.

NOISE IMPACT ANALYSIS

IRIS PARK SINGLE-FAMILY RESIDENTIAL PROJECT

CITY OF MORENO VALLEY

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Moreno Valley
cmu	concrete masonry unit
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
TTM	Tentative Tract Map
UMTA	Federal Urban Mass Transit Administration
VdB	Vibration velocity level in decibels

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Iris Park Single-Family Residential project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the southern portion of the City of Moreno Valley (City). The approximately 10.82-acre project site is a triangular lot, with the California Aqueduct running along the southwestern side of the project site that consists of a 100-foot easement. The project site is bounded by Iris Avenue and single-family homes to the north, single-family homes to the east, vacant land and Red Maple Lane to the south, and a commercial shopping center and Val Verde Academy, which is a K-12 charter school. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are the single-family homes located adjacent to the east side of the project site, where the nearest residential structure is as near as 25 feet east of the project site. In addition, Val Verde Academy is located adjacent to the southwest side of the project site, where the nearest school structure is as near as 180 feet southwest of the project site.

1.3 Proposed Project Description

The proposed project would consist of construction and operation of a proposed 81-lot single-family detached subdivision. The project site is triangular in shape and has a gross acreage of approximately 10.82 acres, including 3.02 acres that is planned for development by the City of Moreno Valley as a public park and trail over the California Aqueduct. The community will have two gated access points off Iris Avenue. Three small park areas are spread out on the site. Residential lots would range from 2,197 sq. ft. to 4,741 sq. ft. Homes would range from 1,848 sq. ft. to 2,201 sq. ft., with 3 to 5 bedrooms and 2.5 to 3 baths. Homes would be two stories, include a back yard approximately 12 to 14 feet deep, and have an attached two-car garage. The project overall would provide 217 parking spaces, including 162 garage spaces and 49 spaces on private streets.. The proposed site plan is shown in Figure 2.

1.4 Executive Summary

Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City and State of California (State).

City of Moreno Valley Noise Regulations

The following lists the noise and vibration regulations from the Municipal Code that are applicable, but not limited to the proposed project.

- Section 9.10.030 Temporary Construction Exemptions;
- Section 9.10.170 Vibration;
- Section 11.80.030(B)(2) Sound Level Limits;

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

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?

Less than significant impact.

Generation of excessive groundborne vibration or groundborne noise levels?

Less than significant impact.

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?

Less than significant impact.

1.5 Project Design Features Incorporated into the Proposed Project

This analysis was based on implementation of the following project design features that are either already depicted on the proposed project site plan and architectural plans or are required from City and State Regulations.

Project Design Feature 1:
The project applicant shall construct all walls shown on the Proposed Fence and Wall (see Figure 3) that includes a 5 to 6-foot high concrete masonry unit (cmu) wall at the rear property lines of Lots 1 to 3 and 69 to 81 that are adjacent to Iris Avenue.

Project Design Feature 2:
The project applicant shall provide a "windows closed" condition for each proposed single-family home. A "window closed" condition requires a means of mechanical ventilation per Chapter 12, Section 1205 of the Uniform Building Code. This shall be achieved with a standard forced air conditioning and heating system with a filtered outside air intake vent for each residential unit.

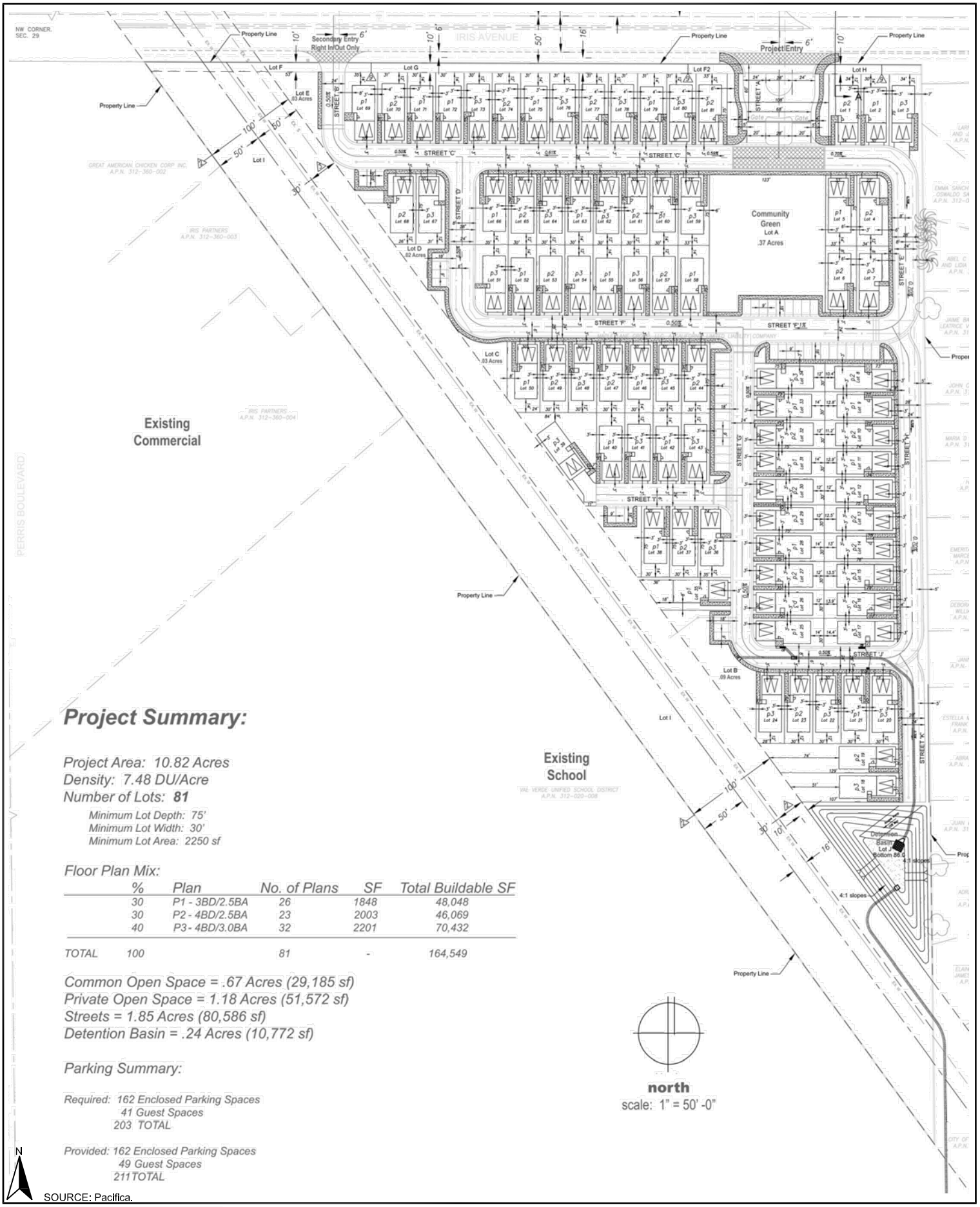
1.6 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above and through implementation of the Project Design Features detailed in Section 1.5 above, all noise and vibration impacts would be reduced to less than significant levels. No mitigation measures are required for the proposed project with respect to noise and vibration impacts.

SOURCE: Pacifica.

VISTA ENVIRONMENTAL

Figure 1
Project Location Map



Project Summary:

Project Area: 10.82 Acres
Density: 7.48 DU/Acre
*Number of Lots: **81***

Minimum Lot Depth: 75'
Minimum Lot Width: 30'
Minimum Lot Area: 2250 sf

Floor Plan Mix:

	%	Plan	No. of Plans	SF	Total Buildable SF
	30	P1 - 3BD/2.5BA	26	1848	48,048
	30	P2 - 4BD/2.5BA	23	2003	46,069
	40	P3 - 4BD/3.0BA	32	2201	70,432
TOTAL	100		81	-	164,549

Common Open Space = .67 Acres (29,185 sf)
Private Open Space = 1.18 Acres (51,572 sf)
Streets = 1.85 Acres (80,586 sf)
Detention Basin = .24 Acres (10,772 sf)

Parking Summary:

Required: 162 Enclosed Parking Spaces
41 Guest Spaces
203 TOTAL

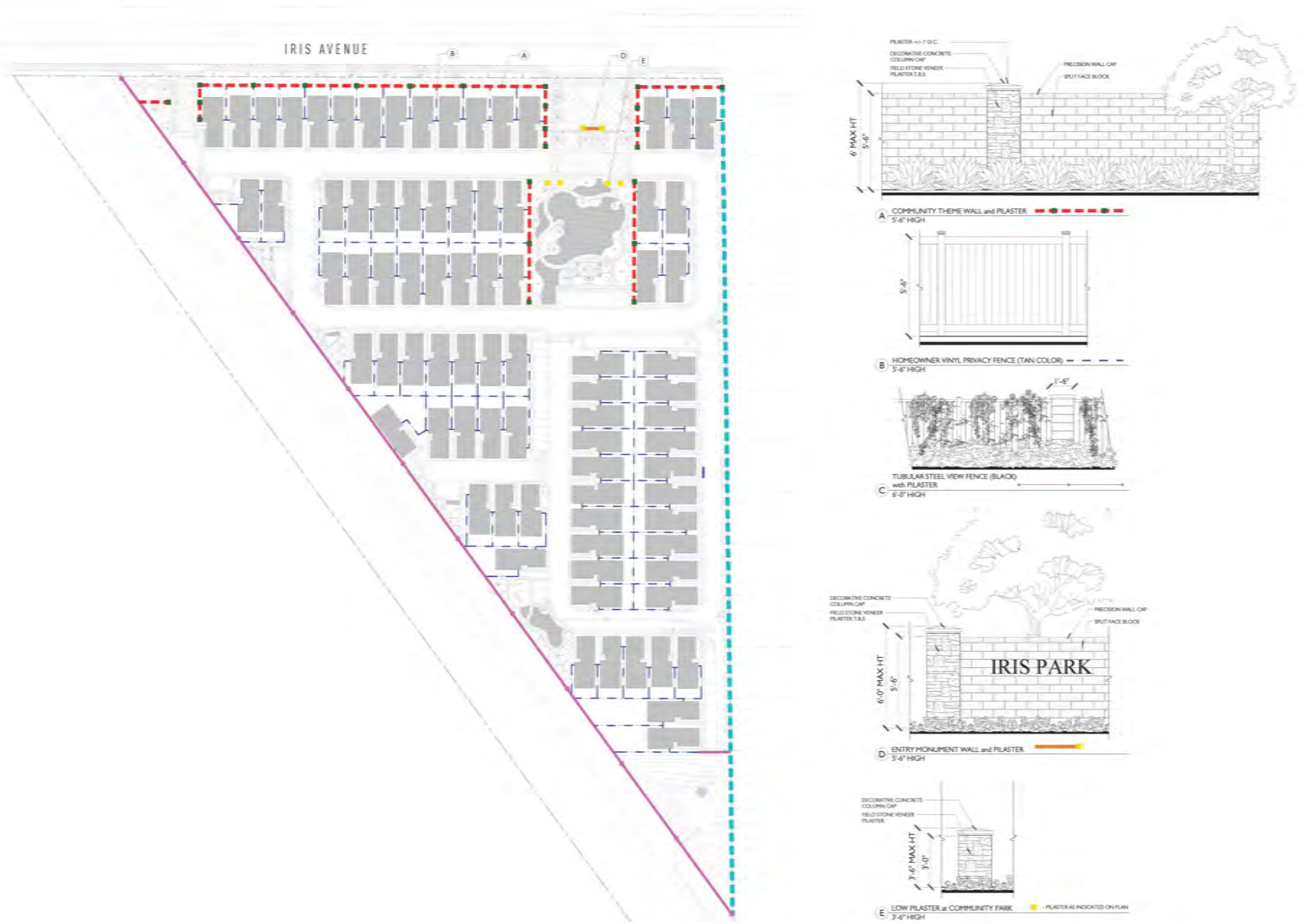
Provided: 162 Enclosed Parking Spaces
49 Guest Spaces
211TOTAL

