. Therefore, no impact would occur.

Level of Significance Before Mitigation: Less than significant impact.

Impact 5.6-4: The proximity of the project site to an airport or airstrip would not result in exposure of future workers to excessive airport-related noise. [Threshold N-3]

The nearest airport is Flabob Airport in Riverside, California, approximately 4.5 miles south of the project site. At that distance from the proposed project, airport noise would not expose people working in the project area to excessive aircraft noise levels. Therefore, no impact would occur.

Level of Significance Before Mitigation: No impact.

5.6.5 Cumulative Impacts

5.6.5.1 CUMULATIVE TRAFFIC

A significant cumulative traffic noise increase would occur if 1) the cumulative increase exceeded 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher; 3 dBA or more for ambient noise environments of 60 to 64 CNEL; or 5 dBA or more for ambient noise environments of less than 60 dBA CNEL, and if 2) the project's contribution to the cumulative increase (Cumulative Plus Project scenario) were calculated to be 1 dBA or greater. As shown in Table 5.6-7, the Cumulative Plus Project increase is up to 1.4 dBA CNEL along Slover Avenue, west of Sierra Avenue. Therefore, cumulative traffic noise impacts are less than significant.

5.6.5.2 CUMULATIVE CONSTRUCTION

The traffic study prepared for the proposed project included as Appendix L provided a list of planned and approved projects in the vicinity of the project site. Based on the cumulative list of planned and approved projects, construction activities could overlap with nearby planned and approved projects. Because construction noise attenuates at a high rate of 6 dBA per doubling of the distance of the noise source, only projects within 1,000 feet of the project site are considered to contribute to cumulative construction noise. Projects farther than 1,000 feet from the project site would typically not significantly contribute to overlapping construction noise. The traffic study was prepared in March 2022 and identified two planned and approved projects within 1,000 feet of the project site, the Fontana Foothills high-cube warehouse/distribution center project adjacent to the west of the project site and the Goodman Logistics Center Fontana III warehousing project on Juniper Avenue adjacent to the Fontana Foothills warehouse project, approximately 700 feet west of the project site. These projects have been constructed as of January 10, 2023. Therefore, the only construction project within 1,000 feet of the project site that has not been completed is the affordable housing project (Courtplace at Fontana) to the south of the project site. The noise analysis for the affordable housing project predicted construction noise levels of up to 76.8 dBA L_{eq} at a distance of 45 feet, the nearest existing sensitive receptor for the housing project. Noncumulative construction noise impacts are discussed in Impact 5.6-1 and noise levels at the future residences to the south are shown in Table 5.6-6 and Table 5.6-7, which would be up to 76 dBA during paving activities. The distance from the project site to the housing project's nearest sensitive receptor is approximately 360 feet and the distance from the housing project to the project site's nearest existing sensitive receptor is approximately 415 feet. At these distances, the composite cumulative construction noise levels from these two projects would not exceed the FTA criterion of 80 dBA L_{eq}. Moreover, construction equipment would operate throughout the respective construction sites and the associated noise levels would not occur at a fixed location for extended periods of time and would not concentrate in one area near surrounding sensitive uses. Therefore, cumulative construction noise levels would be less than significant.

5.6.6 Level of Significance Before Mitigation

Upon implementation of PPP N-1 through PPP N-3, the following impacts would be less than significant: 5.6-1, 5.6-2, 5.6-3, and 5.6-4.

5.6.7 Mitigation Measures

No mitigation measures are required.

5.6.8 Level of Significance After Mitigation

Not applicable.

5.6.9 References

AirNav, LLC. 2020. Airport Information. Accessed January 13, 2022. http://www.airnav.com/airports.

California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS"). https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf.

Federal Highway Administration. 2006, August. *Construction Noise Handbook*.

Federal Transit Administration (FTA). 2018, September. *Transit Noise and Vibration Impact Assessment*.

Fontana, City of. 2018. Fontana Forward General Plan Update 2015-2035. https://www.fontana.org/2632/General-Plan-Update-2015---2035.

———. October 2021. Fontana Municipal Code. https://library.municode.com/ca/fontana/codes/zoning_and_development_code?nodeId=CH30ZODECO_ARTVREZODI_DIV6PEST.

Governor's Office of Planning and Research (OPR). 2017. Noise and Land Use Compatibility Table. In Appendix D of *State of California General Plan 2017 Guidelines*.

Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*. 3rd edition. Woodbury, NY: Acoustical Society of America.

Urban Crossroads. 2022, March 8. Chaffey Community College District's Fontana Campus Master Plan Traffic Study.

———. 2020a, April. Fontana Foothills Commerce Center Noise Impact Analysis.

———. 2020b, April. Goodman Industrial Park Fontana III Noise Impact Analysis.