Noise Study Report

4th Street Park Expansion Project
City of Calimesa

Prepared for:

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1.0 INTRODUCTION

For CEQA purposes, the noise analysis centers around whether an increase in the future noise level would result in a significant effect. A comparison is made between existing noise levels to the predicted noise level with the project. Under CEQA, the assessment entails looking at the noise impact's existing setting and determining how large or perceptible any noise increase would be in the given area. Critical factors considered include the uniqueness of the setting, the noise receptors' sensitive nature, the magnitude of the noise increase, the number of residences affected, and the absolute noise level. As the project is located with the City of Calimesa, the CEQA analysis will also take into consideration the applicability of complying with the City of Calimesa Noise Ordinance, General Plan Noise Element, and other applicable city policies for protecting sensitive land use categories in the project area as well as complying with CEQA threshold requirements. Pursuant to Appendix G of the CEQA Guidelines, a noise analysis will be performed to determine whether the proposed project will result in:

- 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 other agencies' applicable standards?
- Excessive groundborne vibration or groundborne noise levels?
- Expose people residing or working in the project area to excessive noise levels for the project if it is 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?

2.0 PROJECT DESCRIPTION

The 4th Street Park Expansion Project (project) proposes the expansion of the Fourth Street Community Park on a 2.32-acre lot, located in the City of Calimesa, California, on 5th Street. The Project includes the construction of restrooms and a maintenance shed. The park expansion site will include open landscaped areas with decomposed granite walking trails with distance markers that connect to trails at the existing park. The Project includes sport courts that may be used for basketball and/or tennis/pickleball. Additional parking for the park expansion site is proposed on 5th Street.

