Noise & Vibration Study
Arrow Route Warehouse
County of San Bernardino

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1.0 INTRODUCTION

Arrow Route Warehouse (Project) proposes to re-develop an approximately 9.23 net acre site with a single 209,759 square-foot (sf) building and a Lot Merger to combine APNs 232-161-18 and 232-161-19 into one parcel located within the Sphere of Influence for City of Fontana, San Bernardino County. Specifically, the Project site is located on 15719 and 15755 Arrow Route west of Tokay Avenue and east of Lime Avenue, adjacent to the City of Fontana. The Project site is currently developed with three automotive dismantling/parts businesses that will be demolished. The Project proposes to construct a non-refrigerated warehouse building with potential office area, loading docks, landscaping, and associated truck and passenger vehicle parking.

The project has the potential to generate changes in the existing noise environment. Under the California Environmental Quality Act (CEQA), projects of this type must undergo an environmental review to assess potential impacts. The following noise analysis has been prepared to support the Mitigated Negative Declaration (MND) for the project and to demonstrate consistency with all applicable federal, state, and local noise regulations.

The following noise study describes the project, provides information regarding noise fundamentals, describes the applicable federal, state, and local noise guidelines, characterizes the existing noise environment, provides the study methods and procedures used to perform the traffic noise analysis, evaluates off-site traffic noise impacts, presents stationary-related noise impacts from loading and unloading activities and construction noise impacts near sensitive residential communities.

1.1 Project Location and Site Description

The project site is located on 15719 and 15755 Arrow Route, along the southern side, west of Tokay Avenue, and east of Lime Avenue in an unincorporated area of San Bernardino County, immediately adjacent to the City of Fontana. **Figure 1-Project Vicinity Map** depicts the project area in a regional context, while **Figure 2-Aeria Map** presents the project site. The site is accessible by two driveway entrances on Arrow Route. Existing structures that currently exist at the Project site will be demolished. **Figure 3-Site Plan** provides the proposed site plan of the warehouse.

The Project site, which consists of two parcels (Assessor's parcel number (APNs) 232-161-18 and 232-161-19), is relatively flat and is situated at an elevation approximately 1,230 feet (ft) to 1,250 ft above mean sea level. The Project site is within the City of Fontana's Sphere of Influence (SOI). The San Bernardino Countywide Plan Policy Plan Land Use Map categorizes the Project site as General Industrial (GI) and the Development Code's Zoning District Map designates the Project site as "Regional Industrial" (IR). The area surrounding the Project site is currently dominated by light industrial uses to the north, east, and west, and vacant undeveloped land to the south. The Project site is currently developed with three automotive dismantling/parts businesses, containing four single-story storage facilities with office space, and associated outbuilding/garages. The Project site is occupied by Riteway Auto Dismantlers, All Auto Parts, and Arrow Salvage (pallet storage and sales operations).

The Project site is located on land designated by the California Department of Conservation's Farmland Mapping and Monitoring Program as Urban and Built-Up Land.

The proposed Project site is located outside of the airport influence area (AIA) of the Ontario International Airport (ONT).

1.2 Project Description

The proposed 15719 and 15755 Arrow Route Warehouse Project (herein referred to as proposed Project or Project and as further described below) involves the demolition of the existing development and the construction and operation of an industrial non-refrigerated warehouse building.

Demolition of Existing Development

The existing automotive dismantling/parts businesses, the storage facilities with office space, and associated outbuilding/garages occupied by Riteway Auto Dismantlers, All Auto Parts, and Arrow Salvage will be demolished as part of the Project. The existing fence along the southern perimeter and within the Project site will be removed. Also, the existing pavement and concrete within the Project site will be removed. The existing ornamental trees on the north portion of the Project site, along Arrow Route, will be removed.

Proposed Warehouse

The approximately 209,759-square-feet (sf), industrial non-refrigerated warehouse building includes 10,000-sf of potential office space on an approximately 9.23 net acre site (see **Figure 3 –Site Plan**). The proposed development includes concrete-paved circulation and parking areas, including semi-trailer parking, an underground chamber water quality infiltration system, septic system, and loading docks. The applicant is proposing a speculative building as there is no tenant identified at this time. The speculative warehouse building is assumed to operate 24 hours a day seven days a week.

The proposed development has been designed to comply with the applicable San Bernardino County Development Code (SBCDC) and Countywide Plan Standards for Regional Industrial (IR) uses, which include, but are not limited to: setbacks, Floor Area Ratio (FAR), lot coverage, height limit, fencing, landscaping, parking and loading standards, lighting standards, and architectural requirements. The warehouse building will provide approximately 28 dock doors on the western side of the proposed building. Landscaping, walls and fences would be provided on site as required for screening, privacy. The Project also includes approximately 50,948 sf of on-site landscaping. The existing block wall along the west and east side of the Project site will remain and then transition to the proposed 8-foot high steel tube fence that will be constructed along portions of the west and east side and the entire length of south side of the Project site. Truck loading docks and truck parking will be located on the western side of the Project site and will be accessed via two 8-ft high metal swing door gates placed at the north and southeast side of the truck yard. As noted above, the Project site will include onsite landscaping. Landscaping will be installed along the majority of all four sides of the Project site. Vehicle parking located on the north side of the building and the buildings frontage will be visible from Arrow Route.