N

SOURCE: Pacifica.

VISTA ENVIRONMENTAL

Figure 2
Proposed Site Plan



SOURCE: Pacifica.

VISTA ENVIRONMENTAL

Figure 3
Proposed Wall and Fence Plan

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Moreno Valley relies on the CNEL dB(A) noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound

from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is "VdB", which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The project site is located in the City of Moreno Valley. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings are provided below in Table A.

Table A – FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure (dBA Leq or Ldn)	Allowable Noise Impact Exposure dBA Leq or Ldn		
	Project Only	Combined	Noise Exposure Increase
45	51	52	+7
50	53	55	+5
55	55	58	+3
60	57	62	+2
65	60	66	+1
70	64	71	+1
75	65	75	0

Source: Federal Transit Administration, 2006.

As shown in Table A, the allowable cumulative noise level increase created from a project would range from 0 to 7 dBA, which is based on the existing (ambient) noise levels in the project vicinity. The justification for the sliding scale, is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The City of Moreno Valley General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

City of Moreno Valley General Plan

The following applicable goals and policies to the proposed project are from the Noise Element of the General Plan.

Objective 6.3

Provide noise compatible land use relationships by establishing noise standards utilized for design and siting purposes.

Policies

6.3.1 The following uses shall require mitigation to reduce noise exposure where current or future exterior noise levels exceed 20 CNEL above the desired interior noise level:

a. Single and multiple family residential buildings shall achieve an interior noise level of 45 CNEL or less. Such buildings shall include sound-insulating windows, walls, roofs and ventilation systems. Sound barriers shall also be installed (e.g. masonry walls or walls with berms) between single-family residences and major roadways.

6.3.2 Discourage residential uses where current or projected exterior noise due to aircraft over flights will exceed 65 CNEL.

6.3.5 Enforce the California Administrative Code, Title 24 noise insulation standards for new multi-family housing developments, motels and hotels.

6.3.6 Building shall be limited in areas of sensitive receptors.

Objective 6.4

Review noise issues during the planning process and require noise attenuation measures to minimize acoustic impacts to existing and future surrounding land uses.

Policies

6.4.1 Site, landscape and architectural design features shall be encouraged to mitigate noise impacts for new developments, with a preference for noise barriers that avoid freeway sound barrier walls.

Objective 6.5

Minimize noise impacts from significant noise generators such as, but not limited to, motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities.

Policies

6.5.2 Construction activities shall be operated in a manner that limits noise impacts on surrounding uses.

City of Moreno Valley Municipal Code

The City of Moreno Valley Municipal Code establishes the following applicable standards related to noise.

Section 9.10.1010 Performance Standards - Purpose and Intent

The purpose and intent of this chapter is to explicitly describe the location, configuration, design, amenities, operation and other standards for proposed development projects that may impact the surrounding neighborhood. The performance standards set maximum tolerance limits on certain adverse effects created by any use or development of land.

Section 9.10.030 Performance Standards - Exemptions

The following uses or activities are exempt from the provisions of this chapter:

A. Emergency equipment, vehicles, devices and activities.

B. Temporary construction, maintenance, or demolition activities between the hours of seven a.m. and seven p.m.

Section 9.10.170 Performance Standards - Vibration

No vibration shall be permitted which can be felt at or beyond the property line.

Section 11.80.030 Prohibited Acts

A. General Prohibition. It is unlawful and a violation of this chapter to maintain, make, cause, or allow the making of any sound that causes a noise disturbance, as defined in Section 11.80.020.

B. Sound causing permanent hearing loss.

1. Sound level limits. Based on statistics from the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health, Table 1 and Table 1-A specify sound level limits which, if exceeded, will have a high probability of producing permanent hearing loss in anyone in the area where the sound levels are being exceeded. No sound shall be permitted within the city which exceeds the parameters set for in Tables 11.80.030-1 [see Table B] and 11.80.030-1-A [see Table C] of this chapter:

Table B – City of Moreno Valley Maximum Continuous Sound Levels

Duration per Day (Continuous Hours)	Sound Level [dB(A)]
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
.5	110
.25	115

Source: City of Moreno Valley Municipal Code Section 11.80.030.

Table C – City of Moreno Valley Maximum Impulsive Sound Levels

Number of Repetitions per 24-Hour Period	Sound Level [dB(A)]
1	145
10	135
100	125

Source: City of Moreno Valley Municipal Code Section 11.80.030.

C. Nonimpulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 [see Table D] when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

Table D – City of Moreno Valley Maximum Sound Levels for Source Land Uses

Residential		Commercial	
Daytime[1]	**Nightime[2]**	**Daytime[1]**	**Nightime[2]**
60	55	65	60

Notes:
[1] Daytime defined as 8:00 a.m. to 10:00 p.m.
[2] Nighttime define as 10:01 p.m. to 7:59 a.m. the following day.
Source: City of Moreno Valley Municipal Code Section 11.80.030.

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by this chapter, the following specific acts, or the causing or permitting thereof, are regulated as follows:

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 8 p.m. and 7 a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. This section shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicle traffic on Iris Avenue and from commercial activities at the shopping center located adjacent to the west side of the project site. It should be noted that due to COVID-19 Val Verde School was closed and was not producing any noise at the time of the noise measurements. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using three Larson Davis Model LXT1 Type 1 sound level meters programmed in "slow" mode to record the sound pressure level at 1-second intervals for 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded with both sound level meters. The sound level meters and microphones were mounted on fence along the property lines of the project site, were placed between four and six feet above the ground and were equipped with windscreens during all measurements. The noise meters were calibrated before and after the monitoring using a Larson Davis Cal200 calibrator. All noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Locations

The noise monitoring locations were selected in order to obtain noise levels on the project site. Descriptions of the noise monitoring sites are provided below in Table E and are shown in Figure 4. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 2:27 p.m. on Saturday, May 9, 2020 and 2:45 p.m. on Sunday, May 10, 2020. A weekend was selected for the noise measurement, since that is when the greatest noise impacts would occur from the adjacent shopping center on the west side of the project site.

At the start of the noise measurements, the sky was partly cloudy, the temperature was 86 degrees Fahrenheit, the humidity was 37 percent, barometric pressure was 28.30 inches of mercury, and the wind was blowing around five miles per hour. Overnight, the temperature dropped to 60 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was hazy, the temperature was 85 degrees Fahrenheit, the humidity was 44 percent, barometric pressure was 28.30 inches of mercury, and the wind was blowing around four miles per hour.

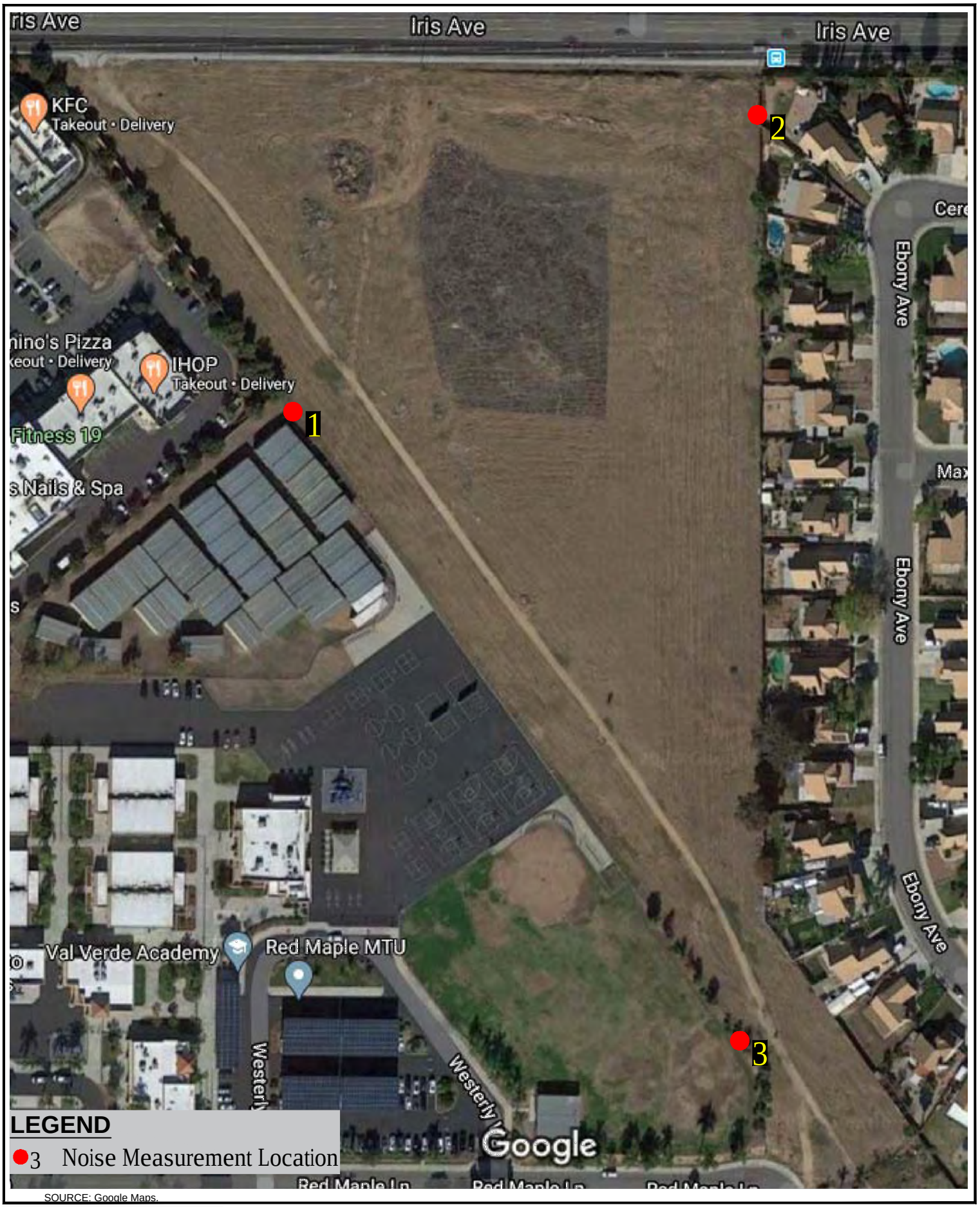
5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table E. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table E also shows the L_{eq}, L_{max}, and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B.

