Rome Hill Commercial Project
Noise Impact Study
City of Lake Elsinore, CA

Prepared for:

Mr. Guy Selleck
Builder's Max Inc.
1207 N. East Street
Anaheim, CA 92805

Prepared by:

MD Acoustics, LLC
Rachel Edelman, INCE-USA
Sarah Ostergaard, INCE-USA
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

Date: 1/28/2025

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State, and Local agencies. Consistent with the City's Noise Guidelines, the project must demonstrate compliance to the applicable noise criterion as outlined within the City's Noise Element and Municipal Code.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An analysis of traffic noise impacts to and from the project site
- An analysis of stationary noise impacts to and from the project site
- An analysis of construction noise impacts

1.2 Site Location and Study Area

The project site is located across two parcels (371-150-001, 371-150-002) in the City of Lake Elsinore, California, as shown in Exhibit A. The project is seeking to merge the two parcels into one and rezone the land from the current designation of R-2 Light-Medium Residential to C-M Commercial-Manufacturing. The proposed use is commercial. Land uses surrounding the site include vacant land to the northwest and northeast, Grand Avenue to the southwest with commercial uses further, and single-family residential uses to the southeast.

1.3 Proposed Project Description

The Project proposes to develop the site with two (2) buildings consisting of 121,430 square feet of warehouse space, offices, and mezzanines on the approximately 6.77-acre site. The site is also to include a parking lot with 180 parking stalls. Exhibit B demonstrates the site plan for the project.

Construction activities within the Project area will consist of site preparation, on-site grading, building, paving, and architectural coating.

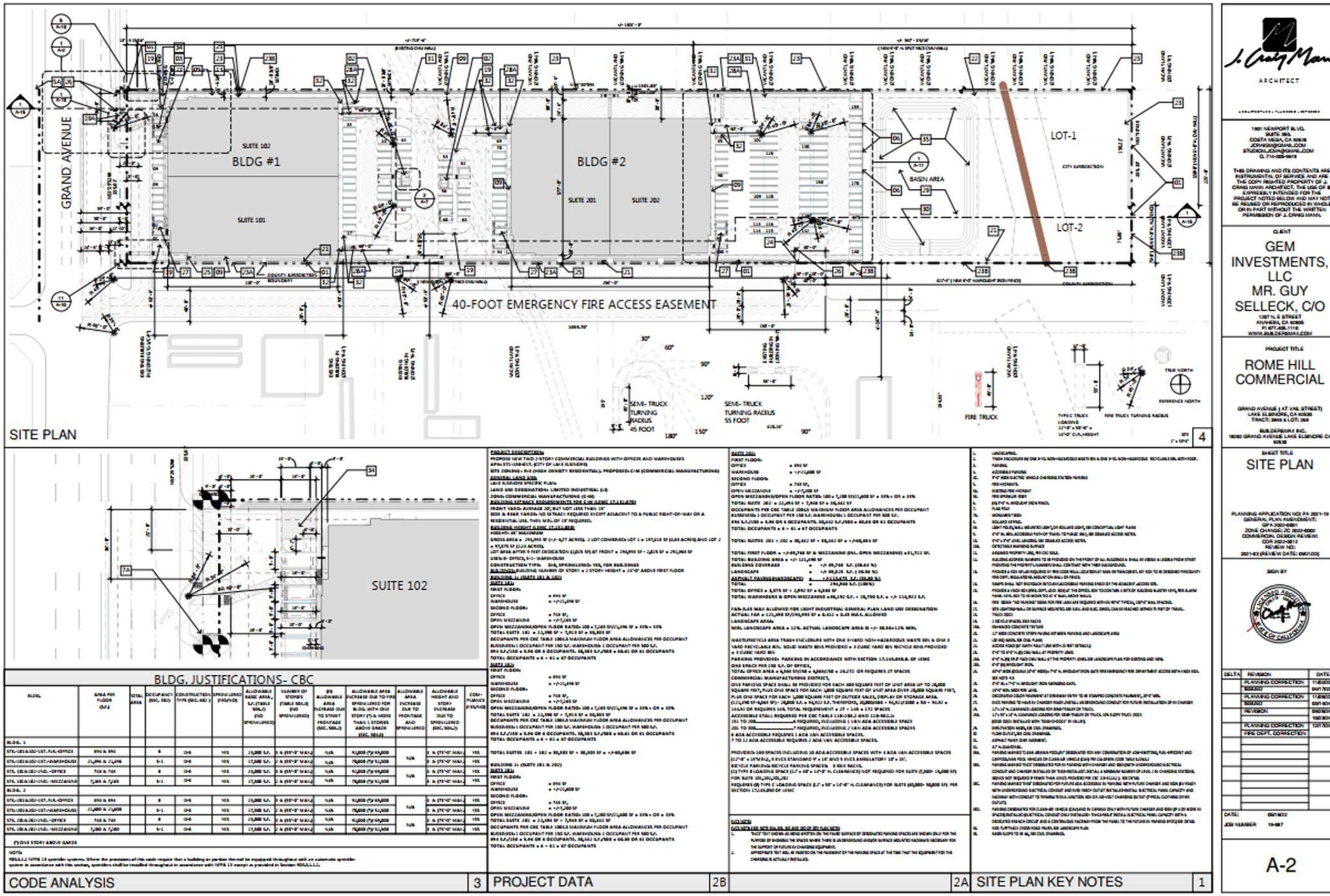
The closest existing sensitive receptors (to the site area) are the residential land uses located approximately 185 feet to the southeast of the project site.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

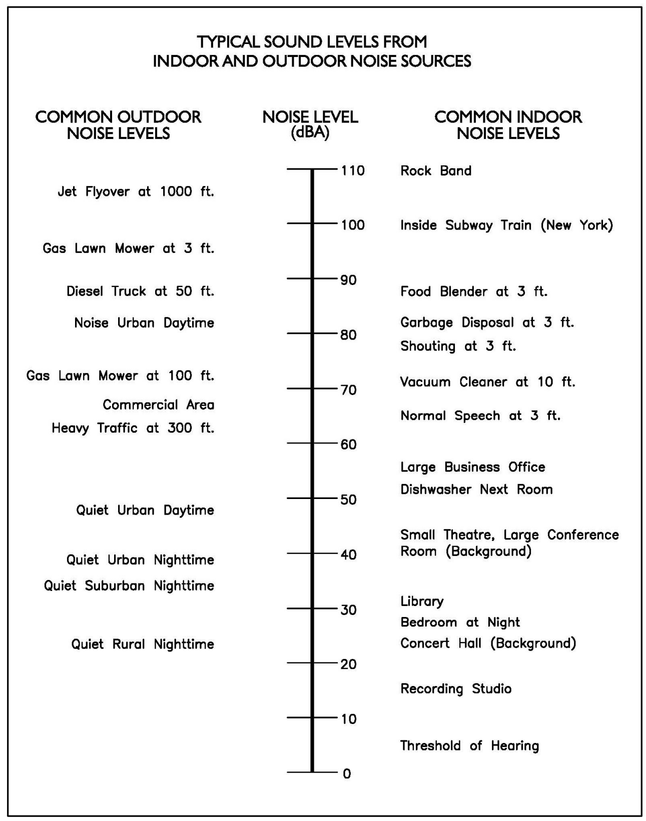
2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting at 20 Hz to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in the noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after the addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which are intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2 axle), and heavy truck percentage (3 axle and greater), and sound propagation. Greater volume of traffic, higher speeds, and larger truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Bourne Vibration Fundamentals

3.1 Vibration Descriptors

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.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

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. Outdoor 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. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

3.3 Vibration Propagation

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 wavefront, 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 wavefront. 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 wavefront. 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 proposed project is located in the sphere of the City of Lake Elsinore and 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:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The federal government 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 constructed adjacent to a highway or that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, 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

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.” The matrix allows the local jurisdiction to clearly delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city 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 as illustrated in Exhibit D, which is the City's version of the guidelines found in the City's General Plan Noise Element.