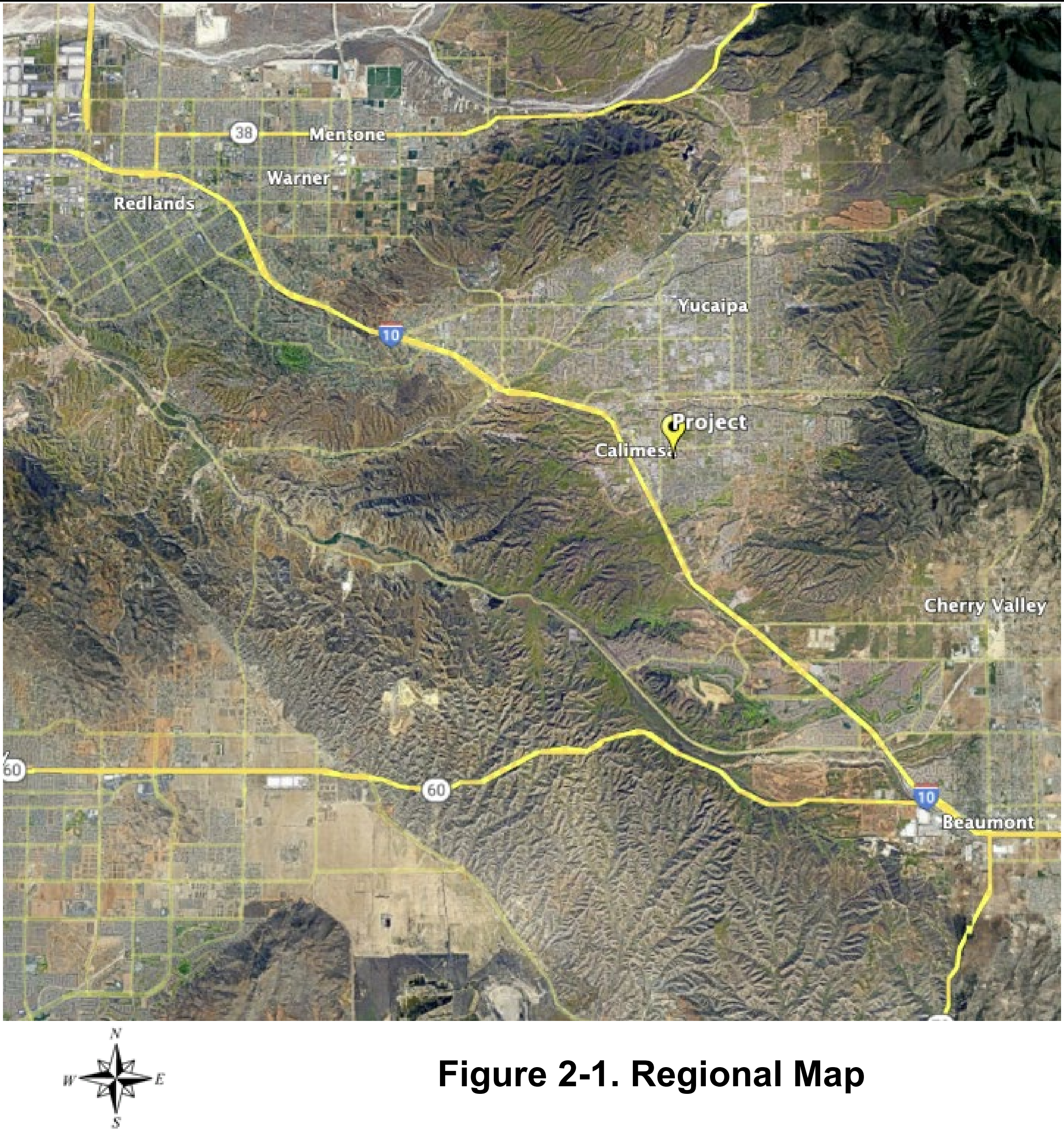


Figure 2-1. Regional Map

Figure 2-2. Project Vicinity Map

3.0 FUNDAMENTALS OF NOISE

Table 3-1 presents a glossary of general acoustical terminology used in this analysis.

Table 3-1. Definition of Acoustical Terms

Term	Definition
Noise	Whether something is perceived as a noise event is influenced by the type of sound, the perceived importance of the sound, and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the listener.
Sound	For purposes of this analysis, sound is a physical phenomenon generated by vibrations that result in waves that travel through a medium, such as air, and result in auditory perception by the human brain.
Frequency	Sound frequency is measured in Hertz (Hz), which is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates several times per second. When the drum skin vibrates 100 times per second, it generates a sound pressure wave oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.
Amplitude or Level	It is measured in decibels (dB) using a logarithmic scale. A sound level of zero dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about one to two dB. A three to five dB change is readily perceived. The average person usually perceives a change in the sound level of about 10 dB as a doubling (or decreasing by 10 dB, halving) of the sound's loudness.
Sound pressure	Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level (SPL or Lp). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (µPa). Lp depends not only on the power of the source but also on the distance from the source and the acoustical characteristics of the space surrounding the source.
A-weighting	Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency and instead are composed of a broadband of frequencies differing in sound level. The

	method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects the typical frequency-dependent sensitivity of average healthy human hearing. This is called "A-weighting," and the decibel level measured is referred to as dBA. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA "curve" of decibel adjustment per octave band center frequency (OBCF) from a "flat" or unweighted SPL.
Equivalent sound level	Although sound level value may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor, L_{eq}, may be used to describe sound that is changing in level. L_{eq} is the energy-average dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured.
L_{max} and L_{min}	Additionally, it is often desirable to know the range of amplitudes for the noise source(s) under study. This is typically accomplished by reporting the L_{max} and L_{min} indicators that represent the root mean square (RMS) maximum and minimum noise levels during a given monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the "noise floor."
Statistical sound values	The statistical noise descriptors L10, L50, and L90, are commonly used to describe environmental noise's time-varying character. These noise levels exceeded during 10, 50, and 90 percent of a stated time interval. Sound levels associated with L10 typically describe transient or short-term events, while levels associated with L90 describe the "steady-state" (or most prevalent) background noise conditions.
Day-night sound level	Average sound exposure over 24 hours is often presented as a day-night average, or time-weighted, sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10 p.m. to 7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime sounds.

In addition, 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 3-2** includes examples of A-weighted noise levels from common indoor and outdoor activities.

Table 3-2. 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 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. Instead, 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 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.

3.1 Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound 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 include 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 and 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 noise. 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). 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 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 a 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 straightforward 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.

3.2 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 absorbent 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. Line sources (such as traffic noise from vehicles) attenuate 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, which would substantially cut the loudness of traffic noise. A noise barrier is more effective when 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.

3.3 Fundamentals of Vibration

Vibration is energy transmitted in waves through the ground or human-made structures. These energy waves generally dissipate with distance from the vibration source. Familiar sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operation of heavy earthmoving 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.

There are several different methods that 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 commonly 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 PPV amplitude ratio 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 human-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, the 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 perception threshold 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).

4.0 Regulatory Framework

The proposed project area's governing regulatory framework includes federal, state, and local agencies that enforce noise standards and specific regulations that govern project development, emitted pollutants, and ambient air quality status for the region.