Table E – Existing (Ambient) Noise Level Measurements

Site No.	Site Description	Average (dBA L_{eq})		1-hr Average (dBA L_{eq}/Time)		Weighted-Average[3] (dBA CNEL)
		Daytime[1]	Nighttime[2]	Minimum	Maximum	
1	Located on the southwest property line fence, approximately 8 feet south of the shopping center and adjacent to the northern portion of Val Verde Academy.	50.0	45.4	37.3 2:52 a.m.	56.2 8:10 p.m.	54.4
2	Located on the east property line fence, approximately 100 feet south of the centerline for Iris Avenue.	61.1	53.5	47.3 3:06 a.m.	63.9 5:00 p.m.	63.3
3	Located at the south corner of the project site on the fence for Val Verde Academy.	51.4	41.5	35.1 3:46 a.m.	54.8 4:18 p.m.	52.1

Notes:
[1] Daytime defined as 8:00 a.m. to 10:00 p.m. (Section 11.80.020 of the Municipal Code)
[2] Nighttime define as 10:01 p.m. to 8:01 a.m. (Section 11.80.020 of the Municipal Code)
[3] The weighted-average noise level (dBA CNEL) includes an additional 4.77 dBA noise penalty to account for the evening noise sensitive hours of 7 p.m. to 10 p.m. and an additional 10 dBA penalty to account for the nighttime noise sensitive hours of 10 p.m. to 7 a.m..
Source: Noise measurements taken between Saturday, May 9 and Sunday, May 10, 2020.



SOURCE: Google Maps.

VISTA ENVIRONMENTAL

Figure 4
Field Noise Monitoring Locations

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table F below provides a list of the construction equipment anticipated to be used for each phase of construction that was calculated through use of the default equipment mixes provided by the CalEEMod model published by Breeze Software under a contract from the South Coast Air Quality Management District for estimating air emissions from land use projects.

Table F – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Site Preparation				
Rubber Tired Dozer	3	40	85	82
Tractor, Loader, or Backhoe	4	40	84	N/A
Grading				
Excavator	1	40	85	81
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Tractor, Loader or Backhoe[5]	3	40	84	N/A
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	3	40	85	83
Generator	1	50	82	81
Tractor, Loader or Backhoe[5]	3	40	84	N/A
Welder	1	40	73	74
Paving				
Paver	2	50	85	77
Paving Equipment	2	50	85	77
Roller	2	20	85	80
Architectural Coating				
Air Compressor	1	40	80	78

Notes:
[1] Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.
[2] Spec 721.560 is the equipment noise level utilized by the RCNM program.
[3] The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.
[4] Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.
[5] For the tractor/loader/backhoe, the tractor noise level was utilized, since it is the loudest of the three types of equipment.
[6] For the cement & mortar mixer, the concrete mixer truck noise level was utilized.
Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table F shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage

factors listed Table F and through use of the RCNM. For each phase of construction, the nearest piece of equipment was placed at 200 feet from the property line, per the methodology detailed in Section 11.80.030(C) of the Municipal Code, and each subsequent piece of equipment was placed an additional 50 feet away.

6.2 Operations-Related Noise

FHWA Model Methodology

The proposed project would result in increases in traffic noise to the nearby roadways as well as introduce new sensitive receptors to the project site. The project impacts to the offsite roadways were analyzed through use of the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 (FHWA Model). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the reference energy mean emission level to account for: the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT) and the percentage of ADT which flows during the day, evening and night, the travel speed, the vehicle mix on the roadway, which is a percentage of the volume of automobiles, medium trucks and heavy trucks, the roadway grade, the angle of view of the observer exposed to the roadway and site conditions ("hard" or "soft" relates to the absorption of the ground, pavement or landscaping). The following section provides a discussion of the software and modeling input parameters used in this analysis and a discussion of the resultant existing noise model.

FHWA Model Traffic Noise Prediction Model Inputs

The roadway parameters used for this study are presented in Table G. The roadway classifications are based on the City's General Plan Circulation Element. The roadway speeds are based on the posted speed limits. The distance to the nearest sensitive receptor was determined by measuring the distance from the roadway centerline to the nearest residence. Since the study area is located in a suburban environment and landscaping exists along the sides of all analyzed roadways, soft site conditions were modeled.

Table G – FHWA Model Roadway Parameters

Roadway	Segment	General Plan Classification	Vehicle Speed (MPH)	Distance to Nearest Receptor[1] (feet)
Iris Avenue	East of Perris Boulevard	Arterial	50	70

Notes:
[1] Distance measured from nearest residential structure to centerline of roadway.
Source: City of Moreno Valley, 2006.

Since the proposed project was only required to prepare the *Trip Generation Analysis for Proposed Iris Park Residential Project,* (Trip Generation Memo), prepared by EPD Solutions, Inc., May 12, 2020, the average daily traffic (ADT) volume for Iris Avenue in the vicinity of the project site was obtained from the *Moreno Valley Traffic Counts*, updated in 2017, that shows Iris Avenue east of Perris Boulevard currently has 21,400 daily vehicle trips. Since the trip distribution is unknown, in order to provide a worst-case analysis, 100 percent of project traffic was assumed to travel the roadway segment of Iris Avenue east of Perris Boulevard. The ADT volumes used in this analysis are shown in Table H.

Table H – Average Daily Traffic Volumes

Roadway	Segment	Average Daily Traffic Volumes	
		Existing	Existing + Project
Iris Avenue	East of Perris Boulevard	21,400	22,174

Source: EPD Solutions, Inc., 2020; City of Moreno Valley, 2017.

The vehicle mix used in the FHWA-RD-77-108 Model is shown in Table I and is based on the vehicle mix utilized for Iris Avenue in the Kaiser Permanente DEIR (Dudek, 2019), which are based on vehicle counts of autos, medium trucks, and heavy trucks taken on Iris Avenue in the vicinity of the project site. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA model.

Table I – Arterial Roadway Vehicle Mix

Vehicle Type	Traffic Flow Distributions			
	Day (7 a.m. to 7 p.m.)	Evening (7 p.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Overall
Automobiles	71.4%	13.2%	12.4%	97.0%
Medium Trucks	1.4%	0.2%	0.4%	2.0%
Heavy Trucks	0.7%	0.1%	0.2%	1.0%

Source: Dudek, 2019.

FHWA Model Source Assumptions

To assess the roadway noise generation in a uniform manner, all vehicles are analyzed at the single lane equivalent acoustic center of the roadway being analyzed. In order to determine the height above the road grade where the noise is being emitted from, each type of vehicle has been analyzed independently with autos at road grade, medium trucks at 2.3 feet above road grade, and heavy trucks at 8 feet above road grade. These elevations were determined through a noise-weighted average of the elevation of the exhaust pipe, tires and mechanical parts in the engine, which are the primary noise emitters from a vehicle.

6.3 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table J gives approximate vibration levels for particular construction activities. The data in Table J provides a reasonable estimate for a wide range of soil conditions.

Table J – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, May 2006.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table J and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table F.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- 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.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate 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. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the City standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include site preparation and grading of the project site, building construction of the 81 single-family homes, paving of the onsite roads, driveways and trails, and application of architectural coatings. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are the single-family homes located adjacent to the east side of the project site. In addition, there are commercial uses and Val Verde Academy are located adjacent to the southwest side of the project site.

Section 11.80.030(C) of the City's Municipal Code limits all noise sources, including construction noise to 60 dBA at the nearby residential uses and 65 dBA at the nearby commercial uses during the daytime. Section 11.80.030(D)(7) of the City's Municipal Code provides additional prohibitions on construction activities by restricting construction activities from occurring between the hours of 8:00 p.m. and 7:00 a.m..

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table F that shows the anticipated construction equipment per phase. The results are shown below in Table K and the RCNM printouts are provided in Appendix C.