Exhibit D: Land Use Compatibility Guidelines

Land Use Categories		Day-Night Noise Level (LDN)						
Categories	Uses	≤55	60	65	70	75	80≥	
Residential	Single, Family, Duplex, Multiple Family	A	A	B	B	C	D	D
Residential	Mobile Homes	A	A	B	C	C	D	D
Commercial Regional District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional Village, District Special	Commercial, Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
Commercial Industrial Institutional	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
Commercial Regional Institutional Civic Center	Amphitheatre, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
Commercial General, Special Industrial Institutional	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools, Classroom	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
Open Space	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
Agriculture	Agriculture	A	A	A	A	A	A	A

Interpretation	
Zone A Clearly Compatible	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Zone B Normally Compatible	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed nose insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Zone C Normally Incompatible	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
Zone D Clearly Incompatible	New construction or development should generally not be undertaken.

4.3 City of Lake Elsinore Noise Regulations

The project falls within the sphere of influence of the City of Lake Elsinore. The City outlines their noise regulations and standards within the Noise Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Lake Elsinore Municipal Code

The City of Lake Elsinore outlines their noise regulations and standards within the Noise Element from the General Plan and the Municipal Code. For purposes of this analysis, the City's Municipal Code zoning performance standards (17.176) are used to evaluate the stationary noise impacts from the proposed project. The project impacts were compared to the City's commercial and residential noise standards.

17.176 Noise Control

Lake Elsinore lays out daytime and nighttime noise limits for an individual operation for residential, commercial, and industrial zones. These limits must not be exceeded for 30 minutes or more within an hour. These limits plus 5 dB must not be exceeded for 15 minutes or more within an hour. These limits plus 10 dB must not be exceeded for 5 minutes or more within an hour. These limits plus 15 dB must not be exceeded for 1 minutes or more within an hour. These limits plus 20 dB must not be exceeded at any time. If the ambient exceeds these levels, each category must be raised 5 dB.

Table 1: Lake Elsinore Exterior Noise Limits

Receiving Land Use Category	Time Period	Noise Level (dBA)
Single-Family Residential	10:00 p.m. – 7:00 a.m.	40
	7:00 a.m. – 10:00 p.m.	50
Multiple Dwelling Residential	10:00 p.m. – 7:00 a.m.	45
	7:00 a.m. – 10:00 p.m.	50
Public Space		
Limited Commercial and Office	10:00 p.m. – 7:00 a.m.	55
	7:00 a.m. – 10:00 p.m.	60
General Commercial	10:00 p.m. – 7:00 a.m.	60
	7:00 a.m. – 10:00 p.m.	65
Light Industrial	Anytime	70
Heavy Industrial	Anytime	75

Construction Noise Regulations

Construction must not occur between the hours of 7 PM and 7 AM or on weekends or holidays. Mobile equipment operating short-time (10 days or less) and intermittently has a maximum noise level restriction of 75 dBA at single-family residential areas. Stationary equipment with long-term operation and repetitive use has a maximum noise level of 60 dBA at single-family residential areas. At commercial properties, mobile equipment must be 85 dBA or less and stationary equipment must be 75 dBA or less. Construction vibration must be imperceptible beyond the property line.

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

MD conducted the sound level measurements in accordance with Caltrans technical noise specifications and the City's noise ordinance. All measurements equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements, any noise contaminations such as barking dogs, local traffic, lawnmowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the distance of the project's stationary noise sources to the nearest sensitive on-site receptors. One (1) short-term and one (1) long-term noise measurement were conducted on the project site and represent ambient levels at the site. Appendix A includes photos, field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

5.3 Stationary Noise Modeling

SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP is capable of evaluating multiple stationary noise source impacts at various receiver locations. SP's software utilizes algorithms (based on the inverse square law and reference equipment noise level data) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The future worst-case noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces and loading docks). The model assumes that the building facility has eight (8) reverse alarms going off at the same time, all parapets are taller than the rooftop HVAC units, and that there are approximately 180 parking spaces.

Reverse alarms were modeled as a point source with a reference noise level of 68.5 dBA at 6 feet. Parking lots were modeled with the parking lot tool at one movement per hour.

The SP model assumes that all noise sources are operating simultaneously (worst-case scenario) when in actuality the noise will be intermittent and lower in noise level.

Finally, the model is able to evaluate the noise attenuating effects of any existing or proposed property line walls. Input and output calculations are provided in Appendix C.

Table 2: Reference Sound Level Measurements for SoundPLAN Model

Source	Source Type	Reference Level (dBA)	Descriptor
Reverse Alarm	Point Source	68.5	6 ft
Parking	Area (SP Parking Tool)	-	1 car per hr

5.4 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the project site.

The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, concrete, and building phases of construction. The construction noise calculation output worksheet is located in Appendix E.

Exhibit E
Measurement Locations

6.0 Existing Noise Environment

One (1) 10-minute ambient noise measurement and one (1) hour and a half measurement were conducted at the project on 12/3/21. These noise monitoring locations are illustrated in Exhibit E. The measurement measured the Leq, Lmin, Lmax and other statistical data (e.g. L2, L8) and is presented in Table 1. The noise measurement was taken to determine the existing baseline noise conditions.

6.1 Short-Term Noise Measurement Results

The results of the Short-term noise data taken are presented in Table 3.

Table 3: Short-Term Nosie Measurement Data (dBA)[1]

Date	Start Time	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
12/3/2021	3:48 PM	52.5	64.9	44.8	59.9	56	52.5	50.9	46.5
Notes: 1. Short-term noise monitoring ST1 is illustrated in Exhibit E.									

Noise data indicates the ambient noise level was 52.5 dBA Leq at the ST1. Additional field notes and photographs are provided in Appendix A. The L50 limit of 50 dBA is exceeded. The project must therefore not exceed the ambient level.

6.2 Long-Term Noise Measurement Results

The results of the Long-term noise data taken are presented in Table 4.

Table 4: Long-Term Nosie Measurement Data (dBA)[1]

Date	Start Time	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
12/3/2021	1:26 PM	68.4	84.3	45.2	75.0	71.9	69.4	66.5	57.2
Notes: 1. Long-term noise monitoring LT1 is illustrated in Exhibit E.									

Noise data indicates the ambient noise level was 68.4 at LT1. The L50 limit of 50 dBA, the L25 limit of 55 dBA, the L8 limit of 60 dBA, the L2 limit of 65 dBA, and the Lmax level of 70 dBA are exceeded.

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to and from the project compares the results to the City's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadways and from on-site stationary noise sources.

7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed project.

7.1.1 Noise Impacts to Off-Site Receptors Due to Stationary Sources

Due to the location of the proposed loading dock facilities, receptors that may be affected by project operational noise include the existing residences to the southeast. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. The model utilizes SoundPLAN's sound level data for the loading docks and parking specified within Section 5.4 of this report. Loading activity constitutes the project's maximum operational noise levels.

A total of four (4) receptor locations were modeled to evaluate the proposed project's operational noise impact to adjacent existing or future noise sensitive land uses. A receptor is denoted by a yellow dot in Exhibit F.

Project Operational Noise Levels

Exhibit F shows the "project only" operational noise levels at the property lines and/or sensitive receptor areas and illustrates how the noise will propagate at the site. Worst-case operational noise levels are anticipated to range between 37 to 45 dBA Leq at the receptors R1 – R4. The noise projections are below the City's noise limits as given in Section 17.176.060 of the Municipal Code.