4.1 Federal Regulations and Standards

There are no federal noise standards that directly regulate environmental noise related to the proposed project's construction or operation. 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 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

Federal Transit Authority Vibration Standards

The FTA has adopted vibration standards to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 4-1**.

Table 4-1. Construction 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, 2006.	

The FTA has also adopted the following standards for groundborne vibration impacts related to human annoyance: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations, such as vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and research operations. Category 2 refers to all residential land uses and buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 4-2**. No thresholds have been adopted or recommended for commercial and office uses.

Table 4-2. Groundborne Vibration Impact Criteria for General Assessment

Land Use Category	Frequent Events [a]	Occasional Events [b]	Infrequent Events [c]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

[a] Frequent Events" is defined as more than 70 vibration events of the same source per day.
[b] Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
[c] Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
[d] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
SOURCE: FTA, 2018

4.2. State Standards

Senate Bill 860

In the State of California, State Senate Bill 860, which became effective January 1, 1976, directed the California Office of Noise Control within the State Department of Health Services to prepare the *Guidelines for the Preparation and Content of Noise Elements of the General Plan*.[1] One purpose of these guidelines was to provide sufficient information concerning the community's noise environment so that noise could be considered in the land-use planning process. As part of this publication, Land Use Compatibility Standards were developed in four categories: Normally Acceptable, Conditionally Acceptable, Normally Unacceptable, and Clearly Unacceptable. These categories were based on earlier work done by the U.S. Department of Housing and Urban Development.

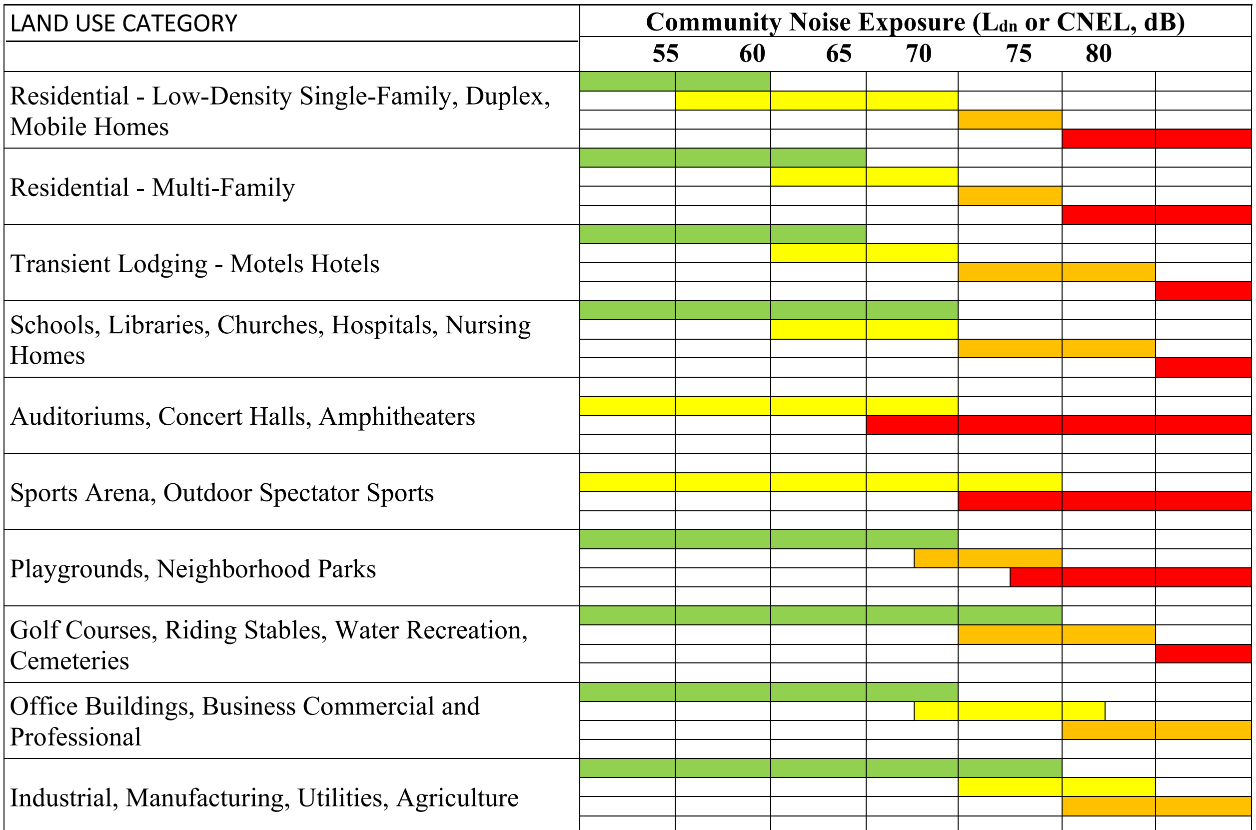
The interpretation of these four categories is as follows:

Normally Acceptable:	Specified land use is satisfactory without special insulation.
Conditionally Acceptable:	New development requires a detailed analysis of noise insulation requirements.
Normally Unacceptable:	New development is discouraged and requires a detailed analysis of insulation features.
Clearly Unacceptable:	New development should not be undertaken.

[1] State of California, General Plan Guidelines, Governor's Office of Planning and Research, October, 2003.

The state has developed a land-use compatibility matrix for community noise environments that further defines four categories of acceptance and assigns CNEL values to them. In addition, the State Building Code (Part 2, Title 24, California Code of Regulations) establishes uniform minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and residential units other than detached single-family residences from the effects of excessive noise, including, but not limited to, hearing loss or impairment and interference with speech and sleep. Residential structures to be located where the CNEL or L_{dn} is 60 dBA or greater are required to provide sound insulation to limit the interior CNEL to a maximum of 45 dBA. An acoustic or noise analysis report prepared by an experienced acoustic engineer is required to issuance a building permit for these structures. Conversely, land use changes that result in increased noise levels at residences of 60 dBA or greater must be considered in the evaluation of impacts to ambient noise levels. **Table 4-3**, *Land Use Compatibility for Community Noise Environments*, graphically depicts noise levels' acceptability for various uses.

Table 4-3. Land Use Compatibility Matrix



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

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

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

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

SOURCE:
Adapted from: Governor's Office of Planning and Research. 2003. State of California General Plan Guidelines. Appendix C, Noise Element Guidelines, Figure 2. Sacramento, CA.

4.3 Community Noise Assessment Criteria

4.3.1 Local Standards

The City of Calimesa has included goals and policies within the General Plan Noise Element to minimize mobile-source generated noise levels. The following goals, policies, and implementation programs apply to this project as they apply to roadway improvement projects.

GOAL N-1: Ensure that all land uses are protected from excessive and unwanted noise.

GOAL N-2: Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses in Calimesa.

POLICY N-1: Future development that could increase ambient noise levels shall be required to mitigate the anticipated noise increase to the extent possible.

POLICY N-7: Consider the following uses to be sensitive to noise and vibration, and discourage these uses in areas where existing or projected future noise levels would be in excess of 65 dBA CNEL and/or vibration would be more than 0.0787 peak particle velocity (inches per second):

- Schools
- Hospitals
- Rest homes
- Long-term care facilities
- Mental care facilities
- Residential uses
- Libraries
- Passive recreation uses
- Places of worship (MM)

POLICY N-9: The City will work to create and preserve a quiet living environment for all residential neighborhoods.

POLICY N-10: When making decisions regarding changes to the General Plan or Zoning Maps, or regarding the suitability of a proposed use, the standards in Table N-C shall apply. (MM)

TABLE N-C: NOISE COMPATIBILITY BY LAND USE TYPE

Land Use Designations	Completely Compatible	Tentatively Compatible	Normally Incompatible	Completely Incompatible
All Residential (Single- and Multi-Family)	Less than 60 dBA	60–70 dBA	70–75 dBA	Greater than 75 dBA
All Nonresidential (Commercial, Industrial & Institutional)	Less than 70 dBA	70–75 dBA	Greater than 75 dBA	(1)
Public Parks (Lands on which public parks are located or planned)	Less than 65 dBA	65–70 dBA	70–75 dBA	Greater than 75 dBA

All noise levels shown in this table are designated CNEL.
1. To be determined as part of the project review process.

POLICY N-11: Table N-D provides the City's standards for maximum exterior non- transportation noise levels to which land designated for residential land uses may be exposed for any 30-minute period on any day. Where existing ambient noise levels exceed these standards, the ambient noise level shall be highest allowable noise level as measured in dBA LEQ (30 minutes). (MM)

TABLE N-D: EXTERIOR NOISE LEVEL STANDARDS FOR NON-TRANSPORTATION NOISE, MEASURED AS dBA L_{EQ} (30 MINUTES)

Land Use Type	Time Period	Maximum Noise Level (dBA)
Single-Family Homes and Duplexes	10 P.M. to 7 A.M.	50
	7 A.M. to 10 P.M.	60
Multi-Family Residential – 3 or More Units Per Building (Triplex +)	10 P.M. to 7 A.M.	55
	7 A.M. to 10 P.M.	60

POLICY N-20: The City shall adopt and apply measures to limit construction noise in residential areas.