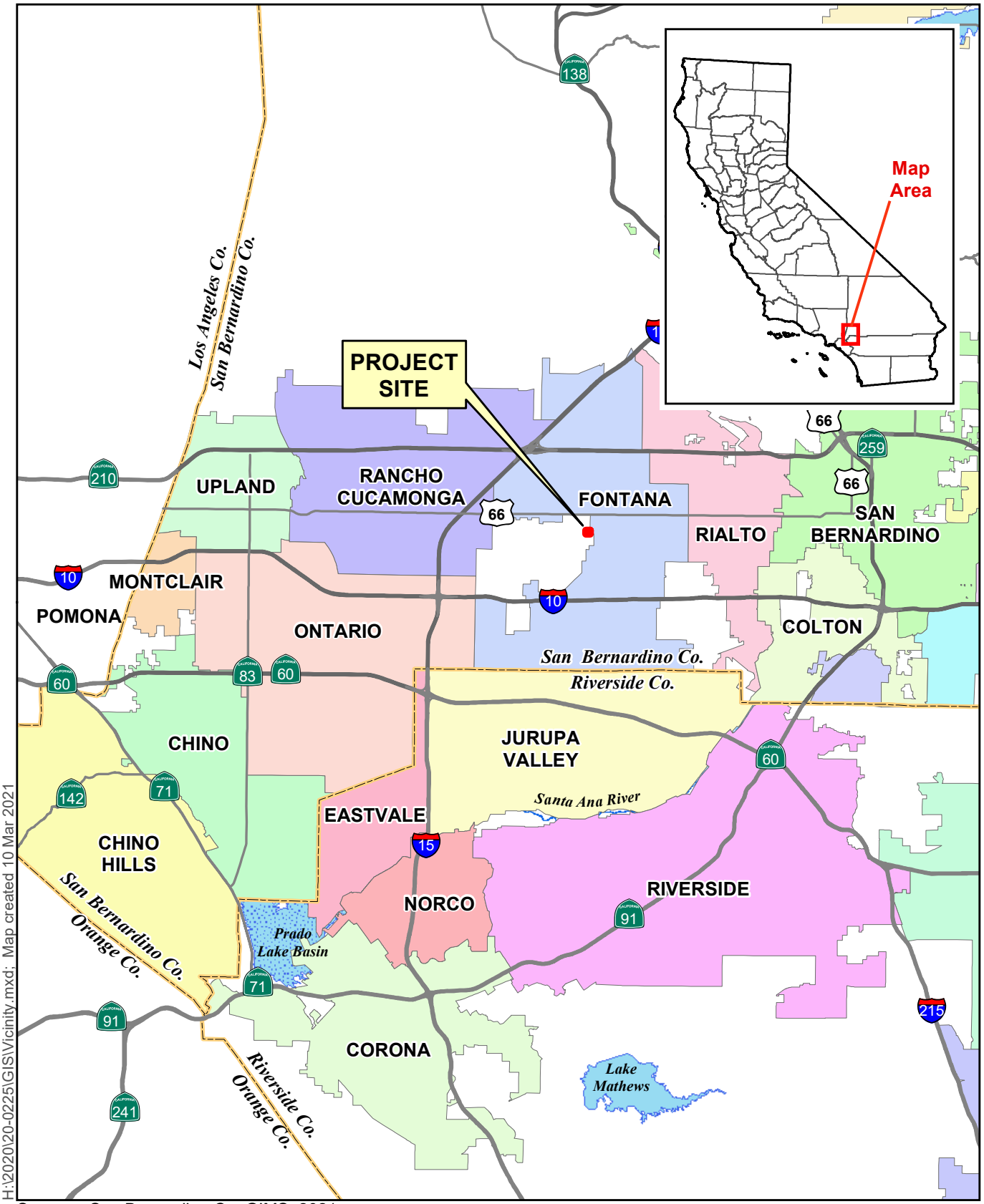
The Project includes curb and gutter, and storm drains to convey on-site flows to the proposed perforated underground chamber infiltration system located along the western portion of the Project site, near the truck trailer parking stalls. The infiltration system is sized to fully capture the postconstruction water quality volume and to mitigate for increased runoff. During high intensity runoff events, the upstream head will push runoff above the water quality volume out of the chambers via an overflow curb weir in the southwest corner of the Project site and surface flow to the southwest draining into the West Fontana Channel before entering existing flood control Banana Basin.

Access to the Project site will be from Arrow Route via two driveways; the westerly driveway would be for truck and passenger vehicle access and the easterly driveway would be only for passenger vehicle access. As shown on **Figure 3 –Site Plan**, automobile and trailer parking will be provided on the site; the number of parking spaces provided would be consistent with the parking requirements outlined in SBCDC, Chapter 83.11. This Project will provide 105 standard parking stalls, seven American Disabilities Act-compliant (ADA) handicapped parking spaces- two of which are also vanpool/electric vehicle (EV)/ clean air stalls, and nine vanpool/EV/ clean air stalls for a total of 121 vehicle parking spaces. The Project also includes 37 trailer parking spaces. Seven short term and seven long term bicycle parking stalls will also be provided.

Arrow Route, which is adjacent to the Project site, is a Major Highway. According to the Countywide Plan, Major Highways typically contain two to four lanes and a right-of-way (ROW) width of 104 ft minimum with a curb-to-curb separation of 80 feet. The proposed Project will expand the existing 36 ft roadway to 40 ft, add new curb and gutter, reconfigure driveways, and add landscaping on the southerly portion of Arrow Route along the Project site's frontage.

The Project's potable water pipeline will connect to existing connections in Arrow Route. Wastewater generated by the Project site will be treated by a septic system. The existing power poles along the Project's frontage of Arrow Route, will be undergrounded or relocated within ROW.

The proposed Project would be constructed in a single phase, and the earthworks volumes during grading would be balanced on the site. Maximum excavation depths would be approximately 8 ft. Construction is expected to commence in January 2022 and be completed by November 2022. The proposed warehouse building is an allowable land use per the SBCDC; however, a Conditional Use Permit (CUP) is required for a warehouse building exceeding 80,000 sf in size in the IR Zoning District. Implementation of the Project would require a Lot Merger to combine the two Project parcels into one parcel.



H:\2020\20-0225\GIS\Vicinity.mxd; Map created 10 Mar 2021

Sources: San Bernardino Co. GIMS, 2021; Riverside County GIS, 2021

0 2 4 6 Miles

Figure 1 – Vicinity Map

15719 and 15755 Arrow Route Warehouse

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H:\2020\20-0225\GIS\Aerial.mxd; Map created 10 Mar 2021

Sources: San Bernardino Co. GIS, 2021 (streets) and 2020 (imagery).