Project Plus Ambient Operational Noise Levels

Table 5 demonstrates the project plus ambient noise levels. Project plus ambient noise level projections are anticipated to range between 53 to 68 dBA Leq at the receptors R1 – R4.

<Table 5, next page>

Table 5: Worst-case Predicted Operational Noise Levels (dBA)

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Leq)[3]	Total Combined Noise Level (dBA, Leq)	Exceeds Ordinance?	Change in Noise Level as Result of Project
R1	53	41	53	**NO**	0
R2	53	45	53	**NO**	0
R3	68	38	68	**NO**	0
R4	68	37	68	**NO**	0

Notes:
1. Receptor locations in Exhibit F. R1 to R3 are industrial.
2. The measured ambient Leq .
3. Residential uses are acceptable up to 50 dBA Leq during the day.

In addition, Table 5 provides the anticipated change in noise level as a result of the proposed project during daytime operable conditions. The levels are not anticipated to increase as a result of the project. The impact is therefore less than significant.

7.1.2 Noise Impacts to On/Off-Site Receptors Due to Project Generated Traffic

The project would generate 208 daily passenger car equivalent trips of which 21 would occur in the AM peak hour and 22 would occur in the PM peak hour. Per the memo provided by TJW Engineering, Inc., 1/27/2025 (*Rome Hill Commercial Trip Generation Analysis and VMT Screening*), see Appendix B. This equates to approximately one passenger car equivalent trip every three minutes in the pm peak hour and would not result in a substantial increase in traffic noise.

Traffic along the subject roadways would need to double in average daily traffic volumes to generate a 3 dBA increase in noise level. Since the project generates a nominal amount of traffic relative to the existing ADTs, the project's traffic noise level increase would be nominal and therefore less than significant.

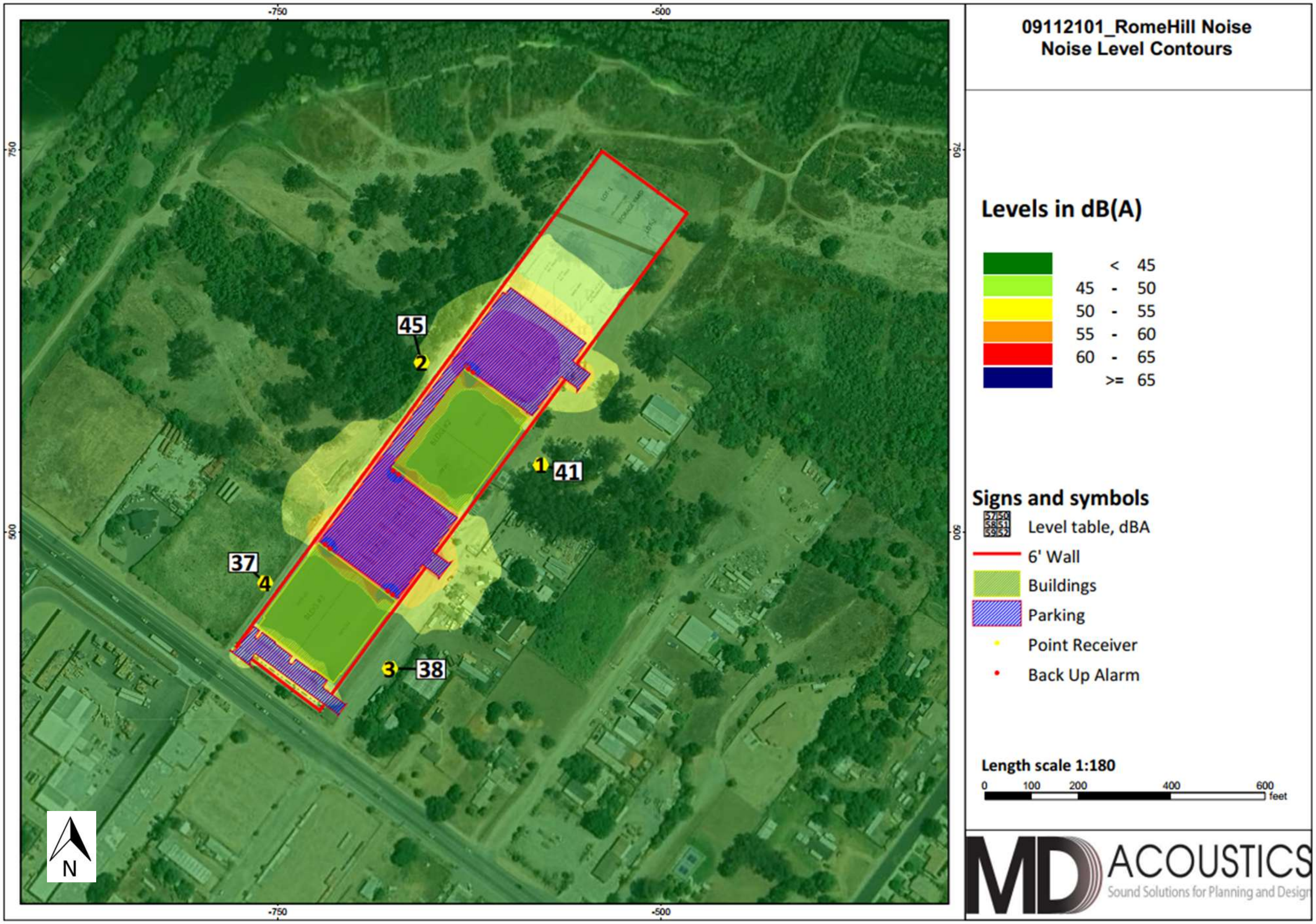
7.2 Noise Reduction Measures

The following noise reduction measures have been implemented into the plan:

- All roof-top exterior equipment will be shielded from view with solid parapets that are taller than the equipment constructed with a surface weight of at least 4.2 lb/ft^2.
- A 6' wall with a surface weight of at least 4.2 lb/ft^2 will surround the site.

Exhibit F

Operational Noise Levels



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 6.

Table 6: Typical Construction Equipment Noise Levels[1]

Equipment Powered by Internal Combustion Engines

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82

Notes:
[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

Construction is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the City's Municipal Code Section 7.34.060. Construction is anticipated to occur during the permissible hours according to the City's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. The loudest piece of mobile equipment (a bulldozer) is anticipated to be 85 dBA at 50 ft from the source. At 70 ft, which is the distance from the nearest proposed building to 10 ft within the residential property line, the Lmax level would be 82 dBA. An 8' temporary barrier is required along the residential property line to bring the level to 73 dBA, which is below the mobile equipment construction noise limit of 75 dBA.

The loudest piece of stationary equipment (a generator) is anticipated to be 82 dBA at 50 ft from the source. At 225 feet with the 8' temporary barrier, a generator is anticipated to be 60 dBA. In order to meet the stationary noise limit of 60 dBA, stationary equipment must be staged as far away from the existing residential properties as possible.

To meet the construction noise limits, construction will operate between the hours of 7 AM and 7 PM on weekdays. Stationary equipment will be staged as far away from the existing residential properties as possible, and there will be an 8-foot wall surrounding the existing residential property lines.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a bulldozer. A large bulldozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is likely perceptible but below any risk to architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (25/D_{rec})^{n}$$

Where: PPV_{ref} = reference PPV at 25ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.5 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 6 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

<Table 7, next page>

Table 7: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 8 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 8: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	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

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

At a distance of 70 feet, a large bulldozer would yield a worst-case 0.019 PPV (in/sec) which below any risk of damage and likely imperceptible. The impact is less than significant, and no mitigation is required.