POLICY N-31: Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas. (MM)

POLICY N-32: Require that all construction equipment be kept properly tuned and use noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer. (MM)

City of Calimesa Municipal Code

Title 8 – Health and Safety, Chapter 8.15 – Noise Abatement and Control

Section 8.15.010 of the Calimesa Municipal Code (CMC) states the purpose of Chapter 8.15 is to establish criteria and standards for regulating noise levels within the City and implementing the noise provisions contained in the City's General Plan.

8.15.080 Construction equipment.

Except for emergency work, it is unlawful for any person, including the city, to operate any single or a combination of powered construction equipment at any construction site, except as outlined in subsections (A) and (B) of this section:

A. It is unlawful for any person, including the city, to operate any single or a combination of powered construction equipment at any construction site before 7:00 a.m. or after 7:00 p.m. In addition, it is unlawful for any person, including the city, to operate any single or a combination of powered construction equipment at any construction site before 10:00 a.m. or after 5:00 p.m. on Saturdays and Sundays, January 1st, the last Monday in May, known as "Memorial Day," July 4th, the first Monday in September, Thanksgiving Day and December 25th. When January 1st, July 4th, or December 25th fall on a Sunday, it is unlawful for any person to operate any single or a combination of powered construction equipment at any construction site before 10:00 a.m. or after 5:00 p.m. on the following Monday.

B. No such equipment, or a combination of equipment regardless of age or date of acquisition, shall be operated so as to cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes.

C. In the event that lower noise limit standards are established for construction equipment pursuant to state or federal law, said lower limits shall be used as a basis for revising and amending the noise level limits specified in subsection (B) of this section. [Ord. 91-21; Code 1990 § 4.2.08.]

8.15.090 Containers and construction material

It is unlawful for any person to handle or transport or cause to be handled or transported in any public place any container or any construction material in such a way as to create a disturbing, excessive, or offensive noise as defined in CMC 8.15.020. [Ord. 91-21; Code 1990 § 4.2.09.]

The City of Calimesa will make reasonable efforts to limit construction hours as outlined in CMC 9.15.080 to protect the health, safety, or general welfare of Calimesa residents.

The regulations and policies discussed above are intended to protect the community from excessive noise and vibration to ensure residents' and workers' quality of life in the City. The City is responsible for the continued enforcement of federal, state, and local regulations pertaining to noise generation and impacts and implementing Safety Element policies and applicable regulations of the CMC to ensure continued protection of the community from excessive noise and vibration in the future growth and development.

In community noise assessment, changes in noise levels greater than 3 dBA are often identified as "barely perceptible" while changes of 5 dBA are "ready perceptible." In the range of 1 dBA to 3 dBA, people who are very sensitive to noise may perceive a slight change in noise level.

In laboratory testing situations, humans can detect noise level changes of slightly less than 1 dBA. However, in a community situation, noise exposure is extended over a long-time period, and changes in noise levels occur over the years rather than the immediate comparison made in a laboratory situation. Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dBA, and 3 dBA appears to be appropriate for most people.

Off-Site Impact Criteria

Transportation-related noise impacts associated with the development of the project were evaluated. Noise level increases and impacts attributable to the development of the proposed project are estimated by comparing the "with project" traffic volume to the "without project" traffic volume. For purposes of this study, roadway noise impacts would be considered significant if the project increases noise levels above allowable noise exposure levels, as shown in **Table 4.4.** *Significance Changes in Operational Roadway Noise Exposure*.