0 250 500 750 Feet

Figure 2 - Aerial Map

15719 and 15755 Arrow Route Warehouse

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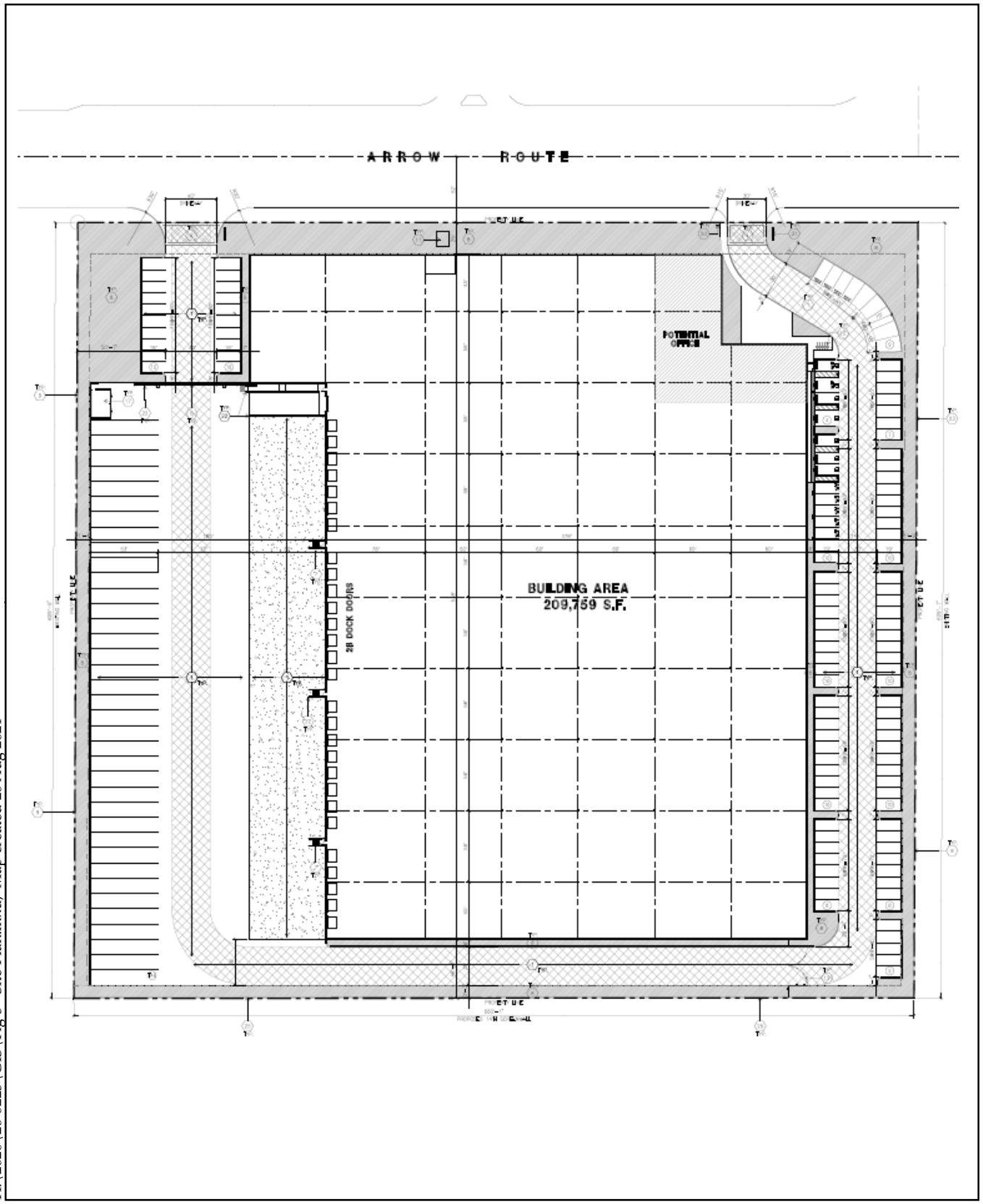

H:\2020\20-0225\GIS\Fig 5 - Site Plan.mxd; Map created 20 Aug 2021

Figure 3- Site Plan

15719 and 15755 Arrow Route Warehouse

Not to Scale

ALBERT A. WEBB ASSOCIATES

2.0 FUNDAMENTALS OF SOUND

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. As such, background noise level changes throughout a typical day, corresponding with the addition and subtraction of distant noise sources such as traffic and single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

Because the noise environment is continually changing, average noise over a period of time is generally used to describe the community noise environment, which requires the measurement of noise over a period of time to accurately characterize a community noise environment. This time-varying characteristic of environmental noise is described using various noise descriptors, which are defined below:

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum instantaneous noise level experienced during a given period of time.

L_{min}: The minimum instantaneous noise level experienced during a given period of time.

L_x: The noise level exceeded a percentage of a specified time period. The "x" represents the percentage of time a noise level is exceeded. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: Also termed the day-night average noise level (DNL), the L_{dn} is the average A-weighted noise level during a 24-hour day, obtained after the addition of 10 dBA to measured noise levels between the hours of 10:00 pm to 7:00 am to account for nighttime noise sensitivity.

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after the addition of 5 dBA to measured noise levels between the hours of 7:00 pm to 10:00 pm and after the addition of 10 dBA to noise levels between the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

In addition, the sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high

frequencies. To approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) is used. On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA. **Table 2-1** includes examples of A-weighted noise levels from common indoor and outdoor activities.

Table 2-1. Typical A-Weighted Noise Levels

Common Outdoor Noise	Noise Level (dBA)	Common Indoor Noise
	— 110 —	Rock band (noise to some, music to others)
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher in a neighboring room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing
SOURCE: Caltrans, 1998.		

Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dBA. The smallest recognizable change in sound levels is approximately 1 dBA. A 3-dBA

increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. Most people judge a 10-dBA increase as an approximate doubling of the sound loudness.

Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source to the receiver and having intervening obstacles such as walls, buildings, or terrain features between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include moving the sound source closer to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

2.1. Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance)
- Interference effects (e.g., communication, sleep, and learning interference)
- Physiological effects (e.g., startle response)
- Physical effects (e.g., hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects refer to interruption of daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can consist of both awakening and arousal to a lesser state of sleep. With regard to the subjective effects, the responses of individuals to similar noise events are diverse. They are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day, and the type of activity during which the noise occurs, and individual noise sensitivity.

Overall, a wide variation of tolerance to noise exists, based on an individual's past experiences with sound. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived.
- A 3 dBA change in noise levels is considered to be a barely perceivable difference outside of the laboratory.
- A change in noise levels of 5 dBA is considered to be a readily perceivable difference.
- A change in noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

2.2. Noise Attenuation

Stationary point sources of noise, including stationary, mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Noise from line sources (such as traffic noise from vehicles) attenuates at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans 2013).

Physical barriers between the noise source and the receiving property are also useful in reducing noise levels. Effective noise barriers can lower noise levels by 10 to 15dBA. A noise barrier is more effective when it's placed closest to the noise source or receiver, depending upon site geometry. However, there is a limitation on the effectiveness of a noise barrier. Noise barriers must block the line of sight between the receiving property and the noise source. When this occurs, a noise barrier can achieve a 5-dBA noise level reduction. This may require the noise barrier to be sufficiently long and high enough to block the view of a road to reduce traffic noise.

2.3. Fundamentals of Vibration

Vibration is energy transmitted in waves through the ground or man-made structures. These energy waves generally dissipate with distance from the vibration source. Familiar sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operation of heavy earth-moving equipment. As described in the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment (FTA 2018), ground-borne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility causing buildings to shake and rumbling sounds to be heard.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. Peak particle velocity is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA 2018). The decibel notation acts to compress the

range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction. Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV (FTA 2018).

In residential areas, the background vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people (FTA 2018).

3.0 REGULATORY FRAMEWORK

The project's governing regulatory framework within the City of Fontana and the County of San Bernardino includes federal, state, and local noise and vibration standards. These standards are summarized below.

3.1 Federal Regulations and Standards

There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the project. With regard to noise exposure and workers, the Office of Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise. Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These controls are implemented through regulatory restrictions on truck manufacturers.