9.0 References

American National Standards Institute (ANSI)
Specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

California, State of, Building Standards Commission
2019 California Uniform Building Code (UBC), Title 24.
2019 Green Code Section 5.507.4.3 (2019)

California Department of Transportation (Caltrans)
2013 Technical Noise Supplement to the Traffic Noise Analysis Protocol.
2020 Transportation and Construction Vibration Guidance Manual. April.
2021 Caltrans Traffic Counts https://dot.ca.gov/programs/traffic-operations/census

California Office of Noise Control
2017 Guidelines for the Preparation and Content of Noise Elements of the General Plan. February.

Environmental Protection Agency (EPA)
1974 Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Prepared by the EPA, Office of Noise Abatement and Control.

Federal Transit Administration
2006 Transit Noise and Vibration Impact Assessment. Typical Construction Equipment Vibration Emissions. FTAVA-90-1003-06.

Lake Elsinore, City of
2011 City of Lake Elsinore General Plan.
2021 City of Lake Elsinore Code of Ordinance

Office of Planning and Research, State of California
2017 Office of Planning and Research, General Plan Guidelines.

Appendix A:

Field Measurement Data

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

10-Minute Continuous Noise Measurement Datasheet

Project: Rome Hill Noise
Site Observations: Sunny, temps in the low 70's little to no wind.
Site Address/Location: Grand Ave, Lake Elsinore, CA
Date: 12/3/2021
Field Tech/Engineer: Jason Schuyler

General Location:
Sound Meter: NTi Audio **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-minute interval
Meteorological Con.: low 70s
Site ID: ST1

Site Topo: Flat
Ground Type: Hard Site

Noise Source(s) w/ Distance:

Figure 1: Monitoring Locations

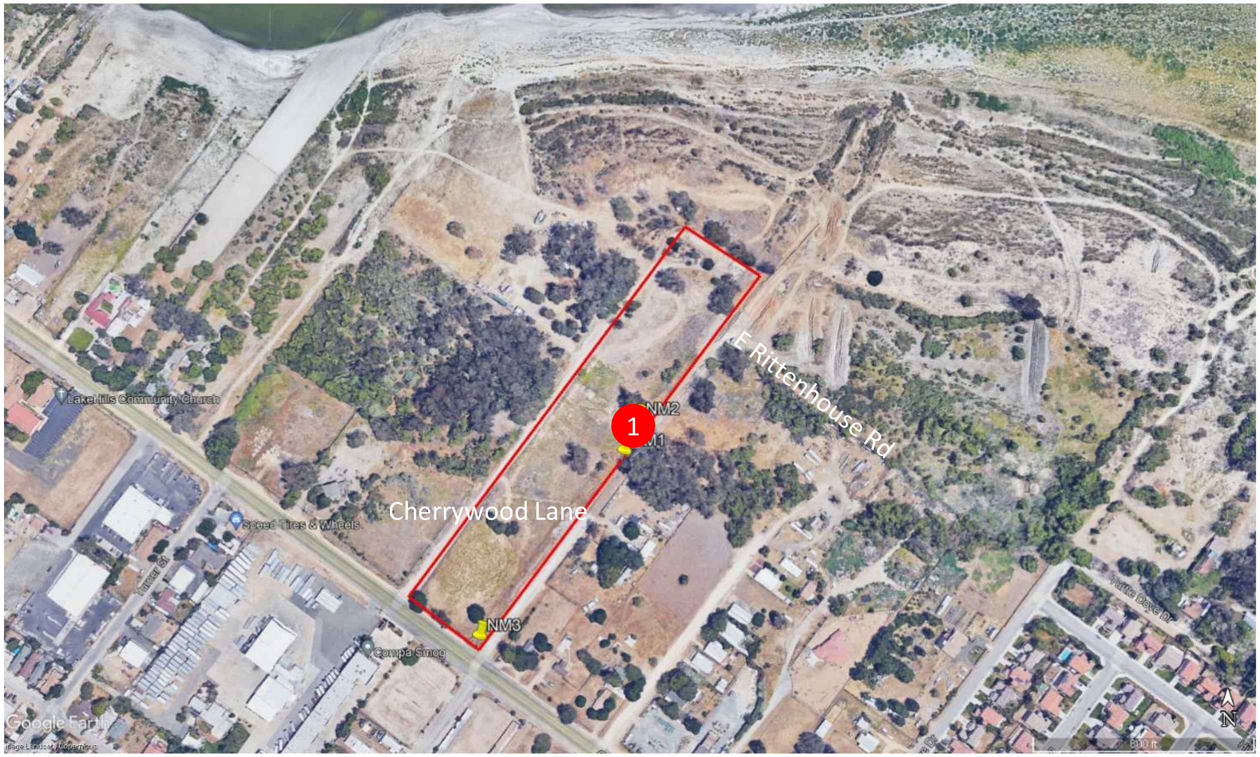


Figure 2: ST-1 Photo

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

.0-Minute Continuous Noise Measurement Datasheet - Con

Project: Rome Hill Noise
Site Address/Location: Grand Ave, Lake Elsinore, CA
Site ID: ST1

Table 1: Morning - Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1	3:48 PM	3:58 PM	52.5	64.9	44.8	59.9	56	52.5	50.9	46.5

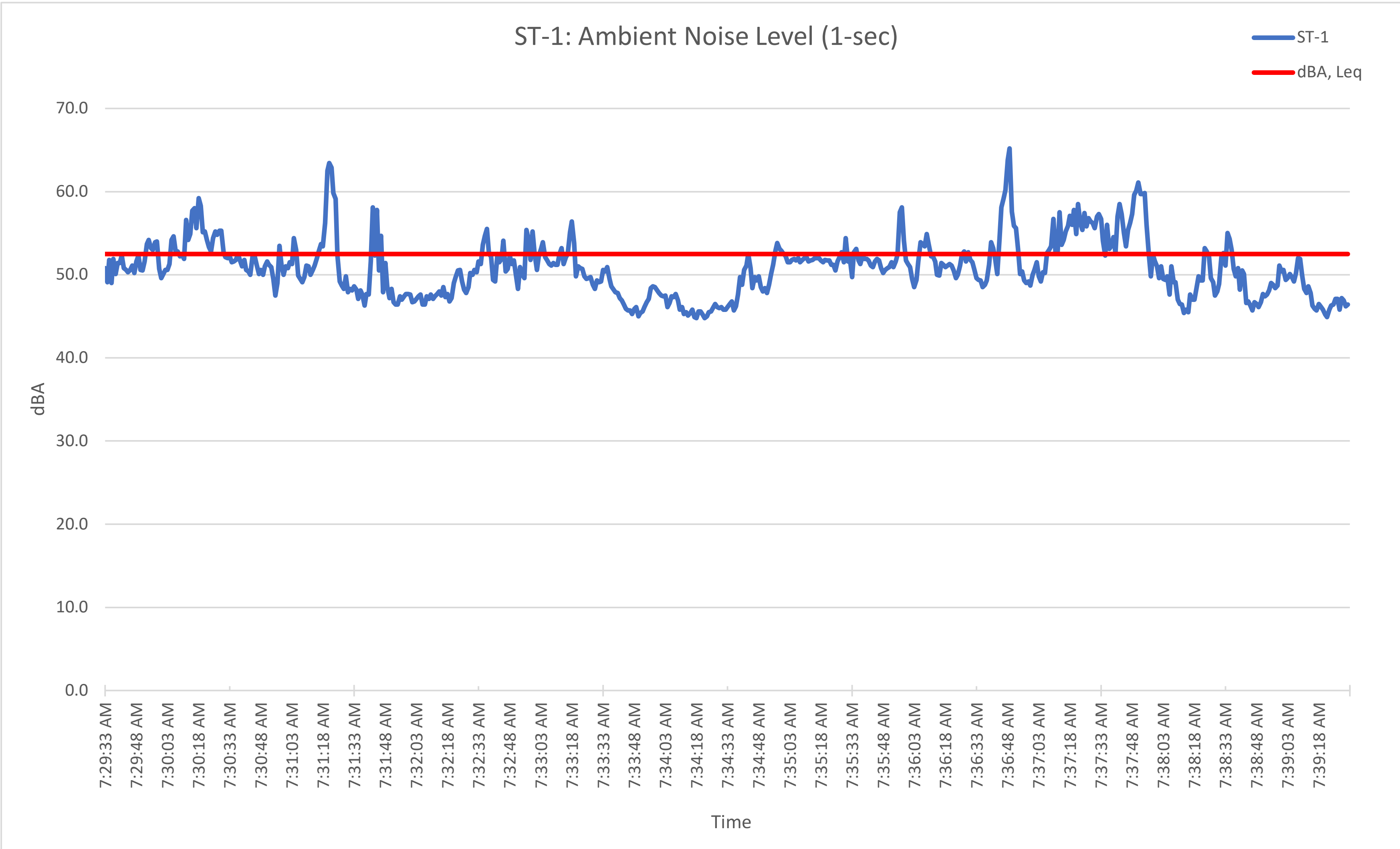
ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