Table 4.4 Significance Changes in Operational Roadway Noise Exposure

Existing Noise Exposure (dBA Ldn or Leq)	Allowable Noise Exposure Increase (dBA Ldn or Leq)
45-49	7
50-54	5
55-59	3
60-64	2
65-69	1
69-74	1
Source: City of Temecula General Plan Noise/Land Use Compatibility Matrix (Table N-2)	

5.0 THRESHOLDS OF SIGNIFICANCE

Appendix G of the California Environmental Quality Act (CEQA) Guidelines states that a project could have a significant adverse effect related to noise if any of the following would occur:

- 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 other agencies' applicable standards?
- Excessive groundborne vibration or groundborne noise levels?
- Expose people residing or working in the project area to excessive noise levels for the project if it is 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?
- Roadway noise that exceeds the allowable noise exposure levels listed in Table 4.4

6.0 EXISTING NOISE

The existing noise environment was characterized by conducting a long-term noise measurement at representative noise-sensitive receiver locations in the project area. One (1) long-term measurement was taken at 5th Street Park. The noise measurement was performed on August 25, 2022. Appendix A includes the field monitoring forms, and Figure 6-1 shows the monitoring locations.

6.1 Measurement Procedure and Criteria

One Long-term noise measurement was taken using a Larsson Davis Type 1 precision sound level meter. The noise meter was programmed in "slow" mode to record noise levels in the "A" weighted form. The sound level meters and microphones were mounted on a tripod, five feet above the ground, and equipped with a windscreen during all measurements. The 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).

6.2 Long Term Noise Measurements

Hourly noise levels were measured during typical weekday conditions over 24 hours to describe the existing noise environment and describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The 24-hour measurements provide the hourly noise levels to calculate the CNEL for the project area.

The noise measurement results indicate that traffic from 4th Street is the main source of noise which impacts the Project's vicinity. Also, the results confirm that the existing noise level of 66 dBA is within the tentatively noise compatibility category for residential land uses. The long-term noise data results are shown in Table 6-1. Noise data indicates the ambient noise level in the project area ranges between 48.0 dBA L_{eq} to 66.1 dBA L_{eq} at LT1. The quietest day/evening hourly level occurred between 12AM and 1AM at 48.0 dBA, $L_{eq(h)}$.

Table 6-1. Existing (Ambient) Long-Term (24-hour) Noise Level Measurements[1]								
Noise Monitoring Location ID[2,3]	Description	Hourly Noise Levels (1hr-L_{eq})[4]						24-hour Noise Levels (CNEL)
		Daytime Minimum	Daytime Maximum	Average Daytime	Nighttime Minimum	Nighttime Maximum	Average Nighttime	
LT-1	4th Street Park	52.3	64.3	56.5	48.0	66.1	56.7	65.9

[1] Noise measurement taken on August 25, 2022. See Appendix A for monitoring data.

[2] See Figure 6-1 for the location of the monitoring sites.