3.2 State Regulations and Standards

Noise Standards

The California Department of Health Services has established guidelines for land use and noise exposure compatibility that are listed in Table 3-1. In addition, the California Government Code (Section 65302(f)) requires a noise element to be included in general plans and requires that the noise element: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-familyhomes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and"conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Table 3-1. California Community Noise Exposure (Ldn or CNEL)				
Land Use	**Normally Acceptable[a]**	**Conditionally Acceptable[b]**	**Normally Unacceptable[c]**	**Clearly Unacceptable[d]**
Single-family, Duplex, Mobile Homes	50 - 60	55 – 70	70 - 75	above 75
Multi-Family Homes	50 - 65	60 – 70	70 - 75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 – 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 – 70	70 - 80	above 75
Auditoriums, Concert Halls, Amphitheaters	---	50 – 70	---	above 70
Sports Arena, Outdoor Spectator Sports	---	50 – 75	---	above 75
Playgrounds, Neighborhood Parks	50 - 70	---	67 - 75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business, and Professional Commercial	50 - 70	67 – 77	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 – 80	above 75	---

a Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

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

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

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

SOURCE: FTA, 2006.

The State of California has noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dBA. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at

15 meters (50 feet) from the centerline. These standards are implemented through controls on vehicle manufacturers and by state and local law enforcement officials' legal sanctions.

3.3 Local Regulations and Standards

3.3.1 County of San Bernardino Countywide Plan

The County of San Bernardino Countywide Plan (October 2020) Human-generated Hazards section identifies noise-sensitiveland uses and noise sources, defines areas of noise impact, and establishes goals and policies to ensure that County residents are protected from excessive noise. The following lists applicable noise goals and policies obtained from the Countywide Plan.

Goal HZ-2 Human-generated Hazards

People and the natural environment protected from exposure to hazardous materials, excessive noise, and other human-generated hazards.

Policy HZ-2.7 **Truck delivery areas.** We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.

Policy HZ-2.8 **Proximity to noise generating uses.** We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.6 **Coordination with transportation authorities.** We collaborate with airport owners, FAA, Caltrans, SBCTA, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, and updates to transportation-related plans and projects to minimize noise impacts and provide appropriate mitigation measures.

Policy HZ-2.9 **Control sound at the source.** We prioritize noise mitigation measures that control sound at the source before buffers, sound walls, and other perimeter measures.

Policy HZ-2.10 **Agricultural operations.** We require new development adjacent to existing conforming agricultural operations to provide adequate buffers to reduce the exposure of new development to operational noise, odor, and the storage or application of pesticides or other hazardous materials.

Policy HZ-3.19 **Community education.** We make educational materials available to the public in unincorporated environmental justice focus areas so that they clearly understand the potential for adverse pollution, noise, odor, vibration, and lighting and glare, and the effects of toxic materials to promote civil engagement. We require that such educational materials be developed in accordance with Plain Language Guidelines. We require that this information be made available in public spaces such as libraries and community centers, as well as on County websites and other appropriate means.

3.3.2 Codified Ordinances of the County of San Bernardino

Chapter 83.01, Section 83.01.080, Noise, of the Codified Ordinances of the County of San Bernardino (SanBernardino County Code) establishes standards concerning acceptable noise levels for both noise- sensitive land uses and for noise-generating land uses. The following sections of the San Bernardino County Code are applicable to the proposed Project.

§ 83.01.080 – Noise.

Noise Standards for Stationary Noise Sources.

Noise Standards. Table 3-2: Noise Standards for Stationary Noise Sources describes the noise standards for emanations from a stationary noise source, as it affects adjacent properties:

Table 3-2. Noise Standards for Stationary Sources		
Affected Land Uses (*Receiving Noise*)	**7:00 a.m. – 10:00 p.m. L_{eq}**	**10:00 p.m. – 7 :00 a.m. L_{eq}**
Residential	55 dB(A)	**45 dB(A)**
Professional Services	55 dB(A)	**55 dB(A)**
Other Commercial	60 dB(A)	**60 dB(A)**
Industrial	70 dB(A)	**70 dB(A)**
Notes: **Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.** **dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A- weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.** **Ldn = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the** **hourly noise levels measured during the night (from 10:00 p.m. to 7:00 a.m.). In this way Ldn takes into account the lower tolerance ofpeople for noise during nighttime periods.**		
Source: San Bernardino County Code Section 83.01.080, Table 83-2.		

Noise Limit Categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied,or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of thefollowing:

The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.

The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

The noise standard plus 20 dB(A) for any period of time.

Noise Standards for Adjacent Mobile Noise Sources. Noise from mobile sources may affectadjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 3-3 : Noise Standards for Adjacent Mobile Noise Sources.

Table 3-3. Noise Standards for Adjacent Mobile Noise Sources			
Land Use		L_{dn} (or CNEL) dB(A)[4]	
Categories	Uses	Interior[1]	Exterior[2]
Residential	Single and multi-family, duplex, mobile homes	45	60[3]
Commercial	Hotel, motel, transient housing	45	60[3]
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development,professional offices	45	65
	Amphitheater, concert hall, auditorium, movietheater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65
Notes: N/A: Not Applicable; Ldn: average day/night sound level; CNEL: Community Noise Equivalent Level; dBA: A-weighted decibelscale The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors. The outdoor environment shall be limited to: Hospital/office building patios Hotel and motel recreation areas Mobile home parks Multi-family private patios or balconies Park picnic areas Private yard of single-family dwellings School playgrounds An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation. CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.			
Source: San Bernardino County Code, Section 83.01.080, Table 83-3.			

Increases in Allowable Noise Levels. If the measured ambient level exceeds any of the firstfour noise limit categories in Subdivision (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subdivision (d)(2), above, the maximum allowablenoise level under this category shall be increased to reflect the maximum ambient noise level.

Reductions in Allowable Noise Levels. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 3-2 Noise Standards for Stationary Noise Sources) shall be reduced by five dB(A).

Exempt Noise. The following sources of noise shall be exempt from the regulations of thisSection:

Motor vehicles not under the control of the commercial or industrial use.

Emergency equipment, vehicles, and devices.

Temporary construction, maintenance, repair, or demolition activities between 7:00a.m. and 7:00 p.m., except Sundays and Federal holidays.

Noise standards for other structures. All other structures shall be sound attenuated against the combined input of all present and projected exterior noise to not exceed the criteria shown in Table 3.4.

Table 3-4. Noise Standards for Other Structures	
Typical Uses	12-Hour Equivalent Sound Level (Interior) in dBA Ldn
Educational, institutions, libraries, meeting facilities, etc.	45
General office, reception, etc.	50
Retail stores, restaurants, etc.	55
Other areas for manufacturing, assembly,testing, warehousing, etc.	65

In addition, the average of the maximum levels on the loudest of intrusive sounds occurring during a 24-hour period shall not exceed 65 dBA interior.

§ 83.01.090 Vibration.

Vibration Standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.
Vibration Measurement. Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibrationalong any lot line next to a parcel within a residential, commercial, and industrial land usezoning district.

Exempt Vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

Motor vehicles not under the control of the subject use.