.0-Minute Continuous Noise Measurement Datasheet - Con

Project: Rome Hill Noise
Site Address/Location: Grand Ave, Lake Elsinore, CA
Site ID: ST-1



MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

1-Hour Noise Measurement Datasheet

Project: Rome Hill Noise
Site Address/Location: Grand Ave, Lake Elsinore, CA
Date: 12/3/2021
Field Tech/Engineer: Jason Schuyler

Site Observations: Sunny, temps in the low 70's little to no wind.

General Location:
Sound Meter: Piccolo II **SN:**
Settings: A-weighted, slow, 1-sec, 1-hour interval, 24-hour duration
Meteorological Con.: low 70s
Site ID: LT1

Site Topo: Flat
Ground Type: Hard site

Noise Source(s) w/ Distance:
C/L of 50th Ave. is 28ft from meter NM3

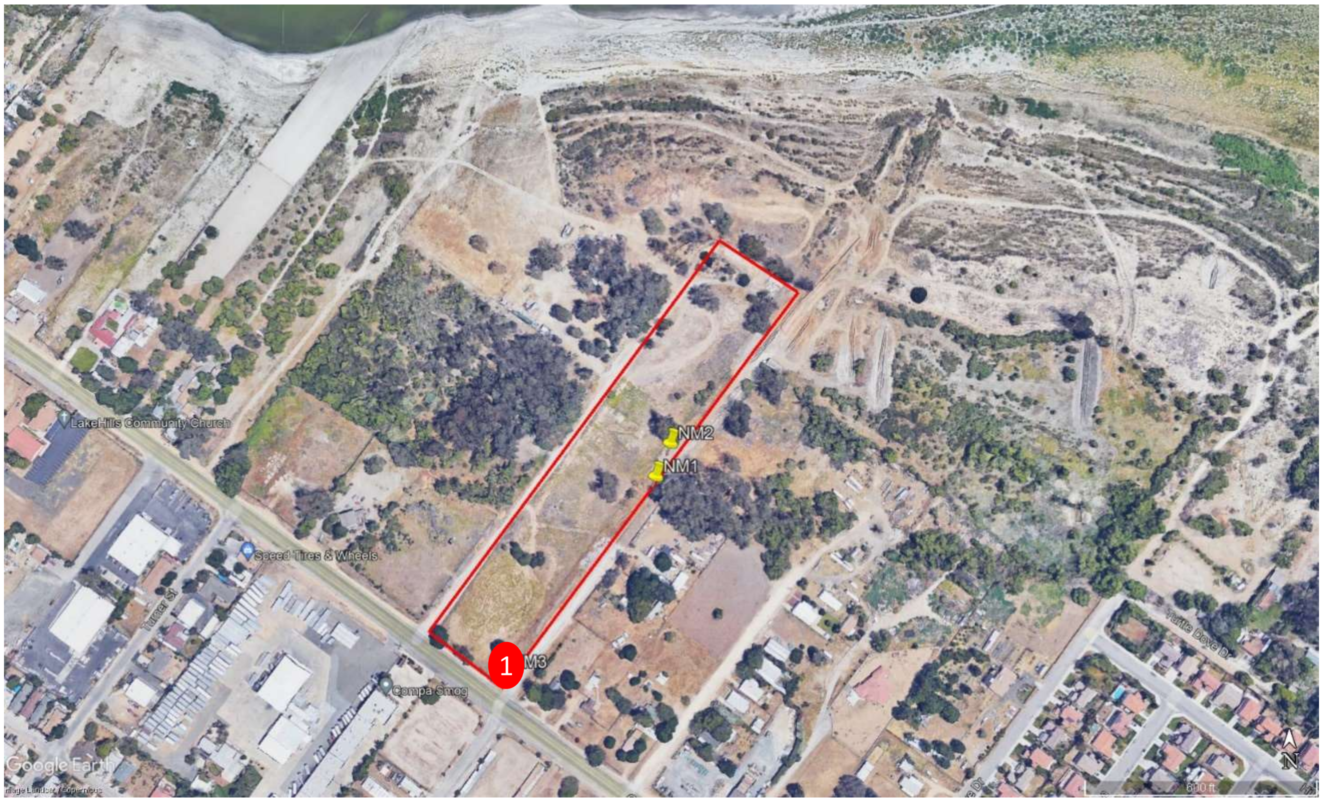


Figure 2: LT1 Photo

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

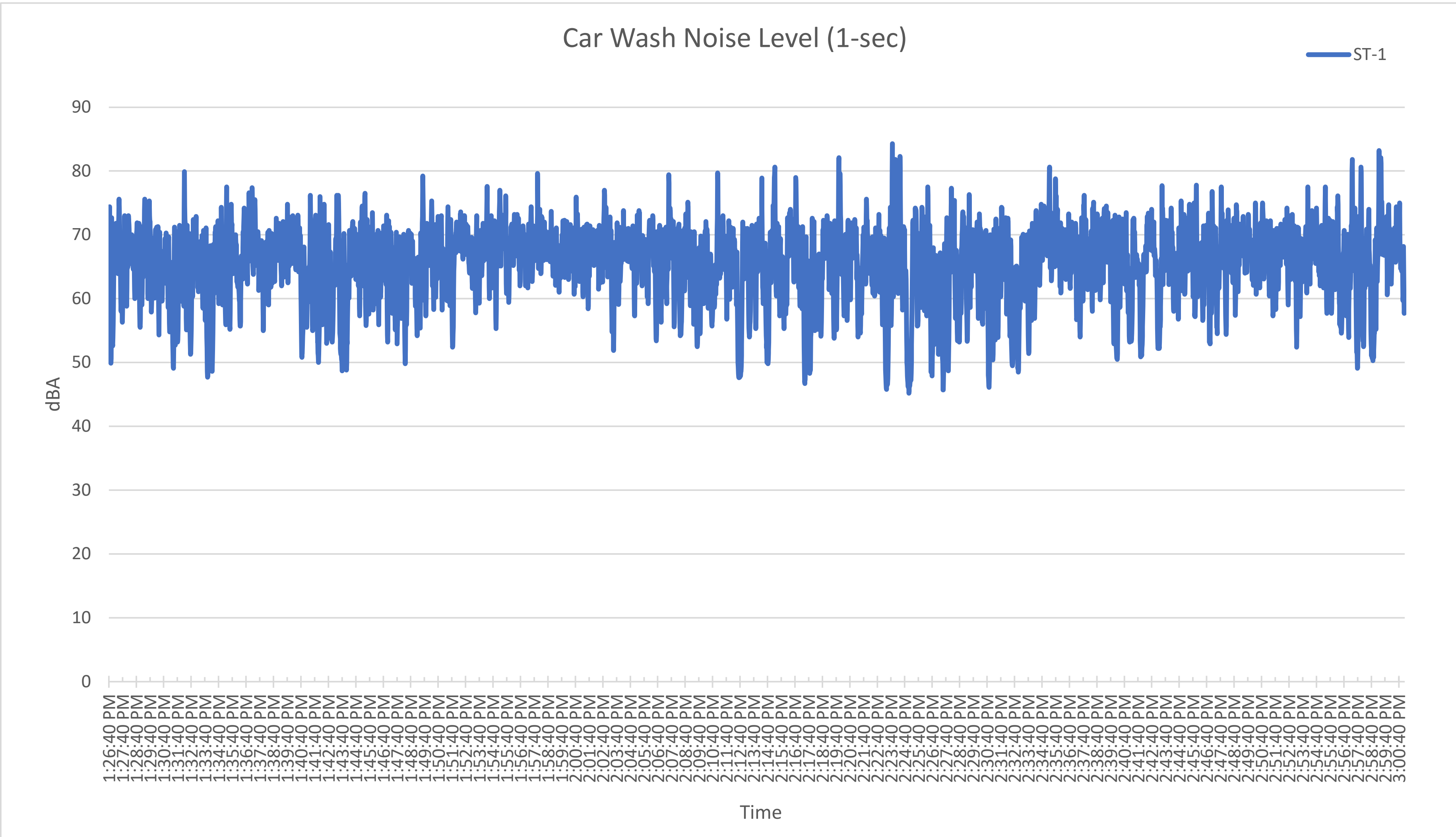
AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