[3] Taken with Larson Davis Type 1 noise meter

[4] Daytime hours- 7:00am to 10:00pm, Nighttime hours-10:01pm to 7:00am

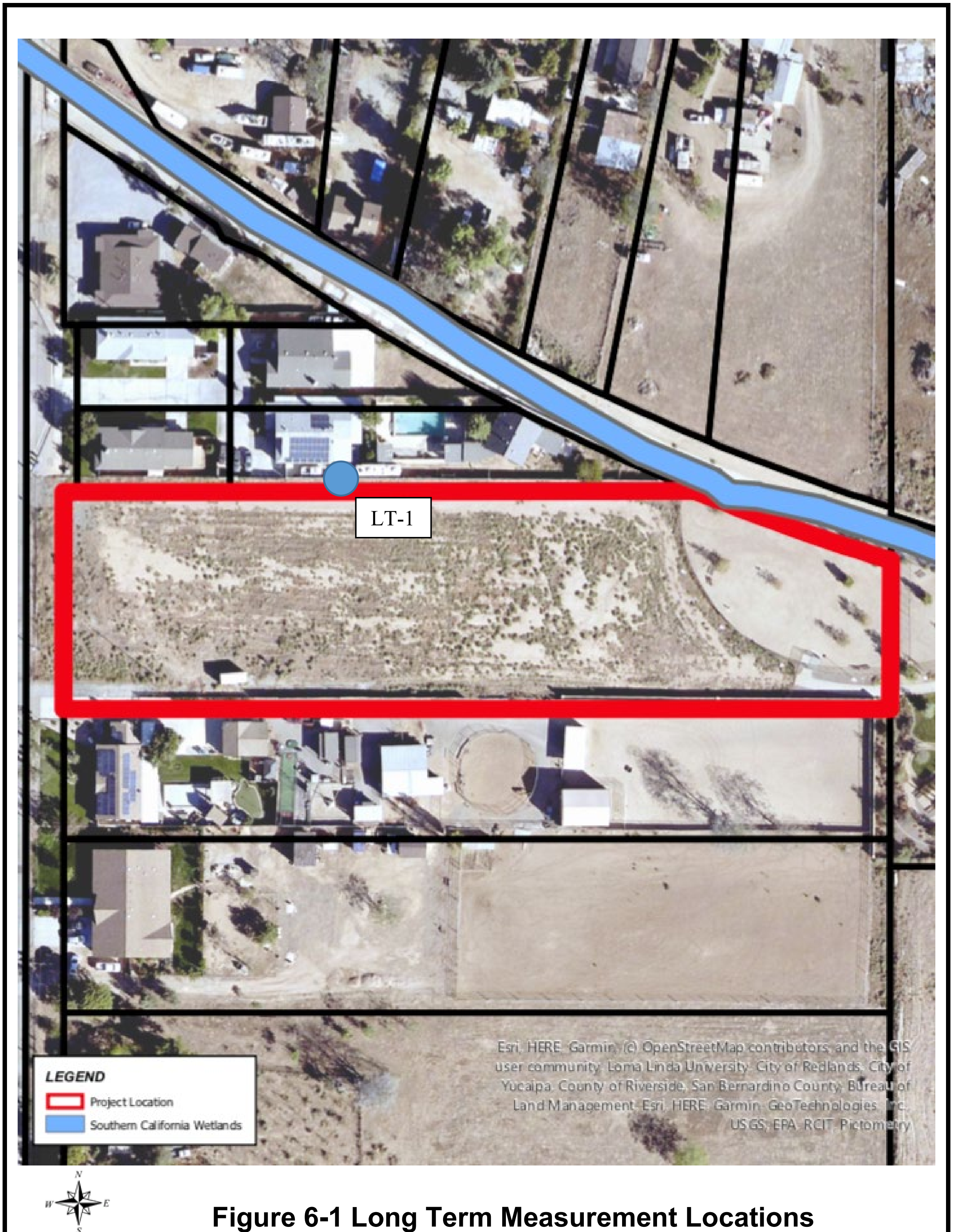


Figure 6-1 Long Term Measurement Locations

7.0 METHODOLOGY

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

7.1 Construction

7.1.1 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 Contractor's discretion. 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. 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 excavation, 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. The calculated noise level was then compared to the respective local noise regulation to determine if construction would cause a short-term noise impact at nearby sensitive land uses along 4th Street. Receiver distance to the construction activity along with the construction equipment operating at the maximum load will have the greatest influence on construction noise levels experienced at sensitive land uses along 4th Street.

7.1.2 Vibration Analysis Methods

Groundborne vibration levels resulting from construction activities within the project area were estimated using the FTA data in its Transit Noise and Vibration Impact Assessment Manual (FTA, 2018). Potential vibration levels resulting from the proposed project's construction activities are identified at the nearest off-site sensitive receptor location and compared to the FTA damage criteria, as shown previously in Table 2-4.

7.2 Operational Noise & Vibration Analysis

7.2.1 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. 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.

7.2.2 Operational Traffic Vibration Analysis

As a conservative measure, the vibration vs. distance curve obtained from the Caltrans Transportation and Construction Vibration Guidance Manual will be used to represent worst-case vibration levels from traffic noise. These vibration levels will be compared to the Caltrans and FTA vibration annoyance criteria, as shown previously in Tables 2-6 and 2-7 for Continuous Sources. These criteria will be utilized to evaluate the level of significance associated with vibration effects from traffic.

7.3 Predicted Noise and Vibration Impacts

This section discusses the noise and vibration impacts compared to the applicable noise significance thresholds. When a significant impact has been set forth, mitigation measures to address that potential impact are presented, along with determining whether the impact will continue to be significant after implementing the mitigation measure.

7.3.1 Cause 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;

Permanent Impacts

Implementation of the Project would create a negligible increase in traffic volumes. This level of traffic is low volume and is not significant enough to change existing noise levels. 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. Therefore, the traffic noise impacts as a result of the Project are less than significant.

Temporary Impacts

The operation of heavy-duty equipment would produce noise. Construction noise levels were estimated using FTA guidance (FTA, 2018), which provides a method for calculating noise levels for the two noisiest pieces of equipment operating in each construction phase using reference noise levels for individual pieces of equipment. Full power operation for a time period of one hour was assumed because most construction equipment operates continuously for periods of one hour or more at some point in the construction period. No ground effects were considered. The closest sensitive receptors are single family residences adjacent to the project site to the north. The noise levels associated with equipment used during the various construction phases are shown in **Table 7-2**. As shown in **Table 7-2**, during each phase of construction, the noise level would have the potential to exceed existing background noise levels.