Temporary construction, maintenance, repair, or demolition activities between7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

3.3.3 City of Fontana General Plan

Adopted on November 13, 2018, the Fontana Forward General Plan Update 2015-2035 (Fontana GeneralPlan) identifies noise standards that are used as guidelines to evaluate transportation noise level impacts.These standards are also used to assess the long-term traffic noise impacts on specific land uses. According to the Fontana General Plan, land uses such as residences have acceptable exterior noise levels of up to 65 dBA CNEL. Based on the guidelines in the Fontana General Plan, an exterior noise level of 65 dBA CNELis generally considered the maximum exterior noise level for sensitive receptors.

Land uses near these significant noise-producers can incorporate buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques toreduce the impact of excessive noise. Selection of the appropriate noise control technique would vary depending on the level of noise that needs to be reduced as well as the location and intended land use. The City has adopted the Noise and Safety Element as a part of the updated Fontana General Plan. The Noise and Safety Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources. Additionally, the Noise and Safety Element identifies transportation noise policies designed to protect, create, and maintain an environment free of harmful noise that could impact the health and welfare of sensitive receptors. The following Fontana General Plan goals, policies, and actions for addressing noise are applicable to the Project:

Goal 8: The City of Fontana protects sensitive land uses from excessive noise by diligent planning through 2035.

> ***Policy 8.2:*** Noise-tolerant land uses shall be guided into areas irrevocably committed toland uses that are noise-producing, such as transportation corridors.
>
> ***Policy 8.4:*** Noise spillover or encroachment from commercial, industrial and educational land uses shall be minimized into adjoining residential neighborhoods or noise-sensitive uses.
>
> ***Action C:*** The State of California Office of Planning and Research General PlanGuidelines shall be followed with respect to acoustical study requirements.

Goal 9: The City of Fontana provides a diverse and efficiently operated ground transportation system that generates the minimum feasible noise on its residents through 2035.

Policy 9.1: All noise sections of the State Motor Vehicle Code shall be enforced.

Policy 9.2: Roads shall be maintained such that the paving is in good condition and freeof cracks, bumps, and potholes.

Action A: On-road trucking activities shall continue to be regulated in the City to ensure noise impacts are minimized, including the implementation of truck-routes based on traffic studies.

Action B: Development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses shall provide appropriate mitigation measures.

Action D: Explore the use of "quiet pavement" materials for street improvements.

Goal 10: Fontana's residents are protected from the negative effects of "spillover" noise.

Policy 10.1: Residential land uses and areas identified as noise-sensitive shall be protected from excessive noise from non-transportation sources including industrial, commercial, and residential activities and equipment.

Action A: Projects located in commercial areas shall not exceed stationary-source noise standards at the property line of proximate residential or commercial uses.

Action B: Industrial uses shall not exceed commercial or residential stationary sourcenoise standards at the most proximate land uses.

Action C: Non-transportation noise shall be considered in land use planning decisions.

Action D: Construction shall be performed as quietly as feasible when performed in proximity to residential or other noise sensitive land uses.

3.3.4 City of Fontana Municipal Code

Standards established under the City of Fontana Municipal Code (Fontana Municipal Code) are used to analyze noise impacts originating from the Project. Operational noise impacts are typically governed by Fontana Municipal Code Sections 18-61 through 18-67. However, the City currently relies on delineated general industrial areas. According to the General Plan Noise and Safety section, these areas are buffered from residential uses through land use zoning that places either light industrial or commercial uses between the major manufacturers involved in heavy industrial uses and local residents. This separation of land uses meaning noise intrusion on conforming land uses is not a problem at this time.

Guidelines for non-transportation and stationary noise source impacts from operations at private properties are found in the Zoning and Development Code in Chapter 30 of the Fontana Municipal Code.Applicable guidelines indicate that no person shall create or cause any sound exceeding the City's stated noise performance standards measured at the property line of any residentially zoned property. Per Fontana Municipal Code Section 30-543(A), the performance standards for exterior noise emanating fromindustrial uses are 65 dBA between the hours of 7:00 a.m. and 10:00 p.m. and 70 dBA during the noise- sensitive hours of 10:00 p.m. to 7:00 a.m. at residential uses. However, the nighttime performance standard in Section 30-543(A) should actually reference 65 dBA instead of the 70 dBA that is listed. For this analysis, a 65-dBA nighttime noise level standard is conservatively used to analyze potential noise impacts at off-site residential receptors within the City of Fontana.

The City has also set restrictions to control noise impacts from construction activities. Section 18-63(b)(7) states that the erection (including excavation), demolition, alteration, or repair of any structure shall onlyoccur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays, except in the case of urgent necessity or otherwise approved by the City of Fontana. Although the Fontana Municipal Code limits the hours of construction, it does not provide specific noise level performance standards for construction.

4.0 THRESHOLDS OF SIGNIFICANCE

Appendix G of the 2019 California Environmental Quality Act (CEQA) Guidelines states that a project could have a noise impact if any of the following would occur:

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

b) Generation of excessive ground-borne vibration or ground-borne noise levels?

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

5.0 EXISTING NOISE MEASUREMENTS

The existing noise environment was characterized by collecting field noise measurements at sensitive residential properties within the project area. One (1) long-term 24-hour measurement was taken at the project site on April 29 and April 30, 2021. **Table 5-1** presents the CNEL values and hourly day and night noise levels for the project site for the sensitive receiver identified in **Figure 4-Long Term Monitoring Location**. Appendix A includes the field monitoring data for each monitoring location.

5.1 Measurement Procedure and Criteria

Hourly noise levels were measured during typical weekday conditions over 24 hours to describe the existing noise environment, the daytime, nighttime hourly noise levels, and associated 24-hour CNEL. The 24-hour measurements provide the hourly noise levels to calculate the CNEL for the project area. Long-term noise measurements were taken using a Larson Davis Type 1 precision sound level meter. All noise meters were programmed in "slow" mode to record noise levels in the "A" weighted form. The sound level meter and microphone were mounted, five feet above the ground, and equipped with a windscreen during all measurements. The Larson Davis sound level meter was calibrated before the monitoring using a CAL200 calibrator. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

5.2 Noise Measurement Locations

The noise monitoring location was selected based on the proximity to nearby residential property and local roadways. Noise measurement location at Site 1, approximately 1,400 feet from the Project site, as shown in **Figure 4-Long Term Monitoring Location,** was monitored for 24 hours. Site 1 is located at the residential property at the corner of Arrow Route and Tokay Avenue. The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network (i.e., Arrow Route). The background ambient noise levels include the auto and heavy truck activities near the noise level measurement location. **Table 5-1** identifies the hourly daytime (7:01 am to 10:00 pm) and nighttime (10:01 pm to 7:00 am) noise levels at each noise level measurement location consistent with the County of San Bernardino Municipal Code. Appendix A provides a summary of the existing hourly ambient noise levels as described below.