Table K – Construction Noise Levels at the Nearest Sensitive Receptors

Construction Phase	Construction Noise Level[1] (dBA Leq) at:	
	Homes to the East[2]	School and Commercial to Southwest[3]
Site Preparation	59	64
Grading	59	64
Building Construction	58	61
Paving	55	59
Painting	50	52
City's Noise Threshold[4]	**60**	**65**
Exceed Thresholds?	No	No

Notes:
[1] The construction noise levels were calculated at 200 feet from the project's property line pursuant to Section 11.80.030(C) of the Municipal Code.
[2] In order to account for the existing 6-foot high wall on the east property line and the first row of homes that are located within 200 feet of the property line 10 dB of shielding was added to the RCNM Model.
[3] In order to account for the commercial and school structures that are located within 200 feet of the property line, 5 dB of shielding was added to the RCNM Model..
[4] City Noise Thresholds obtained from Section 11.80.030(C) of the Municipal Code.
Source: RCNM, Federal Highway Administration, 2006

Table K shows that the greatest noise impacts would occur during the site preparation and grading phases, with noise levels as high as 59 dBA at the nearest homes to the east, which is within the City's residential noise threshold of 60 dBA and as high as 64 dBA at the school and commercial uses to the southwest, which is within the City's commercial noise threshold of 65 dBA. Through adherence to the limitation of allowable construction times provided in Section 9.10.030(B) of the City's Municipal Code, the construction-related noise levels would not exceed any standards. Therefore, impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of the development of 81 single-family homes. Potential noise impacts associated with the operations of the proposed project would be from project-generated vehicular traffic on the nearby roadways. In addition, the proposed development would be adjacent to Iris Avenue, which may create exterior and interior noise levels in excess of City standards at the proposed homes. The noise impacts to the nearby existing homes and proposed homes have been analyzed separately below.

The proposed project would also include improvements to the existing trail along the California Aqueduct easement, however since the trail currently exists, no new noise sources would be created on this portion of the project site. As such no further analysis of the operational noise impacts from the California Aqueduct easement is provided in this analysis.

Roadway Vehicular Noise Impact to Nearby Homes

Vehicle noise is a combination of the noise produced by the engine, exhaust and tires. The level of traffic noise depends on three primary factors (1) the volume of traffic, (2) the speed of traffic, and (3) the number of trucks in the flow of traffic. The proposed project does not propose any uses that would require a substantial number of truck trips and the proposed project would not alter the speed limit on any existing roadway so the proposed project's potential offsite noise impacts have been focused on the noise

impacts associated with the change of volume of traffic that would occur with development of the proposed project.

Objective 6.5 of the City's General Plan Noise Element, requires the City to minimize noise impacts from significant noise generators including roadway noise impacts. However neither the General Plan nor the CEQA Guidelines define what constitutes a "substantial permanent increase to ambient noise levels", as such, this impact analysis has utilized guidance from the Federal Transit Administration for a moderate impact that has been detailed above in Table A that shows that the project contribution to the noise environment can range between 0 and 7 dB, which is dependent on the existing noise levels.

The potential offsite traffic noise impacts created by the on-going operations of the proposed project have been analyzed through utilization of the FHWA model and parameters described above in Section 6.2 and the FHWA model traffic noise calculation spreadsheets are provided in Appendix D. The proposed project's offsite traffic noise impacts have been calculated through a comparison of the without project scenario to the with project scenario. The results of this comparison are shown in Table L.

Table L – Proposed Project Traffic Noise Contributions

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Without Project	With Project	Project Contribution	Increase Threshold[2]
Iris Avenue	East of Perris Boulevard	68.8	69.0	0.2	+1 dBA

Notes:
[1] Distance to nearest residential use shown in Table G, does not take into account existing noise barriers.
[2] Increase Threshold obtained from the FTA's allowable noise impact exposures detailed above in Table A..
Source: FHWA Traffic Noise Prediction Model FHWA-RD-77-108.

Table L shows that the proposed project's permanent noise increases to the nearby homes from the generation of additional vehicular traffic would not exceed the traffic noise increase thresholds detailed above. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels. Impacts would be less than significant.

Roadway Vehicular Noise Impacts to Proposed Homes

The proposed project would consist of the development of a residential community with 81 single-family homes. General Plan Policy 6.3.1 limits the interior noise levels in new homes to 45 dBA CNEL or less and requires the exterior noise levels at new homes to not exceed 20 dBA above the desired interior noise levels, which results in an exterior noise level limit of 65 dBA CNEL. It is anticipated that the primary source of noise impacts to the project site will be traffic noise from Iris Avenue. The proposed homes will also experience some background traffic noise impacts from the proposed project's internal roadways. As the traffic on these local streets would consist of low traffic volumes at slower speeds and the traffic noise from these roads would not make a significant contribution to the noise environment, the noise levels from these local roads were not analyzed. The FHWA traffic noise prediction model parameters used in this analysis are discussed above in detail in Section 6.2 and the FHWA model printouts are provided in Appendix F.

Roadway Noise Impacts to the Proposed Homes Backyards

The anticipated noise levels have been calculated for backyards that are adjacent to Iris Avenue for representative lots and the results are shown below in Table M.

Table M – Proposed Homes Exterior Backyard Noise Levels from Nearby Roads

Lot Number	Roadway	Exterior Backyard Noise Levels (dBA CNEL)		Sound Wall Height[1] (feet)
		Without Sound Wall	With Sound Wall	
3	Iris Avenue	**69**	62	6.0
69	Iris Avenue	**69**	61	6.0
73	Iris Avenue	**69**	61	6.0
77	Iris Avenue	**69**	61	6.0
81	Iris Avenue	**69**	61	6.0

Notes:
[1] Project Design Feature 1 is included that requires construction of a 6-foot high cmu wall at rear property lines of Lots 1 to 3 and 69 to 81, that are adjacent to Iris Avenue.
Exceedance of City's 65 dBA CNEL residential exterior noise standard shown in **bold**.
Source: FHWA RD-77-108 Model.

Table M shows that with implementation of Project Design Feature 1 that requires a 6 foot high cmu wall to be constructed at the rear property lines of Lots 1 to 3 and 69 to 81 that are adjacent to Iris Avenue, the noise levels at all proposed homes backyards would be within the City's 65 dBA CNEL residential exterior noise standard. Impacts would be less than significant with implementation of Project Design Feature 1.

Proposed Homes Interior Roadway Noise Impacts

To assess the interior noise levels related to compliance with the 45 dBA CNEL interior noise standard, the same proposed homes analyzed for the exterior private backyard analysis were also analyzed for their interior noise levels. The exterior noise level at the façade of the first and second floors were calculated through use of the same methodology detailed above for the outdoor noise calculations (see Section 6.2 above) and the results are shown below in Table N. Table N also show the interior noise levels calculated based on 25 dB of attenuation, since new homes that are designed to meet the Title 24 Part 6 energy efficiency standards that require installation of dual-paned windows as well as installation of forced-air mechanical ventilation systems (see Project Design Feature 2) provide a minimum of 25 dB of exterior to interior noise reduction.

Table N – Proposed Homes Interior Noise Levels from Cactus Avenue

Lot Number	Roadway	Floor	Exterior Noise Level at Building Façade (dBA CNEL)	Interior Noise Levels[1] (dBA CNEL)
3	Iris Avenue	1	62	37
		2	68	43
69	Iris Avenue	1	62	37
		2	68	43
73	Iris Avenue	1	62	37
		2	68	43
77	Iris Avenue	1	62	37
		2	68	43
81	Iris Avenue	1	62	37
		2	68	43

Notes:
[1] Interior noise levels based on 25 dBA of noise reduction with implementation of Project Design Feature 2 and Title 24 Part 6 requirements.

Source: FHWA RD-77-108 Model.

Table N shows that with implementation of Project Design Feature 2 that requires installation of forced air mechanical ventilation systems on all of the proposed homes as well as adherence to Title 24 Part 6 energy efficiency standards that require installation of dual-paned windows, the noise levels at the interior of all proposed homes would be within the City's 45 dBA CNEL residential interior noise standard. Impacts would be less than significant with implementation of Project Design Feature 2.

Level of Significance

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The construction activities for the proposed project are anticipated to include site preparation and grading of the project site, building construction of the 81 single-family homes, paving of the onsite roads, driveways and trails, and application of architectural coatings. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are the single-family homes located adjacent to the east side of the project site, where the nearest residential structure is as near as 25 feet east of the project site.

Chapter 9.10 of the Municipal Code includes performance standards for proposed development projects that may impact the surrounding neighborhood and Section 9.10.030(B), which is part of this Chapter, exempts temporary construction activities from Section 9.10.170 that restricts the creation of vibration that can be felt at the property line, provided that construction activities occur between the hours of 7 a.m. and 7 p.m.. Since the City's Municipal does not provide a quantifiable vibration level for construction activities, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table J above a large bulldozer would create a vibration level of 0.089 inch-per-second PPV at 25 feet, which is the approximate distance to the nearest home. The vibration level at the nearest offsite home is within the 0.25 inch per second PPV threshold detailed above. Therefore, a less than significant vibration impact is anticipated from construction of the proposed project.

Operations-Related Vibration Impacts

The proposed project would consist of the development of 81 single-family homes. The on-going operation of the proposed project would not include the operation of any known vibration sources other than typical onsite vehicle operations for a residential development. Therefore, a less than significant vibration impact is anticipated from operation of the proposed project.