Construction-related noise at the nearest sensitive receptors would reach up-to an estimated exterior maximum unmitigated noise level of 75.6 dBA (Table 7.2). This temporary increase in construction noise would be readily perceivable. The residential structure itself would reduce interior noise levels. Typical noise attenuation within structures with open windows is about 17 dBA, while the noise attenuation with closed windows is about 25 dBA (NCHRP 1971). Considering these attenuation factors, maximum interior noise levels during construction are anticipated to be maintained at or below approximately 58.6 dBA in structures with closed windows.

Actual construction noise levels may be lower than predicted noise levels depending upon construction phasing and the implementation of typical best management practices such as reducing equipment idling, operating equipment with mufflers, limiting equipment operating hours, utilizing construction staging techniques that buffer noise emanating from the project boundary to the nearest sensitive receptors and maintaining construction equipment in good working order. These best management practices have been effective in reducing construction noise levels within acceptable maximum allowable levels.

It is recommended that the City incorporates the best management practices consistent with the implementation measures listed in the General Plan. Construction noise impacts at the site of the closest sensitive receptors along 5th Street are unlikely to be sustained during the entire construction period but will occur only when heavy construction equipment is operating near the Project site perimeter.

Adherence to local noise ordinances and implementation of construction Best Management Practices, such as limiting construction operating hours between 7:00 am to 7:00 pm would reduce construction impacts at sensitive receptors to less than significant.

TABLE 7.2. CONSTRUCTION EQUIPMENT BY PHASE WITH ASSOCIATED MAXIMUM 1-hr L_{eq}

Equipment Type	Number of equipment	dBA at 150 feet	Predicted Noise Levels (dBA) 1-hr L_{eq} at Nearest Sensitive Receptor
Grading			
Graders	1	79	71.6
Rubber Tired Dozers	1	72	
Tractors/Loaders/Backhoes	2	71	
Park Construction			
Cranes	1	71	71
Forklifts	2	71	
Tractors/Loaders/Backhoes	1	71	
Welders	3		
Generator Sets	1		
Paving			
Pavers	1	66	72
Rollers	1	71	
Tractors/Loaders/Backhoes	1	71	
Cement and Mortar Mixers	1		
Architectural Coating			
Air Compressors	1	79	75.6

7.3.2 Expose persons to or generate excessive groundborne vibration or groundborne noise levels;

As a result of the proposed project's construction, groundborne vibration may occur from heavy equipment during demolition, grading, and paving. 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 the nearest residential receptor north of the project site along 5th Street, approximately 200 feet from the center of the project site, the vibration level would be 0.004 in/sec (59.9 VdB). Using the construction vibration assessment annoyance criteria provided by the FTA for infrequent events, as shown in **Tables 4-1** and **4-2**, the proposed project site will not include nor require equipment, facilities, or activities that would result in causing building damage or perceptible human response (annoyance) that exceeds the FTA criteria of 0.2 in/sec or 80 VdB respectively and does not exceed the City of Calimesa vibration threshold of 0.0787 in/sec for residential or passive recreational land use. Further, vibration impacts at the site of the closest sensitive receptor are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating near the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements, thereby eliminating potential vibration impact during the sensitive nighttime hours. On this basis, the potential for the proposed project to result in persons' exposure to or generation of excessive ground-borne vibration is determined to be less than significant.

Groundborne vibration from vehicular traffic rarely causes a disturbance within buildings located in urban environments unless the pavement surface is uneven or the receptor is highly sensitive (e.g., a scientific research establishment) to groundborne vibration. Therefore, groundborne vibration levels within the project are not expected to increase as a result of the implementation of the Proposed Project.

7.3.3 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, would the project expose people residing or working in the project area to excessive noise levels?

The nearest airport is Redlands Municipal Airport. The project site is 7.5 miles southeast of the airport and is outside of its noise contour. The proposed project will not generate operational noise levels that would increase the noise within the existing environment. Therefore, the proposed project area would not exposure people working in the project area to excessive noise levels associated with aircraft.

8.0 REFERENCES

Caltrans. (2013) *Caltrans Transportation and Construction Vibration Guidance Manual*

CEQA Checklist (2019). http://califaep.org/docs/2019-Appendix_G_Checklist.pdf

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Appendix A Noise Monitoring Data

Appendix B RCNM Modeling Runs