The noise level measurements collected show an overall 24-hour exterior noise level of 63 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 54.2 dBA L_{eq} with an average nighttime noise level of 51.0 dBA L_{eq}.

Table 5-1. Existing (Ambient) Long-Term (24-hour) Noise Level Measurements[1]								
Noise Monitoring Location ID[2,3]	Description	Hourly Noise Levels (1hr-L_{eq})						24-hour Noise Levels (CNEL)
		Daytime Minimum	Daytime Maximum	Average Daytime	Nighttime Minimum	Nighttime Maximum	Average Nighttime	
Site 1	Arrow Route & Tokay Street	52.4	59.8	54.2	47.8	60.6	51.0	63

[1] Noise measurement was taken on April 29, 2021 and April 30, 2021. See Appendix A for monitoring data.

[2] See Figure 4 for the location of the monitoring site.

[3] Taken with Larson Davis Type 1 noise meter

Site 1

Figure 4. Long Term Monitoring Location

6.0 ANALYSIS METHODS AND PROCEDURES

The following section outlines the analysis methods utilized to predict future noise and vibration levels from the construction and operation of the project.

6.1 Construction

6.1.1 Noise Analysis Methods

The assessment of the construction noise impacts must be relatively general at this phase of the project because many of the decisions affecting noise will be at the discretion of the contractor. However, an assessment based on the type of equipment expected to be used by the contractor can provide a reasonable estimate of potential noise impacts and the need for noise mitigation. Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration. A worst-case construction noise scenario was developed to estimate the loudest activities occurring at the project site. Pile driving and blasting activities are not anticipated; therefore, the loudest construction activities are centered around the movement of heavy construction equipment during site preparation, grading operations, and the erection of buildings. Noise levels were estimated based on a worst-case scenario, which assumed all pieces of equipment would be operating simultaneously during each construction phase. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

6.1.2 Vibration Analysis Methods

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from Federal Transit Administration (FTA) published data for construction equipment. Potential groundborne vibration levels resulting from construction activities within the project area were evaluated at the nearest off-site residential land use and compared to the County of San Bernardino vibration standard of 0.2 PPV (in/sec).

6.2 Operational Noise & Vibration Analysis

6.2.1 Operational Traffic Noise Analysis Methods

The traffic analysis prepared by Webb & Associates demonstrated that the project is in a low Vehicle Mile Travel (VMT) generating area per the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool for base year 2016, present year 2021 and future year 2040. The project is also not considered a local-serving project. Therefore, a qualitative analysis was performed to evaluate the determine whether the project would provide a net increase in vehicle trips compared to existing conditions that would have the ability to increase noise levels to a perceptible level of 3 dBA or greater. If increases are perceptible the Project would have a significant impact.

6.2.2 Operational Vibration Analysis Methods

As a conservative measure, the vibration vs. distance curve obtained from the Caltrans Transportation and Construction Vibration Guidance Manual was used to represent worst-case vibration levels from truck traffic at the nearest receiver locations along Arrow Route. This curve provides empirical data collected from several

freeways and local roadways to determine auto and truck traffic vibration levels. This curve was used to make a qualitative assessment of anticipated vibration levels at residential land uses along local roadways near the project site. These vibration levels were compared to the County of San Bernardino vibration standard. This criteria was utilized to evaluate the vibration effects of continuous auto and truck traffic.

6.2.3 Stationary Noise Analysis Method

The primary non-transportation noise sources associated with the project are HVAC equipment, on-site parking lot circulation, and the 28-bay loading dock. In order to evaluate these noise sources at the nearest residential noise-sensitive receptors, reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

7.0 OFF-SITE TRANSPORTATION NOISE IMPACTS

Roadway Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Traffic Impact Analysis (TIA) and Vehicle Miles Traveled (VMT) Screening Analysis for WPT Arrow Industrial Warehouse Development prepared by Webb & Associates (August, 2021), the proposed Project would generate 365 daily trips. The Project's increase in traffic would result in noise increases on Project area roadways. In general, a traffic noise increase of 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. According to the Community Mobility Circulation Element of the Fontana General Plan, average daily traffic (ADT) volumes along Arrow Route Boulevard (the nearest roadway with available ADT volumes) are 16,900 ADT. As such, the Project's vehicle trip generation (365 daily trips) would represent an increase of less than two percent in vehicle trips along Arrow Route Boulevard compared to existing conditions. Therefore, the proposed Project would not generate enough traffic to result in a permanent 3-dBA increase in ambient noise levels and traffic noise would not exceed any local standards. Impacts would be less than significant in this regard.

8.0 STATIONARY-RELATED NOISE IMPACTS

Implementation of the proposed Project would create new sources of noise in the Project vicinity. The major noise sources associated with the Project that could potentially impact existing and future nearby residences include mechanical equipment (i.e. trash compactors, air conditioners, etc.); truck and loading dock operations (i.e. slow-moving trucks on the site, maneuvering and idling trucks, equipment noise); parking areas (i.e. car door slamming, car radios, engine start-up, and car pass-by); and off-site traffic noise.

8.1 Mechanical Equipment

The Project site is surrounded by industrial uses to the east, south, and west. The nearest sensitive receptors are residences located approximately 1,153 feet south, 2,710 feet west and 1,400 feet east of the Project site. Stationary noise sources from the proposed Project that could affect the nearby residential uses include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[1] As such, noise levels at the nearest sensitive receptor (a single-family residences 1,153 feet south of the Project site) would be approximately 25 dBA, which is below the County's and City's noise standards of 55 dBA and 65 dBA, respectively, for residential uses. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed Project would result in a less than significant impact related to mechanical equipment noise levels.

8.2 Truck and Loading Dock Noise

During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting braking activities; backing up toward the docks; dropping down the dock ramps; and maneuvering away from the docks. Loading/unloading activities would occur on the western portion of the proposed warehouse building. Driveways and access to the site would occur along Arrow Route.

The proposed warehouse building includes dock-high doors for truck loading/unloading and manufacturing/light industrial operations. Loading dock noise is approximately 68 dBA at 50 feet.[2] Loading dock noise levels would be approximately 41 dBA at the nearest receptors (between Lime Avenue and Tokay Avenue south of the Project site near the railroad tracks) conservatively assuming a clear line of sight and no attenuation from intervening walls or structures. Furthermore, loading dock doors would also be surrounded with protective aprons, gaskets, or similar improvements that, when a trailer is docked, would serve as a noise barrier between the interior warehouse activities and the exterior loading area. This would attenuate noise emanating from interior activities, and as such, interior loading and associated activities would be permissible during all hours of the day. Therefore, noise levels associated with truck loading/unloading activities would not exceed the County's and City's noise standards of 55 dBA and 65 dBA, respectively, for residential uses.

[1] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, Noise Navigator Sound Level Database with Over 1700 Measurement Values, 2015.
[2] Charles M. Salter Associates, Inc., Midpoint at 237 Loading Dock Noise Study, March 27, 2014.