1-Hour Noise Measurement Datasheet - Cont.

Project: Rome Hill Noise
Site Address/Location: Grand Ave, Lake Elsinore, CA
Site ID: LT1

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1	1:26 PM	3:01 PM	68.4	84.3	45.2	75.0	71.9	69.4	66.5	57.2



Appendix B:

Referenced Traffic Data

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

January 27, 2025

BUILDER'S MAX INC.
C/O Guy Selleck
1207 N East Street
Anaheim, CA 92805

SUBJECT: Rome Hill Commercial Trip Generation Analysis and VMT Screening, City of Lake Elsinore

Dear Mr. Selleck,

*TJW Engineering, Inc. (*TJW*)* is pleased to submit this Trip Generation Analysis and VMT Screening for the proposed project located along Grand Avenue at Vail Street in the City of Lake Elsinore. The proposed project includes 2 buildings of warehousing with a total of 121,490 square feet. A site plan is attached for reference. The purpose of this memorandum is to summarize the project Trip Generation Analysis and VMT Screening.

Proposed Project

The proposed site is located along Grand Avenue at Vail Street in the City of Lake Elsinore. The project will construct 2 buildings of warehousing with a total of 121,490 square feet. Site access will be provided along via an access road off Grand Avenue.

Trip Generation Analysis

Projected trip generation for the proposed project was developed based on the City of Lake Elsinore Traffic Impact Analysis Preparation Guide (June 2020). The guidelines state land uses that generate less than 100 peak hour trips will not require a Traffic Impact Analysis (TIA) that includes LOS analysis.

The trip generation for the proposed project was determined using the Institute of Transportation Engineers Trip Generation Manual (11th Edition). Based on the proposed project's intended use the projected trip generation was determined using the Warehousing Land Use Code 150. The proposed project is projected to generate 21 total AM peak hour trips, 22 total PM peak hour trips, and 208 total daily trips.

Table 1 – Trip Generation

Proposed Land Use	Qty	Unit	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Trips	Rate	In:Out Split	Trips			Rate	In:Out Split	Trips		
							In	Out	Total			In	Out	Total
Warehousing (150)	121.49	TSF	1.71	208	0.17	77:23	16	5	21	0.18	28:72	6	16	22
Total				**208**			**16**	**5**	**21**			**6**	**16**	**22**

Notes: ITE Trip Generation (11th Edition, 2021); TSF=Thousand Square Feet

Vehicle Miles Traveled (VMT) Screening

Senate Bill (SB) 743 was adopted in 2013 requiring the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts within the California Environmental Quality Act (CEQA). For land use projects, OPR has identified Vehicle Miles Traveled (VMT) as the new metric for transportation analysis under CEQA. The regulatory changes to the CEQA guidelines that implement SB 743 were approved on December 28th, 2018, with an implementation date of July 1st, 2020, as the new metric.

The City of Lake Elsinore updated their Transportation Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment in June 2020. The document outlines guidelines for CEQA analysis including screening criteria and requirements for VMT assessment of land use projects. The VMT guidelines provide several screening criteria for projects including Transit Priority Area (TPA) Screening, Low VMT Area Screening, and Project Type Screening.

The City's Guidelines indicate residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact. In addition, other employment-related land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per service population that is similar to the existing land uses in the low VMT area. For this screening, the WRCOG screening tool was used to determine low VMT-generating areas. The proposed project is located within a low VMT-generating area (see attached). In addition, the proposed project can be reasonably expected to generate VMT per service population similar to the existing land uses within the low VMT area such as the manufacturing/warehousing/industrial buildings along Grand Avenue and the surrounding area. As such, the proposed project can be presumed to have a less than significant impact.

Summary

This memorandum provides an overview of the trip generation analysis and VMT screening for the proposed project. Based on the City of Lake Elsinore Traffic Impact Analysis Guidelines (June 2020), the proposed project generates less than 100 peak hour trips and does not require a TIA that includes LOS analysis. In addition, the City guidelines outline employment related land use projects within a low VMT-generating area may be presumed to have a less than significant impact on VMT and can be screened from VMT analysis. Consistent with the City guidelines, the proposed project does not require additional traffic or VMT analysis.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

David Chew, PTP
Transportation Planner

REGISTERED PROFESSIONAL ENGINEER
THOMAS JOSEPH WHEAT
No. 69467
Exp. 6/30/26
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
THOMAS JOSEPH WHEAT
No. 2565
Exp. 6/30/26
TRAFFIC
STATE OF CALIFORNIA