Level of Significance

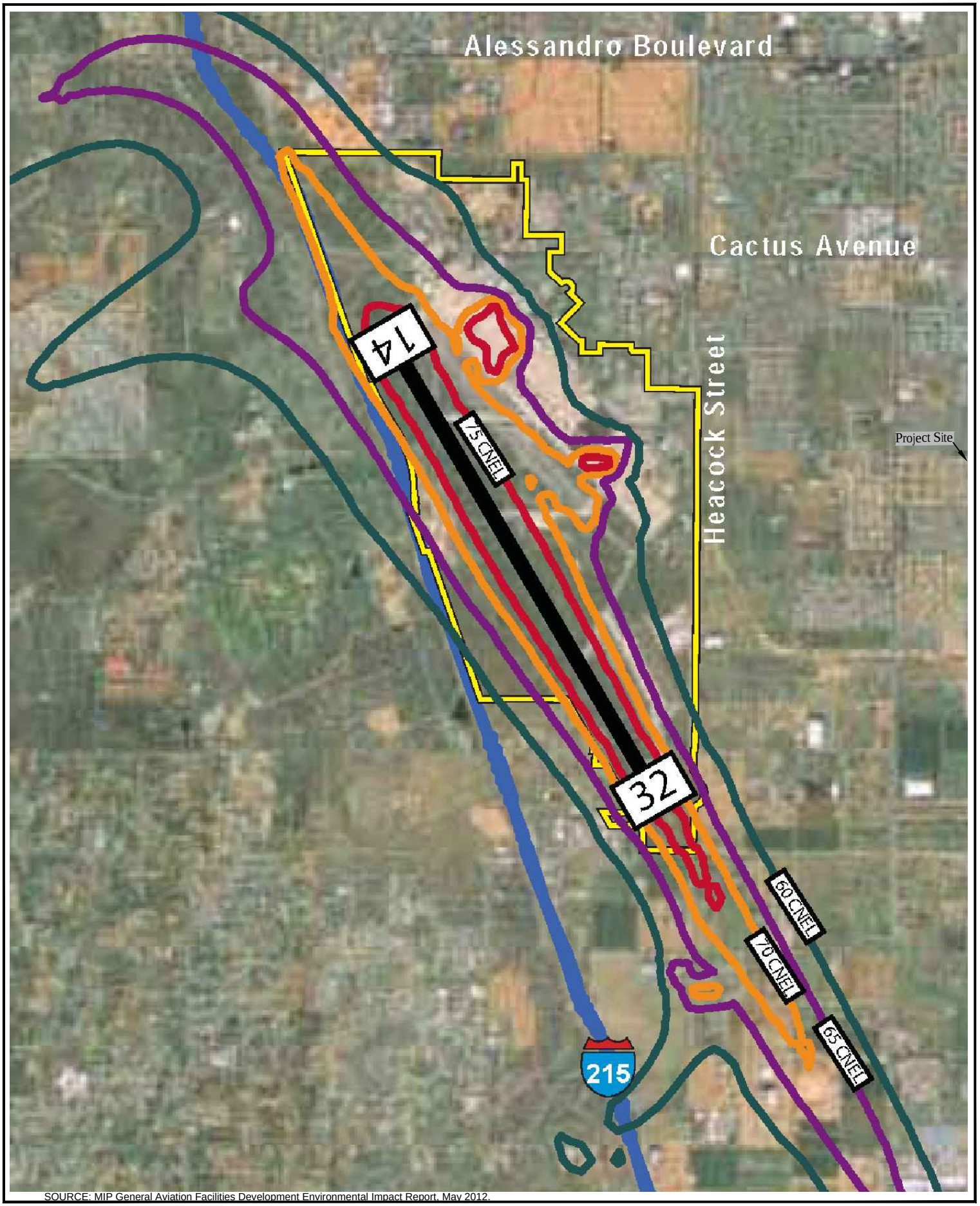
Less than significant impact.

7.4 Aircraft Noise

The proposed project may expose people residing in the project area to excessive noise levels from aircraft. The nearest airport is March Air Reserve Base that is located as near as 1.2 mile west of the project site. As detailed in Figure 5, the project site is located outside of the 60 dBA CNEL noise contours. Site observations during the noise measurements found that aircraft rarely fly over the project site, since the project site is located on the side of March Air Reserve Base and is not lined up with any of the runways. Therefore, the proposed project would not expose people to excessive noise levels from aircraft. Impacts would be less than significant.

Level of Significance

Less than significant impact.



SOURCE: MIP General Aviation Facilities Development Environmental Impact Report, May 2012.

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Figure 5
March Air Reserve Base Noise Contours

8.0 REFERENCES

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California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, September 2013.

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EPD Solutions, Inc., *Trip Generation Analysis for Proposed Iris Park Residential Project,* May 12, 2020.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* May 2006.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

APPENDIX A

Field Noise Measurements Photo Index

Noise Measurement Site 1 - looking north

Noise Measurement Site 1 - looking northeast

Noise Measurement Site 1 - looking east

Noise Measurement Site 1 - looking southeast

Noise Measurement Site 1 - looking south

Noise Measurement Site 1 - looking southwest

Noise Measurement Site 1 - looking west

Noise Measurement Site 1 - looking northwest

Noise Measurement Site 2 - looking north

Noise Measurement Site 2 - looking northeast

Noise Measurement Site 2 - looking east

Noise Measurement Site 2 - looking southeast

Noise Measurement Site 2 - looking south

Noise Measurement Site 2 - looking southwest

Noise Measurement Site 2 - looking west

Noise Measurement Site 2 - looking northwest

Noise Measurement Site 3 - looking north

Noise Measurement Site 3 - looking northeast

Noise Measurement Site 3 - looking east

Noise Measurement Site 3 - looking southeast

Noise Measurement Site 3 - looking south

Noise Measurement Site 3 - looking southwest

Noise Measurement Site 3 - looking west

Noise Measurement Site 3 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Measurement Report

Report Summary

Meter's File Name	LxT_Data.001	Computer's File Name	SLM_0004671_LxT_Data_001.11
Meter	LxT1		
Firmware	2.302		
User	GT		Location
Description	Moreno Valley - Iris Park		
Note	Located on SW Property Line Fence, approx 8 feet SE from Val Verde Academy North Property Corner		
Start Time	2020-05-09 14:37:04	Duration	24:00:00.0
End Time	2020-05-10 14:37:04	Run Time	24:00:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	48.3 dB		
LAE	97.7 dB	SEA	--- dB
EA	649.2 µPa²h		
EA8	216.4 µPa²h		
EA40	1.1 mPa²h		
LAS_{peak}	106.1 dB	2020-05-09 14:37:18	
LAS_{max}	84.2 dB	2020-05-09 20:27:44	
LAS_{min}	32.0 dB	2020-05-10 03:19:17	
LA_{eq}	48.3 dB		
LC_{eq}	62.1 dB	LC_{eq} - LA_{eq}	13.8 dB
LAI_{eq}	52.3 dB	LAI_{eq} - LA_{eq}	4.0 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LASpeak > 135.0 dB	0	0:00:00.0
LASpeak > 137.0 dB	0	0:00:00.0
LASpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.3 dB		--- dB		--- dB	
$Ls_{(max)}$	84.2 dB	2020-05-09 20:27:44	--- dB		--- dB	
$LS_{(min)}$	32.0 dB	2020-05-10 03:19:17	--- dB		--- dB	
$L_{Peak(max)}$	106.1 dB	2020-05-09 14:37:18	--- dB		--- dB	

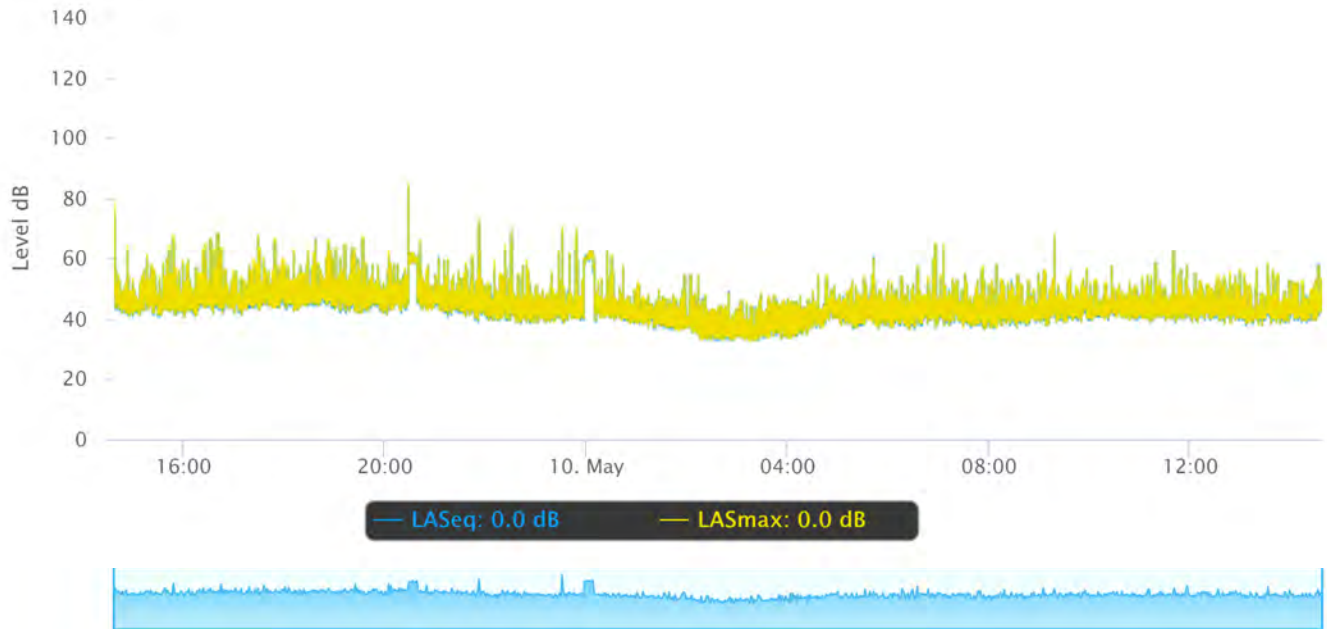
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	51.2 dB
LAS 10.0	48.9 dB
LAS 33.3	45.3 dB
LAS 50.0	43.6 dB
LAS 66.6	42.0 dB
LAS 90.0	38.8 dB

Time History



Measurement Report

Report Summary

Meter's File Name	LxT_Data.001	Computer's File Name	SLM_0006082_LxT_Data_001.03.ldbin
Meter	LxT1		
Firmware	2.402		
User	GT	Location	
Description	Moreno Valley - Iris Park		
Note	Located on East Property Line Fence, Approx 100 ft south of Iris Ave CL		
Start Time	2020-05-09 14:45:26	Duration	24:00:00.0
End Time	2020-05-10 14:45:26	Run Time	24:00:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	58.8 dB		
LAE	108.1 dB	SEA	--- dB
EA	7.2 mPa²h		
EA8	2.4 mPa²h		
EA40	12.1 mPa²h		
LZS_{peak}	114.7 dB	2020-05-09 16:40:17	
LAS_{max}	93.2 dB	2020-05-09 16:40:17	
LAS_{min}	33.3 dB	2020-05-10 02:23:13	
LA_{eq}	58.8 dB		
LC_{eq}	69.1 dB	LC_{eq} - LA_{eq}	10.3 dB
LAI_{eq}	62.0 dB	LAI_{eq} - LA_{eq}	3.2 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	2	0:00:04.4
LAS > 115.0 dB	0	0:00:00.0
LZSpeak > 135.0 dB	0	0:00:00.0
LZSpeak > 137.0 dB	0	0:00:00.0
LZSpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.8 dB		--- dB		--- dB	
$L_{S(max)}$	93.2 dB	2020-05-09 16:40:17	--- dB		--- dB	
$L_{S(min)}$	33.3 dB	2020-05-10 02:23:13	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		114.7 dB	2020-05-09 16:40:17