Trucks at the Project site would also utilize backup alarms during loading/unloading activities. Backup alarms produce a typical noise level of 79 dB at 30 feet.[3] At the nearest receiver at a of 1,153 feet, backup alarm noise levels would be approximately 47 dBA and would be below the County's and City's noise standards of 55 dBA and 65 dBA, respectively, for residential uses. Therefore, noise levels from trucks and loading/unloading activities would not exceed any local noise standards and a less than significant impact would occur.

8.3 Parking Noise

The Project provides 121 automobile parking stalls and 37 trailer parking stalls. Parking is located on the eastern and western portions of the Project site. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time- averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA[4] and may be an annoyance to adjacent noise-sensitive receptors. Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.[5] It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period.

Parking and driveway noise would be consistent with existing noise in the vicinity and would be partially masked by background traffic noise from motor vehicles traveling along Arrow Route. Actual noise levels over time resulting from parking activities are anticipated to be far below the local noise standards. Therefore, noise impacts associated with parking would be less than significant.

[3] Ibid.

[4] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

[5] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.

9.0 OPERATIONAL VIBRATION ANALYSIS

The operation of the project will increase auto and truck traffic within the project area. Per the Caltrans Transportation Noise and Vibration Manual (Caltrans, 2013a), traffic, auto, and heavy trucks traveling on roadways rarely generate vibration amplitudes high enough to cause structural or cosmetic damage. However, a qualitative analysis was provided in this study to evaluate the likelihood of vibration impacts from the project utilizing the empirical vibration curve developed by Caltrans.

The Caltrans Noise and Vibration Manual provides a collection of measured vibration data for truck pass-bys. This data demonstrates that truck pass-bys can be characterized by a peak in vibration that is considerably higher than those generated by automobiles for a few seconds. Vibration from these trucks drops off dramatically with distance. As truck volumes increases, more peaks will occur but not necessarily higher peaks. Vibration wavefronts emanating from several trucks closely together may either cancel or partially cancel (destructive interference) or reinforce or partially reinforce (constructive interference) each other, depending on their phases and frequencies. Since traffic vibrations can be considered random, the probabilities of total destructive or constructive interference are minimal. Coupled with the fact that two trucks cannot occupy the same space and the rapid drop-off rates, it is understandable that two or more trucks normally do not contribute significantly to each other's peaks.

In order to predict the maximum truck traffic vibrations from the project, the Caltrans empirical curve, as shown in **Figure 5-Maximum Truck Traffic Vibration Levels vs. Distance,** was obtained from the Caltrans Noise and Vibration Manual (Caltrans, 2013). This curve was used to predict operational vibration impacts. **Figure 5- Maximum Truck Traffic Vibration Levels vs. Distance** shows a graph of measured vibration data collected from truck traffic traveling on freeways and local roadways plotted by truck traffic vibrations vs. distance from the nearest travel lane's centerline. The graph indicates that the highest traffic generated vibrations measured on freeway shoulders (5 m from the centerline of the nearest lane) have never exceeded 2.0 mm/s or (0.08 in/sec) with the worst combinations of heavy trucks. This amplitude coincides with the maximum recommended "safe amplitude" for historical buildings. The graph illustrates the rapid attenuation of vibration amplitudes, which dips below the threshold of perception for most people at about 45 m (150 ft). Caltrans states that sensitive receivers adjacent to local roadways, within 15 m(50 feet) of the nearest travel lane's centerline will have maximum worse-case vibration levels near 0.08 mm/s or (0.0032 in/sec or 70 VdB).

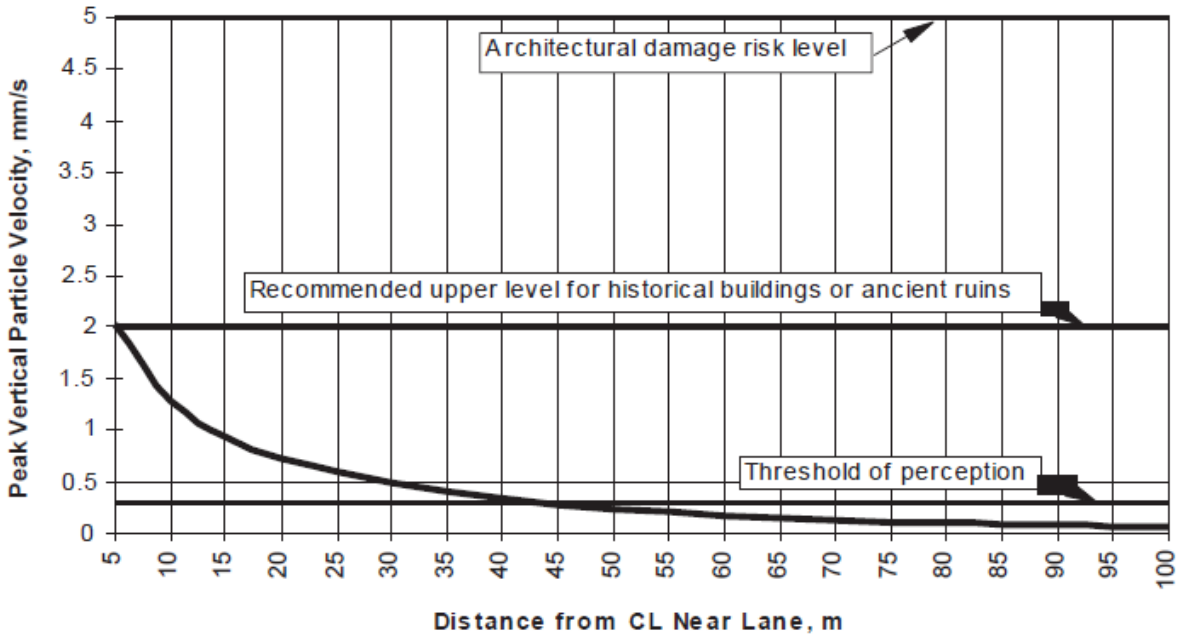

Figure 5. Maximum Truck Traffic Vibration Levels vs. Distance

This predicted vibration level falls well below the distinctly perceptible level of 0.2 PPV (in/sec). It is expected that actual vibration levels within the project area from truck traffic will be lower than this worst-case level when soil type and pavement conditions are considered. On this basis, the potential for the Project to result in the exposure of persons to, or generation of, excessive ground-borne vibration is determined to have less than a significant impact.