Appendix C:
SoundPLAN Input and Output

RomeHill Noise
Contribution spectra - 001 - RomeHill: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver -578,544 Fl G LrD,lim dB(A) LrD 40.9 dB(A)																															
Auto pakring	LrD	15.4					5.3			11.5			-1.7			3.7			8.0			8.2			0.9			-21.5			-85.2
Auto pakring	LrD	39.0					26.6			34.9			24.9			29.6			30.9			31.4			26.7			13.7			-16.1
Truck1	LrD	21.4	-4.4	-2.8	-5.8	7.5	13.3	11.2	2.9	-0.7	-2.7	-3.5	-3.2	0.5	7.5	-1.5	-2.2	0.5	0.1	-1.5	5.1	14.2	17.1	-1.8	-6.8	-13.9	-22.8	-33.6	-50.5	-68.0	-89.9
Truck2	LrD	15.7	-2.9	-1.9	-7.7	4.8	9.9	7.0	-0.7	-4.7	-7.0	-8.0	-7.9	-4.3	2.7	-6.3	-7.1	-4.7	-4.9	-5.5	-4.3	5.4	9.2	-8.2	-12.4	-16.3	-20.3	-24.7	-34.9	-45.6	-59.1
Truck5	LrD	33.9	0.9	2.7	0.4	14.0	20.2	18.6	11.3	8.4	7.3	1.4	2.6	7.2	17.5	9.5	9.7	16.8	17.4	16.8	17.9	27.6	31.2	13.4	8.7	3.9	-1.6	-8.1	-21.4	-36.6	-56.1
Truck6	LrD	15.2	-3.4	-2.4	-8.2	4.3	9.4	6.6	-1.1	-5.1	-7.4	-8.4	-8.3	-4.7	2.3	-6.7	-7.5	-5.1	-5.3	-5.9	-4.7	5.0	8.8	-8.7	-12.9	-16.8	-21.0	-25.5	-35.9	-46.9	-60.8
Truck7	LrD	23.0	-5.9	-5.1	-11.0	1.4	6.5	3.7	-4.2	-8.1	-10.3	-11.5	-11.4	-7.8	-0.7	-9.7	-10.5	-7.4	7.6	6.9	7.9	17.3	20.6	2.3	-3.3	-9.3	-16.5	-25.0	-39.4	-53.0	-69.1
Truck8	LrD	23.1	-5.7	-4.9	-10.8	1.6	6.7	3.9	-3.9	-7.9	-10.1	-11.3	-11.2	-7.6	-0.5	-9.6	-10.3	-7.1	7.6	7.0	7.9	17.4	20.7	2.4	-3.1	-9.1	-16.3	-24.6	-38.7	-51.9	-67.6
Truck9	LrD	30.5	-0.7	1.1	-2.4	11.2	17.4	15.8	8.4	5.5	4.3	1.4	2.5	7.2	17.1	9.0	9.2	13.5	14.0	13.4	14.4	23.9	27.5	9.6	4.7	-0.1	-5.8	-12.4	-25.9	-41.2	-60.9
Truck10	LrD	21.6	-4.1	-2.5	-5.5	7.7	13.6	11.5	3.2	-0.4	-2.4	-3.1	-2.9	0.8	7.8	-1.2	-1.9	0.7	0.3	-1.2	5.2	14.3	17.2	-1.7	-8.0	-15.0	-22.7	-33.3	-50.0	-67.3	-89.0
Remaining contrib. of src "Truck1"	LrD																														
Remaining contrib. of src "Truck2"	LrD																														
Remaining contrib. of src "Truck5"	LrD																														
Remaining contrib. of src "Truck6"	LrD																														
Remaining contrib. of src "Truck7"	LrD																														
Remaining contrib. of src "Truck8"	LrD																														

RomeHill Noise
Contribution spectra - 001 - RomeHill: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Remaining contrib. of src "Truck9"	LrD																														
Remaining contrib. of src "Truck10"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														
Receiver -656,611 Fl G LrD,lim dB(A) LrD 45.4 dB(A)																															
Auto pakring	LrD	10.4					2.4			7.4			-3.4			0.3			0.4			-0.2			-6.6			-30.3			-96.6
Auto pakring	LrD	43.3					29.3			38.7			30.3			34.7			35.4			35.9			31.8			20.9			-2.3
Truck1	LrD	28.9	-4.1	-2.3	-4.7	8.9	15.2	13.6	6.1	3.3	2.1	1.0	2.1	6.8	16.1	8.1	8.3	11.6	12.2	11.7	12.7	22.4	26.0	8.2	3.4	-1.5	-7.2	-13.9	-27.7	-43.3	-63.5
Truck2	LrD	30.7	3.6	4.8	-0.6	12.3	17.9	15.5	8.4	4.7	2.6	1.7	1.8	5.3	11.9	2.5	1.3	3.1	2.3	1.4	2.3	12.2	29.9	12.5	8.6	5.0	1.4	-2.2	-11.4	-20.5	-31.7
Truck5	LrD	18.4	-5.5	-3.8	-6.3	7.1	13.0	10.9	2.6	-0.9	-2.9	-3.4	-3.1	0.6	7.6	-1.4	-2.1	0.5	0.1	-1.4	-1.4	7.3	9.8	-9.1	-15.1	-21.2	-28.4	-36.8	-52.1	-69.2	-91.3
Truck6	LrD	39.9	7.7	9.5	4.7	18.3	24.6	22.9	16.8	13.9	12.7	12.8	14.0	18.6	26.5	18.5	18.7	22.0	22.6	22.1	22.9	32.7	37.6	20.3	16.5	13.2	9.9	6.9	-1.2	-8.9	-18.3
Truck7	LrD	23.6	-3.6	-2.4	-7.9	5.0	10.4	8.0	0.6	-3.3	-5.5	-6.3	-6.4	-3.2	3.3	-6.2	-7.5	-5.7	7.8	7.2	8.2	17.7	21.0	2.7	-2.7	-8.5	-15.1	-22.2	-34.0	-44.9	-58.3
Truck8	LrD	23.5	-3.9	-2.7	-8.3	4.4	9.7	7.0	-0.7	-4.9	-7.5	-8.5	-8.8	-5.5	1.1	-8.0	-8.9	-5.9	7.8	7.2	8.1	17.6	20.9	2.7	-2.8	-8.5	-15.3	-22.4	-34.4	-45.5	-59.0
Truck9	LrD	18.6	-5.3	-3.6	-6.2	7.2	13.2	11.1	2.9	-0.6	-2.6	-3.1	-2.8	0.9	7.8	-1.1	-1.8	0.7	0.3	-1.2	-1.1	7.5	10.1	-8.8	-14.8	-20.9	-28.0	-20.6	-36.0	-53.9	-77.0
Truck10	LrD	28.9	-4.2	0.1	-4.7	8.9	15.1	13.5	6.1	3.2	2.0	1.0	2.1	6.7	16.0	8.0	8.2	11.6	12.2	11.6	12.6	22.3	25.9	8.1	3.3	-1.6	-7.3	-14.0	-27.8	-43.6	-63.8
Remaining contrib. of src "Truck1"	LrD																														
Remaining contrib. of src "Truck2"	LrD																														

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Remaining contrib. of src "Truck5"	LrD																														
Remaining contrib. of src "Truck6"	LrD																														
Remaining contrib. of src "Truck7"	LrD																														
Remaining contrib. of src "Truck8"	LrD																														
Remaining contrib. of src "Truck9"	LrD																														
Remaining contrib. of src "Truck10"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														
Receiver -677,411 Fl G LrD,lim dB(A) LrD 37.8 dB(A)																															
Auto pakring	LrD	30.0					16.7			25.2			13.9			19.3			21.7			23.5			20.7			10.4			-14.3
Auto pakring	LrD	36.1					23.9			31.7			21.1			26.4			28.4			29.1			24.4			10.6			-21.1
Truck1	LrD	23.8	-5.5	-4.6	-10.6	1.9	6.9	4.1	-3.6	-7.6	-9.8	-10.8	-10.7	-7.0	0.0	-9.0	-9.8	-7.2	8.3	7.6	8.6	18.1	21.5	5.5	0.1	-5.8	-12.9	-21.4	-36.6	-51.0	-66.8
Truck2	LrD	6.5	-11.4	-10.7	-16.6	-4.2	0.9	-1.8	-11.1	-15.1	-17.3	-18.6	-18.5	-14.9	-8.0	-17.0	-17.8	-14.0	-13.6	-14.3	-12.7	-3.3	-0.1	-18.5	-24.2	-30.4	-37.9	-47.3	-64.9	-85.9	
Truck5	LrD	19.9	0.3	1.4	-4.1	8.7	14.2	11.7	4.5	0.6	-1.6	-2.7	-2.8	0.5	7.0	-2.4	-3.6	-1.4	-0.9	-1.5	-0.6	9.3	13.3	-4.0	-7.8	-11.2	-14.5	-17.8	-26.4	-34.9	-45.6