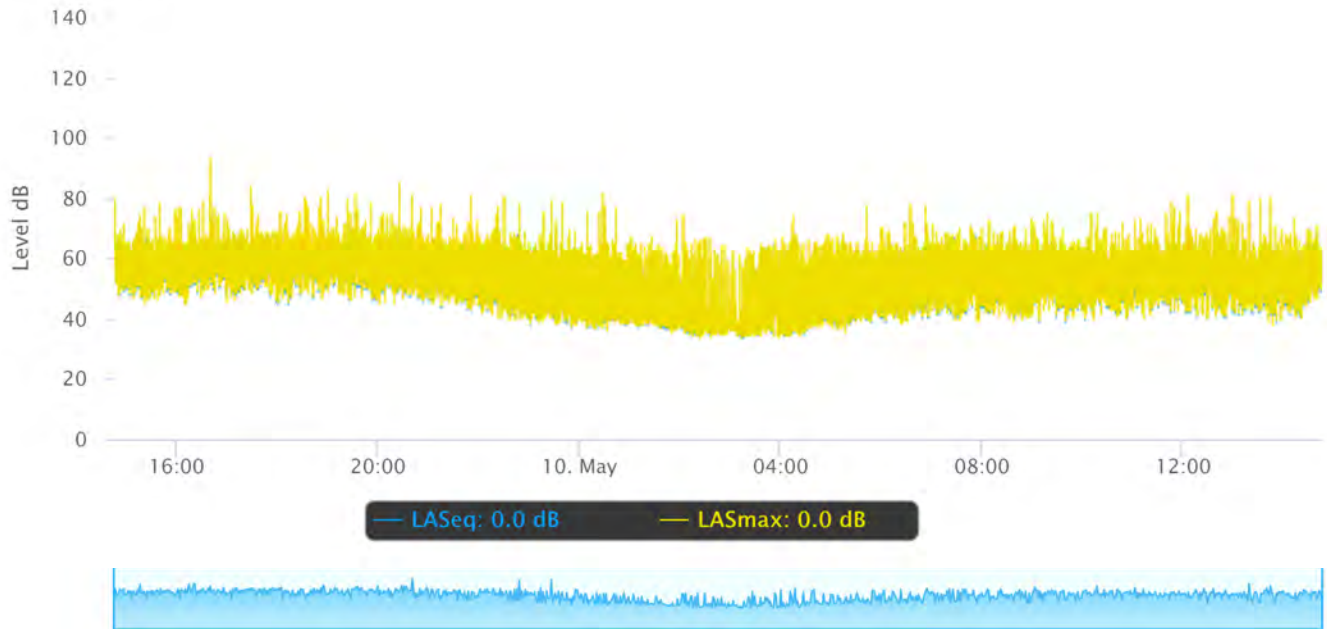
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	63.6 dB
LAS 10.0	61.9 dB
LAS 33.3	57.4 dB
LAS 50.0	54.2 dB
LAS 66.6	49.7 dB
LAS 90.0	39.9 dB

Time History



Measurement Report

Report Summary

Meter's File Name	LxT_Data.001	Computer's File Name	SLM_0004209_LxT_Data_001.10.ldbin
Meter	LxT1		
Firmware	2.302		
User	GT	Location	
Description	Moreno Valley - Iris Park		
Note	Located on Fence at South Property Corner		
Start Time	2020-05-09 14:27:02	Duration	24:00:00.0
End Time	2020-05-10 14:27:02	Run Time	24:00:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	48.8 dB		
LAE	98.1 dB	SEA	--- dB
EA	721.1 µPa²h		
EA8	240.4 µPa²h		
EA40	1.2 mPa²h		
LAS_{peak}	105.9 dB	2020-05-09 14:27:53	
LAS_{max}	76.9 dB	2020-05-10 12:17:06	
LAS_{min}	32.0 dB	2020-05-10 04:00:52	
LA_{eq}	48.8 dB		
LC_{eq}	61.4 dB	LC_{eq} - LA_{eq}	12.6 dB
LAI_{eq}	53.9 dB	LAI_{eq} - LA_{eq}	5.1 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LASpeak > 135.0 dB	0	0:00:00.0
LASpeak > 137.0 dB	0	0:00:00.0
LASpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.8 dB		--- dB		--- dB	
$L_{S(max)}$	76.9 dB	2020-05-10 12:17:06	--- dB		--- dB	
$L_{S(min)}$	32.0 dB	2020-05-10 04:00:52	--- dB		--- dB	
$L_{Peak(max)}$	105.9 dB	2020-05-09 14:27:53	--- dB		--- dB	

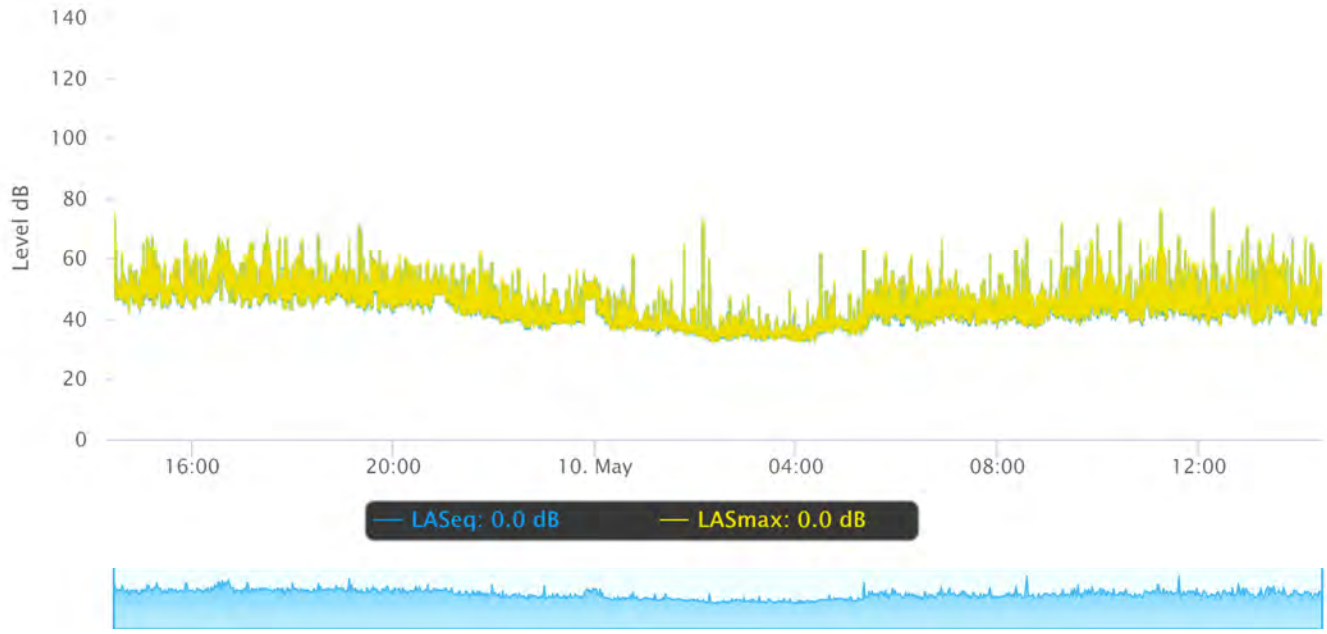
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	53.2 dB
LAS 10.0	50.8 dB
LAS 33.3	46.7 dB
LAS 50.0	44.1 dB
LAS 66.6	41.3 dB
LAS 90.0	36.3 dB

Time History



APPENDIX C

RCNM Model Construction Noise Calculation Printouts

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Site Preparation

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Homes to East	Residential	61.1	61.1	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	10
Dozer	No	40		81.7	325	10
Dozer	No	40		81.7	425	10
Tractor	No	40	84		525	10
Tractor	No	40	84		625	10
Tractor	No	40	84		725	10
Tractor	No	40	84		825	10

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		58.6	54.6	N/A	N/A	N/A	N/A
Dozer		55.4	51.4	N/A	N/A	N/A	N/A
Dozer		53.1	49.1	N/A	N/A	N/A	N/A
Tractor		53.6	49.6	N/A	N/A	N/A	N/A
Tractor		52.1	48.1	N/A	N/A	N/A	N/A
Tractor		50.8	46.8	N/A	N/A	N/A	N/A
Tractor		49.7	45.7	N/A	N/A	N/A	N/A
	Total	**59**	**59**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Site Preparation

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest School to SW	Commercial	50.0	50.0	45.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	5
Dozer	No	40		81.7	325	5
Dozer	No	40		81.7	425	5
Tractor	No	40	84		525	5
Tractor	No	40	84		625	5
Tractor	No	40	84		725	5
Tractor	No	40	84		825	5

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		64	60	N/A	N/A	N/A	N/A
Dozer		60	56	N/A	N/A	N/A	N/A
Dozer		58	54	N/A	N/A	N/A	N/A
Tractor		59	55	N/A	N/A	N/A	N/A
Tractor		57	53	N/A	N/A	N/A	N/A
Tractor		56	52	N/A	N/A	N/A	N/A
Tractor		55	51	N/A	N/A	N/A	N/A
	Total	**64**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Homes to East	Residential	61.1	61.1	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	225	10
Grader	No	40	85		325	10
Dozer	No	40		81.7	425	10
Tractor	No	40	84		525	10
Tractor	No	40	84		625	10
Tractor	No	40	84		725	10

		Calculated (dBA)		Results		Noise Limits (dBA)	
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		57.6	53.7	N/A	N/A	N/A	N/A
Grader		58.7	54.8	N/A	N/A	N/A	N/A
Dozer		53.1	49.1	N/A	N/A	N/A	N/A
Tractor		53.6	49.6	N/A	N/A	N/A	N/A
Tractor		52.1	48.1	N/A	N/A	N/A	N/A
Tractor		50.8	46.8	N/A	N/A	N/A	N/A
	Total	**59**	**59**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Grading