10.0 SHORT-TERM CONSTRUCTION NOISE & VIBRATION IMPACTS

Construction noise represents a temporary impact on ambient noise levels. Construction noise is primarily caused by diesel engines (trucks, dozers, backhoes), impacts (jackhammers, pile drivers, hoe rams), and backup alarms. Construction equipment can be stationary or mobile. Stationary equipment operates in one location for hours or days in a constant mode (generators, compressors) or generates variable noise operations (pile drivers, jackhammers), producing constant noise for a period of time. Mobile equipment moves around the site and is characterized by variations in power and location, resulting in significant variations in noise levels over time. Grading activities and rock blasting typically generate the greatest noise impacts during construction. This section assesses the potential noise impacts to the existing sensitive residential land uses during construction.

10.1 Noise Sensitive Uses and Construction Noise Standards

The County of San Bernardino Municipal Code section 83.01.090 establishing a vibration standard of 0.2 in/sec measured at or beyond the lot line.

The County of San Bernardino limits temporary construction, maintenance, repair, or demolition activities between 7:00a.m. and 7:00 p.m., except Sundays and Federal holidays.

The Fontana has also set restrictions to control noise impacts from construction activities. Section 18-63(b)(7) states that the erection (including excavation), demolition, alteration, or repair of any structure shall onlyoccur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays, except in the case of urgent necessity or otherwise approved by the City of Fontana. Although the Fontana Municipal Code limits the hours of construction, it does not provide specific noise level performance standards for construction.

10.2 Construction Schedule

The construction schedule for the project is described below.

As shown in **Table 10-1**, the estimated construction period for the project is approximately nine months. Construction is anticipated to begin with grading in January 2022 and end with architectural coatings (painting) in October 2022, as shown in **Table 10-1**.

Table 10-1. Construction Schedule

Construction Activity	Start Date	End Date
Demolition	January 01, 2022	January 31, 202
Grading	February 01, 2022	February 21, 2022
Building Construction	February 22, 2022	October 31, 2022
Paving	October 1, 2022	October 31, 2022
Architectural Coatings	October 01, 2022	October 31, 2022

Table 10-2 presents the equipment for each construction activity based on engineering estimates and the Applicant.

Table 10-2. Equipment by Construction Activity

Construction Activity	Off-Road Equipment	Unit Amount
Demolition	Concrete/Industrial Saws	1
	Excavators	3
	Rubber Tired Dozers	2
	Rubber Tired Loader	1
Grading	Rubber Tired Loader	1
	Graders	1
	Roller	1
	Scrapers	3
	Tractors/Loaders/Backhoes	1
Building Construction	Crane	1
	Forklifts	3
	Generator Set	4
	Tractor/Loader/Backhoe	3
	Welder	2
	Excavators	1
	Aerial Lifts	6
	Laser Screed (Pump)	1
	Cement and Mortar Mixers (concrete finishing machines)	5
Paving	Paver	1
	Paving Equipment	2
	Rollers	2
Architectural Coatings	Air Compressors	1

10.3 Construction Noise Levels

The RCNM model was used to determine which phase of construction activity for the project would generate the greatest construction noise level. It was assumed that each construction activity would occur within a distance of 1,153 feet of the nearest residential receivers between Lime Avenue and Tokay Avenue south of the Project site near the railroad tracks. The receiver distance was measured from the loading dock to the adjacent property line of the affected residential land uses to the south of the project site. **Table 10-3** presents the noise levels in L_{eq} for each construction phase. As shown in **Table 10-3,** the highest noise level that would be experienced at the nearest residential property is 61.3 dBA L_{eq}. This noise level occurs during the building construction phase of the project.

Table 10-3. Construction Noise Levels by Construction Phase	
Construction Phases	**Construction Hourly dBA, Leq[1]**
Demolition	57.8
Grading	57.6
Building	61.3
Paving	57.3
Painting	44.7
[1]Worst-case construction noise levels evaluated at the nearest residential property line.	

10.4 Construction Vibration

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated using FTA data. Construction activities that would occur within the project site include grading, building construction, paving, and painting. These activities have the potential to generate low levels of ground-borne vibration.

Using the FTA's vibration source level of construction equipment and the FTA's construction vibration assessment methodology, it is possible to estimate the project vibration impacts. **Table 10-4** presents the expected project-related vibration levels at the nearest residential land use at a distance of 1,153 feet. The receiver distance was measured from the loading dock to the residential land uses between Lime Avenue and Tokay Avenue south of the Project site near the railroad tracks.

Table 10-4. Construction Equipment Vibration Levels				
Noise Receiver	**Distance to Property Line[1]**	**Large Bulldozer Reference Vibration Level PPV_{ref} (in/sec) at 25ft**	**Peak Vibration PPV (VdB) at 1,153 ft**	**Exceed Threshold? (Below 0.2 in/sec)**
Residences between Lime Avenue and Tokay Avenue south of the Project site near the railroad tracks	1,153 feet	0.089	0.00028	No
[1] Reference noise level obtained from the FTA Noise and Vibration Manual, Table 7-4. (FTA, 2018)				

Based on the FTA's reference vibration levels, a large bulldozer represents the peak source of vibration with a reference level of 0.089 in/sec at a distance of 25 feet. At 1,153 feet, construction vibration levels are expected to approach 0.00028 in/sec. Using the construction vibration assessment annoyance criteria provided by the County of San Bernardino of 0.2in/sec, the construction of the project site will not result in vibration impact. Impacts at the site of the closest sensitive receptor are unlikely to be sustained during the entire construction period. Moreover, construction at the project site will be restricted to daytime hours, thereby eliminating potential vibration impacts during sensitive nighttime hours.

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Appendix A Noise Monitoring Data

Site 1 - CNEL Values, April 29-30, 2021					
Background Leq and Hour Averaging DNL					
Hour	**Background L_{eq}**	**Penalty**	**L_{eq} DNL (L_{eq} + 10 or 5)**		**L_{eq} DNL (10^(D/10))**
0	51	10	61	DNL	1258925.412
1	47.8	10	57.8	DNL	602559.5861
2	49.2	10	59.2	DNL	831763.7711
3	52.9	10	62.9	DNL	1949844.6
4	60.6	10	70.6	DNL	11481536.21
5	57.7	10	67.7	DNL	5888436.554
6	57.9	10	67.9	DNL	6165950.019
7	57		57		501187.2336
8	55.1		55.1		323593.6569
9	55.7		55.7		371535.2291
10	56.3		56.3		426579.5188
11	59.8		59.8		954992.586
12	52.4		52.4		173780.0829
13	54.6		54.6		288403.1503
14	52.6		52.6		181970.0859
15	56.6		56.6		457088.1896
16	56.3		56.3		426579.5188
17	55.8		55.8		380189.3963
18	56.2		56.2		416869.3835
19	55.7	5	60.7	CNEL	1174897.555
20	55.1	5	60.1	CNEL	1023292.992
21	58.3	5	63.3	CNEL	2137962.09
22	59.2	10	69.2	DNL	8317637.711
23	53.5	10	63.5	DNL	2238721.139
(Hour 23 is 23:00 to 23:59)				Average=	1998928.986
	10LOG10 of (Average=)				**63**