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest School to SW	Residential	50	50	45.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	225	5
Grader	No	40	85		325	5
Dozer	No	40		81.7	425	5
Tractor	No	40	84		525	5
Tractor	No	40	84		625	5
Tractor	No	40.0	84		725	5

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Excavator	62.6	58.7	N/A	N/A	N/A	N/A
Grader	63.7	59.8	N/A	N/A	N/A	N/A
Dozer	58.1	54.1	N/A	N/A	N/A	N/A
Tractor	58.6	54.6	N/A	N/A	N/A	N/A
Tractor	57.1	53.1	N/A	N/A	N/A	N/A
Tractor	55.8	51.8	N/A	N/A	N/A	N/A
Total	**64**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Building Construction

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Homes to East	Residential	61.1	61.1	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	255	10
Gradall	No	40		83.4	355	10
Gradall	No	40		83.4	455	10
Gradall	No	40		83.4	555	10
Generator	No	50		80.6	655	10
Tractor	No	40	84		755	10
Tractor	No	40	84		855	10
Tractor	No	40	84		955	10
Welder / Torch	No	40		74	1055	10

		Calculated (dBA)		Results			
				Day	Noise Limits (dBA)	Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		56.4	48.4	N/A	N/A	N/A	N/A
Gradall		56.4	52.4	N/A	N/A	N/A	N/A
Gradall		54.2	50.2	N/A	N/A	N/A	N/A
Gradall		52.5	48.5	N/A	N/A	N/A	N/A
Generator		48.3	45.3	N/A	N/A	N/A	N/A
Tractor		50.4	46.4	N/A	N/A	N/A	N/A
Tractor		49.3	45.4	N/A	N/A	N/A	N/A
Tractor		48.4	44.4	N/A	N/A	N/A	N/A
Welder / Torch		37.5	33.5	N/A	N/A	N/A	N/A
	Total	**56**	**58**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Building Construction

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest School to SW	Residential	50.0	50.0	45.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	325	5
Gradall	No	40		83.4	425	5
Gradall	No	40		83.4	525	5
Gradall	No	40		83.4	625	5
Generator	No	50		80.6	725	5
Tractor	No	40	84		825	5
Tractor	No	40	84		925	5
Tractor	No	40	84		1025	5
Welder / Torch	No	40		74	1125	5

		Calculated (dBA)		Results			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		59.3	51.3	N/A	N/A	N/A	N/A
Gradall		59.8	55.8	N/A	N/A	N/A	N/A
Gradall		58.0	54.0	N/A	N/A	N/A	N/A
Gradall		56.5	52.5	N/A	N/A	N/A	N/A
Generator		52.4	49.4	N/A	N/A	N/A	N/A
Tractor		54.7	50.7	N/A	N/A	N/A	N/A
Tractor		53.7	49.7	N/A	N/A	N/A	N/A
Tractor		52.8	48.8	N/A	N/A	N/A	N/A
Welder / Torch		42.0	38.0	N/A	N/A	N/A	N/A
	Total	**60**	**61**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Homes to East	Residential	61.1	61.1	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	230	10
Concrete Mixer Truck	No	40		78.8	330	10
Paver	No	50		77.2	430	10
Paver	No	50		77.2	530	10
Roller	No	20		80	630	10
Roller	No	20		80	730	10
Tractor	No	40	84		830	10

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck		55.5	51.6	N/A	N/A	N/A	N/A
Concrete Mixer Truck		52.4	48.4	N/A	N/A	N/A	N/A
Paver		48.5	45.5	N/A	N/A	N/A	N/A
Paver		46.7	43.7	N/A	N/A	N/A	N/A
Roller		48.0	41.0	N/A	N/A	N/A	N/A
Roller		46.7	39.7	N/A	N/A	N/A	N/A
Tractor		49.6	45.6	N/A	N/A	N/A	N/A
	Total	**56**	**55**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Paving

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest School to SW	Residential	50	50	45.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	275	5
Concrete Mixer Truck	No	40		78.8	375	5
Paver	No	50		77.2	475	5
Paver	No	50		77.2	575	5
Roller	No	20		80	675	5
Roller	No	20		80	775	5
Tractor	No	40	84		875	5

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck		59.0	55.0	N/A	N/A	N/A	N/A
Concrete Mixer Truck		56.3	52.3	N/A	N/A	N/A	N/A
Paver		52.7	49.7	N/A	N/A	N/A	N/A
Paver		51.0	48.0	N/A	N/A	N/A	N/A
Roller		52.4	45.4	N/A	N/A	N/A	N/A
Roller		51.2	44.2	N/A	N/A	N/A	N/A
Tractor		54.1	50.2	N/A	N/A	N/A	N/A
	Total	**59**	**59**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2020
Case Description: Iris Park Rsidential Project - Painting

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Homes to East	Residential	61.1	61.1	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	255	10

		Calculated (dBA)		Results Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		53.5	49.5	N/A	N/A	N/A	N/A
	Total	**54**	**50**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest School to SW	Residential	50.0	50.0	45.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	325	5

		Calculated (dBA)		Results Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		56.4	52.4	N/A	N/A	N/A	N/A
	Total	**56**	**52**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX D

FHWA Model Offsite Traffic Noise Calculation Printouts

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS

Project: Iris Park Residential
Site Conditions: Soft

	Vehicle Mix 1 (Local)				Vehicle Mix 2 (Arterial)				Vehicle Mix 3 (Iris Ave)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	73.60%	13.60%	10.22%	97.42%	69.50%	12.90%	9.60%	92.00%	71.37%	13.19%	12.41%	96.97%
Medium Trucks	0.90%	0.90%	0.04%	1.84%	1.44%	0.06%	1.50%	3.00%	1.40%	0.20%	0.40%	2.00%
Heavy Trucks	0.35%	0.04%	0.35%	0.74%	2.40%	0.10%	2.50%	5.00%	0.73%	0.10%	0.21%	1.04%

Road Name: **Iris Avenue** **Segment:** **Perris Blvd to Kitching St**

Average Daily Traffic: 21400 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 3 Roadway Classification: Arterial

	NOISE PARAMETERS AT 70 FEET FROM CENTERLINE (Equiv. Lane Dist: 66.45 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	0.88	-1.96	-1.20	68.84	66.58	65.27	60.23	68.23	68.79	70 dBA:	**54**	**58**
Medium Trucks	78.79	-15.99	-1.96	-1.20	59.65	40.31	37.87	36.11	43.32	43.64	65 dBA:	**115**	**126**
Heavy Trucks	83.02	-18.83	-1.96	-1.20	61.03	38.85	36.42	34.66	41.86	42.19	60 dBA:	**249**	**271**
				Total:	**69.93**	**66.60**	**65.28**	**60.26**	**68.26**	**68.81**	55 dBA:	**536**	**583**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT CONDITIONS

Project: Iris Park Residential
Site Conditions: Soft

	Vehicle Mix 1 (Local)				Vehicle Mix 2 (Arterial)				Vehicle Mix 3 (Iris Ave)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	73.60%	13.60%	10.22%	97.42%	69.50%	12.90%	9.60%	92.00%	71.37%	13.19%	12.41%	96.97%
Medium Trucks	0.90%	0.90%	0.04%	1.84%	1.44%	0.06%	1.50%	3.00%	1.40%	0.20%	0.40%	2.00%
Heavy Trucks	0.35%	0.04%	0.35%	0.74%	2.40%	0.10%	2.50%	5.00%	0.73%	0.10%	0.21%	1.04%

Road Name: Iris Avenue **Segment: Perris Blvd to Kitching St**

Average Daily Traffic: 22174 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 3 Roadway Classification: Arterial

	NOISE PARAMETERS AT 70 FEET FROM CENTERLINE (Equiv. Lane Dist: 66.45 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	1.03	-1.96	-1.20	68.99	66.74	65.42	60.39	68.39	68.94	70 dBA:	**55**	**60**
Medium Trucks	78.79	-15.84	-1.96	-1.20	59.80	40.46	38.03	36.27	43.47	43.79	65 dBA:	**118**	**129**
Heavy Trucks	83.02	-18.68	-1.96	-1.20	61.19	39.01	36.58	34.81	42.02	42.34	60 dBA:	**255**	**277**
				Total:	**70.09**	**66.75**	**65.44**	**60.42**	**68.41**	**68.96**	55 dBA:	**548**	**597**

APPENDIX E

FHWA Model Onsite Traffic Noise Calculation Printouts

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Road Name: Iris Avenue
Lot Number: 3

Project Name: Iris Park
Job Number: 20010

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	22,174	vehicles
Peak Hour Volume:	2,217	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	44	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	71.4%	13.2%	12.4%	97.0%
Medium Trucks:	1.4%	0.2%	0.4%	2.0%
Heavy Trucks:	0.7%	0.1%	0.2%	1.0%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	60	feet
C.L. Dist. To Observer (Backyard):	66	feet
Barrier Dist. To Observer (Backyard):	6	feet
C.L. Dist. To Observer (Structure):	72	feet
Barrier Dist. To Observer (Structure):	12	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	1,497.9	feet
Road Elevation:	1,499.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	1,497.9	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	0.80	-1.54	-1.20	0.00	-7.6	-6.32	0
Med Trucks:	78.79	-14.07	-1.54	-1.20	0.00	-7.43	-5.8	0
Hvy Trucks:	83.02	-11.85	-1.54	-1.20	0.00	-5.8	-4.9	0

UNMITIGATED NOISE LEVELS (Backyard with topographical attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	66.8	65.5	59.5	67.9	68.5
Med Trucks:	62.0	42.8	35.0	44.2	50.4	50.4
Hvy Trucks:	68.4	51.4	43.7	52.9	59.0	59.1
Traffic Noise:	**72.3**	**66.9**	**65.5**	**60.4**	**68.5**	**69.0**

MITIGATED NOISE LEVELS (Backyard with sound wall)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.2	57.9	51.9	60.3	60.9
Med Trucks:	54.6	35.3	27.6	36.8	42.9	43.0
Hvy Trucks:	62.6	45.6	37.9	47.1	53.2	53.3
Traffic Noise:	**65.5**	**59.4**	**58.0**	**53.2**	**61.1**	**61.7**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.5	59.9	58.6	52.5	60.9	61.6
Med Trucks:	53.8	36.3	28.6	37.8	43.9	44.0
Hvy Trucks:	56.1	45.9	38.1	47.3	53.5	53.5
Traffic Noise:	**63.8**	**60.0**	**58.6**	**53.8**	**61.7**	**62.3**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.7	66.1	64.8	58.7	67.2	67.8
Med Trucks:	59.5	42.0	34.3	43.5	49.6	49.7
Hvy Trucks:	60.9	50.7	42.9	52.1	58.3	58.3
Traffic Noise:	**69.8**	**66.2**	**64.8**	**59.7**	**67.7**	**68.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Road Name: Iris Avenue
Lot Number: 69

Project Name: Iris Park
Job Number: 20010

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	22,174	vehicles
Peak Hour Volume:	2,217	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	44	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	71.4%	13.2%	12.4%	97.0%
Medium Trucks:	1.4%	0.2%	0.4%	2.0%
Heavy Trucks:	0.7%	0.1%	0.2%	1.0%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	60	feet
C.L. Dist. To Observer (Backyard):	66	feet
Barrier Dist. To Observer (Backyard):	6	feet
C.L. Dist. To Observer (Structure):	72	feet
Barrier Dist. To Observer (Structure):	12	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	1,500.3	feet
Road Elevation:	1,500.5	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	1,500.3	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	0.80	-1.55	-1.20	0.00	-7.8	-6.64	0
Med Trucks:	78.79	-14.07	-1.55	-1.20	0.00	-7.7	-6.16	0
Hvy Trucks:	83.02	-11.85	-1.55	-1.20	0.00	-6.08	-4.9	0

UNMITIGATED NOISE LEVELS (Backyard with topographical attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	66.8	65.5	59.5	67.9	68.5
Med Trucks:	62.0	42.8	35.0	44.2	50.4	50.4
Hvy Trucks:	68.4	51.4	43.7	52.9	59.0	59.1
Traffic Noise:	**72.3**	**66.9**	**65.5**	**60.4**	**68.5**	**69.0**

MITIGATED NOISE LEVELS (Backyard with sound wall)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.0	57.7	51.7	60.1	60.7
Med Trucks:	54.3	35.1	27.3	36.5	42.7	42.7
Hvy Trucks:	62.3	45.4	37.6	46.8	52.9	53.0
Traffic Noise:	**65.3**	**59.2**	**57.8**	**53.0**	**60.9**	**61.4**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	59.5	58.2	52.2	60.6	61.2
Med Trucks:	53.4	36.0	28.2	37.4	43.6	43.6
Hvy Trucks:	56.1	45.9	38.1	47.3	53.5	53.5
Traffic Noise:	**63.5**	**59.7**	**58.3**	**53.5**	**61.5**	**62.0**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.7	66.1	64.8	58.7	67.1	67.8
Med Trucks:	59.5	42.0	34.2	43.4	49.6	49.6
Hvy Trucks:	60.8	50.7	42.9	52.1	58.3	58.3
Traffic Noise:	**69.7**	**66.2**	**64.8**	**59.7**	**67.7**	**68.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Road Name: Iris Avenue
Lot Number: 73

Project Name: Iris Park
Job Number: 20010

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	22,174	vehicles
Peak Hour Volume:	2,217	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	44	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	71.4%	13.2%	12.4%	97.0%
Medium Trucks:	1.4%	0.2%	0.4%	2.0%
Heavy Trucks:	0.7%	0.1%	0.2%	1.0%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	60	feet
C.L. Dist. To Observer (Backyard):	66	feet
Barrier Dist. To Observer (Backyard):	6	feet
C.L. Dist. To Observer (Structure):	72	feet
Barrier Dist. To Observer (Structure):	12	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	1,499.7	feet
Road Elevation:	1,500.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	1,499.7	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	0.80	-1.55	-1.20	0.00	-7.8	-6.64	0
Med Trucks:	78.79	-14.07	-1.55	-1.20	0.00	-7.65	-6.16	0
Hvy Trucks:	83.02	-11.85	-1.55	-1.20	0.00	-6.08	-4.9	0

UNMITIGATED NOISE LEVELS (Backyard with topographical attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	66.8	65.5	59.5	67.9	68.5
Med Trucks:	62.0	42.8	35.0	44.2	50.4	50.4
Hvy Trucks:	68.4	51.4	43.7	52.9	59.0	59.1
Traffic Noise:	**72.3**	**66.9**	**65.5**	**60.4**	**68.5**	**69.0**

MITIGATED NOISE LEVELS (Backyard with sound wall)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.0	57.7	51.7	60.1	60.7
Med Trucks:	54.3	35.1	27.3	36.5	42.7	42.7
Hvy Trucks:	62.3	45.4	37.6	46.8	52.9	53.0
Traffic Noise:	**65.3**	**59.2**	**57.8**	**53.0**	**60.9**	**61.5**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	59.5	58.2	52.2	60.6	61.2
Med Trucks:	53.4	36.0	28.2	37.4	43.6	43.6
Hvy Trucks:	56.1	45.9	38.1	47.3	53.5	53.5
Traffic Noise:	**63.5**	**59.7**	**58.3**	**53.5**	**61.5**	**62.0**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.7	66.1	64.8	58.7	67.1	67.8
Med Trucks:	59.5	42.0	34.2	43.5	49.6	49.6
Hvy Trucks:	60.8	50.7	42.9	52.1	58.3	58.3
Traffic Noise:	**69.7**	**66.2**	**64.8**	**59.7**	**67.7**	**68.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Road Name: Iris Avenue
Lot Number: 77

Project Name: Iris Park
Job Number: 20010

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	22,174	vehicles
Peak Hour Volume:	2,217	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	44	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	71.4%	13.2%	12.4%	97.0%
Medium Trucks:	1.4%	0.2%	0.4%	2.0%
Heavy Trucks:	0.7%	0.1%	0.2%	1.0%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	60	feet
C.L. Dist. To Observer (Backyard):	66	feet
Barrier Dist. To Observer (Backyard):	6	feet
C.L. Dist. To Observer (Structure):	72	feet
Barrier Dist. To Observer (Structure):	12	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	1,500.6	feet
Road Elevation:	1,500.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	1,500.6	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	0.80	-1.55	-1.20	0.00	-8	-6.94	0
Med Trucks:	78.79	-14.07	-1.55	-1.20	0.00	-7.9	-6.4	0
Hvy Trucks:	83.02	-11.85	-1.55	-1.20	0.00	-6.24	-4.9	0

UNMITIGATED NOISE LEVELS (Backyard with topographical attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	66.8	65.5	59.4	67.9	68.5
Med Trucks:	62.0	42.8	35.0	44.2	50.3	50.4
Hvy Trucks:	68.4	51.4	43.6	52.9	59.0	59.0
Traffic Noise:	**72.2**	**66.9**	**65.5**	**60.4**	**68.5**	**69.0**

MITIGATED NOISE LEVELS (Backyard with sound wall)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	58.8	57.5	51.4	59.9	60.5
Med Trucks:	54.1	34.9	27.1	36.3	42.4	42.5
Hvy Trucks:	62.2	45.2	37.4	46.6	52.8	52.8
Traffic Noise:	**65.1**	**59.0**	**57.5**	**52.8**	**60.7**	**61.2**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.8	59.2	57.9	51.9	60.3	60.9
Med Trucks:	53.2	35.7	28.0	37.2	43.3	43.3
Hvy Trucks:	56.1	45.9	38.1	47.3	53.5	53.5
Traffic Noise:	**63.3**	**59.4**	**58.0**	**53.3**	**61.2**	**61.7**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.0	64.7	58.7	67.1	67.8
Med Trucks:	59.4	42.0	34.2	43.4	49.6	49.6
Hvy Trucks:	60.8	50.7	42.9	52.1	58.3	58.3
Traffic Noise:	**69.7**	**66.2**	**64.8**	**59.7**	**67.7**	**68.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Road Name: Iris Avenue
Lot Number: 81

Project Name: Iris Park
Job Number: 20010

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	22,174	vehicles
Peak Hour Volume:	2,217	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	44	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	71.4%	13.2%	12.4%	97.0%
Medium Trucks:	1.4%	0.2%	0.4%	2.0%
Heavy Trucks:	0.7%	0.1%	0.2%	1.0%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	60	feet
C.L. Dist. To Observer (Backyard):	66	feet
Barrier Dist. To Observer (Backyard):	6	feet
C.L. Dist. To Observer (Structure):	72	feet
Barrier Dist. To Observer (Structure):	12	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	1,499.9	feet
Road Elevation:	1,499.5	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	1,499.9	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	0.80	-1.55	-1.20	0.00	-7.95	-6.87	0
Med Trucks:	78.79	-14.07	-1.55	-1.20	0.00	-7.85	-6.4	0
Hvy Trucks:	83.02	-11.85	-1.55	-1.20	0.00	-6.24	-4.9	0

UNMITIGATED NOISE LEVELS (Backyard with topographical attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	66.8	65.5	59.4	67.9	68.5
Med Trucks:	62.0	42.8	35.0	44.2	50.3	50.4
Hvy Trucks:	68.4	51.4	43.6	52.9	59.0	59.0
Traffic Noise:	**72.2**	**66.9**	**65.5**	**60.4**	**68.5**	**69.0**

MITIGATED NOISE LEVELS (Backyard with sound wall)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	58.8	57.6	51.5	59.9	60.6
Med Trucks:	54.1	34.9	27.1	36.3	42.5	42.5
Hvy Trucks:	62.2	45.2	37.4	46.6	52.8	52.8
Traffic Noise:	**65.1**	**59.0**	**57.6**	**52.8**	**60.8**	**61.3**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.3	58.0	51.9	60.4	61.0
Med Trucks:	53.2	35.7	28.0	37.2	43.3	43.4
Hvy Trucks:	56.1	45.9	38.1	47.3	53.5	53.5
Traffic Noise:	**63.3**	**59.5**	**58.1**	**53.3**	**61.3**	**61.8**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.0	64.7	58.7	67.1	67.8
Med Trucks:	59.4	42.0	34.2	43.4	49.6	49.6
Hvy Trucks:	60.8	50.7	42.9	52.1	58.3	58.3
Traffic Noise:	**69.7**	**66.2**	**64.8**	**59.7**	**67.7**	**68.3**