RomeHill Noise
Contribution spectra - 001 - RomeHill: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Truck6	LrD	6.4	-11.5	-10.8	-16.8	-4.3	0.8	-1.9	-11.2	-15.2	-17.4	-18.7	-18.6	-15.0	-8.0	-17.1	-17.8	-14.1	-13.7	-14.4	-12.8	-3.4	-0.2	-18.6	-24.3	-30.5	-38.1	-47.5	-65.2	-86.3	
Truck7	LrD	21.7	-3.5	-1.9	-7.0	8.6	14.5	12.6	4.9	1.5	-0.2	-0.7	-0.4	3.2	9.9	0.7	-0.3	2.0	1.4	3.7	4.2	13.3	16.2	-2.5	-8.5	-15.1	-12.2	-19.1	-32.9	-48.5	-68.6
Truck8	LrD	20.5	-3.2	-1.7	-6.8	8.8	14.7	12.8	5.1	1.9	0.2	-0.1	0.3	4.1	11.0	1.9	0.9	3.0	2.3	0.5	0.3	8.9	11.4	-7.4	-13.2	-18.9	-8.4	-15.0	-28.5	-43.7	-63.3
Truck9	LrD	19.3	-0.1	1.0	-4.5	8.3	13.6	11.0	3.6	-0.5	-3.0	-4.3	-4.6	-1.4	5.2	-4.0	-5.0	-1.9	-1.4	-1.9	-1.0	8.9	12.8	-4.4	-8.3	-11.7	-15.1	-18.5	-27.3	-36.0	-46.9
Truck10	LrD	23.9	-5.2	-4.4	-10.3	2.1	7.1	4.3	-3.4	-7.4	-9.7	-10.7	-10.6	-7.0	0.0	-9.0	-9.7	-6.8	8.3	7.7	8.7	18.2	21.6	3.4	-2.0	-5.7	-12.8	-21.2	-36.0	-49.8	-65.1
Remaining contrib. of src "Truck1"	LrD																														
Remaining contrib. of src "Truck2"	LrD																														
Remaining contrib. of src "Truck5"	LrD																														
Remaining contrib. of src "Truck6"	LrD																														
Remaining contrib. of src "Truck7"	LrD																														
Remaining contrib. of src "Truck8"	LrD																														
Remaining contrib. of src "Truck9"	LrD																														
Remaining contrib. of src "Truck10"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Remaining contrib. of src "Auto pakring"	LrD																														
Receiver -758,467 Fl G LrD,lim dB(A) LrD 37.2 dB(A)																															
Auto pakring	LrD	26.9					14.7			22.8			13.6			17.7			18.3			19.2			15.6			4.8			-19.9
Auto pakring	LrD	33.5					22.0			29.3			19.6			24.4			25.3			25.9			20.8			7.2			-23.8
Truck1	LrD	19.6	0.0	1.2	-4.4	8.4	13.7	11.2	3.8	-0.3	-2.8	-4.0	-4.3	-1.1	5.4	-3.9	-4.9	-1.6	-1.0	-1.4	-0.5	9.4	13.5	-3.7	-7.5	-10.8	-14.1	-17.3	-25.8	-34.2	-44.6
Truck2	LrD	6.6	-11.0	-10.2	-16.1	-3.7	1.2	-1.7	-11.0	-15.1	-17.5	-18.3	-18.2	-14.7	-7.8	-16.9	-17.6	-14.0	-13.5	-14.1	-13.2	-3.7	-0.4	-18.6	-24.1	-29.9	-37.1	-46.2	-63.2	-83.6	
Truck5	LrD	14.6	-5.7	-5.0	-11.0	1.3	6.4	3.6	-4.2	-8.1	-10.3	-11.0	-10.9	-7.3	-0.3	-9.4	-10.0	-6.9	-1.3	-2.5	-2.1	7.0	10.2	-7.9	-12.7	-17.2	-21.8	-26.6	-37.4	-48.8	-63.2
Truck6	LrD	7.4	-10.6	-9.5	-15.2	-2.6	2.6	-0.3	-9.7	-14.0	-16.6	-17.6	-17.7	-14.3	-7.6	-16.7	-17.6	-14.0	-13.5	-14.1	-13.2	-3.7	-0.3	-18.6	-24.0	-29.9	-37.0	-46.1	-63.1	-83.4	
Truck7	LrD	30.6	-2.8	-1.0	-3.4	10.1	16.4	14.8	7.7	4.9	3.7	2.8	3.9	8.6	17.8	9.7	10.0	13.2	13.8	13.3	14.3	24.1	27.8	10.1	5.6	1.1	-3.9	-9.7	-22.1	-35.9	-53.5
Truck8	LrD	30.5	-2.9	-1.1	-3.5	10.1	16.3	14.7	7.7	4.8	3.6	2.7	3.9	8.5	17.7	9.7	9.9	13.1	13.7	13.2	14.2	24.0	27.7	10.0	5.5	1.0	-2.0	-7.9	-20.4	-34.3	-52.1
Truck9	LrD	15.0	-5.3	-4.6	-10.6	1.8	6.8	4.0	-3.7	-7.7	-9.9	-10.6	-10.5	-6.9	0.0	-9.0	-9.7	-6.5	-0.9	-2.1	-1.7	7.4	10.6	-7.5	-12.3	-16.7	-17.4	-24.1	-35.9	-47.5	-61.6
Truck10	LrD	18.9	-0.5	0.6	-5.0	7.6	12.8	10.0	2.4	-1.9	-4.5	-5.7	-5.9	-2.5	4.2	-4.9	-5.1	-1.9	-1.3	-1.7	-0.8	9.2	13.2	-4.0	-7.8	-11.1	-14.5	-17.7	-26.3	-34.8	-45.4
Remaining contrib. of src "Truck1"	LrD																														
Remaining contrib. of src "Truck2"	LrD																														
Remaining contrib. of src "Truck5"	LrD																														
Remaining contrib. of src "Truck6"	LrD																														
Remaining contrib. of src "Truck7"	LrD																														

RomeHill Noise
Contribution spectra - 001 - RomeHill: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Remaining contrib. of src "Truck8"	LrD																														
Remaining contrib. of src "Truck9"	LrD																														
Remaining contrib. of src "Truck10"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														
Remaining contrib. of src "Auto pakring"	LrD																														

Source	Source group	Source ty	
Receiver -578,544 Fl G LrD,lim dB(A) LrD 40.9 dB(A)			
Auto pakring	Default parking lot noise	PLot	
Truck5	Default industrial noise	Point	
Truck9	Default industrial noise	Point	
Truck8	Default industrial noise	Point	
Truck7	Default industrial noise	Point	
Truck10	Default industrial noise	Point	
Truck1	Default industrial noise	Point	
Truck2	Default industrial noise	Point	
Auto pakring	Default parking lot noise	PLot	
Truck6	Default industrial noise	Point	
Receiver -656,611 Fl G LrD,lim dB(A) LrD 45.4 dB(A)			
Auto pakring	Default parking lot noise	PLot	
Truck6	Default industrial noise	Point	
Truck2	Default industrial noise	Point	
Truck1	Default industrial noise	Point	
Truck10	Default industrial noise	Point	
Truck7	Default industrial noise	Point	
Truck8	Default industrial noise	Point	
Truck9	Default industrial noise	Point	
Truck5	Default industrial noise	Point	
Auto pakring	Default parking lot noise	PLot	
Receiver -677,411 Fl G LrD,lim dB(A) LrD 37.8 dB(A)			
Auto pakring	Default parking lot noise	PLot	
Auto pakring	Default parking lot noise	PLot	
Truck10	Default industrial noise	Point	
Truck1	Default industrial noise	Point	
Truck7	Default industrial noise	Point	
Truck8	Default industrial noise	Point	
Truck5	Default industrial noise	Point	
Truck9	Default industrial noise	Point	
Truck2	Default industrial noise	Point	
Truck6	Default industrial noise	Point	
Receiver -758,467 Fl G LrD,lim dB(A) LrD 37.2 dB(A)			
Auto pakring	Default parking lot noise	PLot	
Truck7	Default industrial noise	Point	
Truck8	Default industrial noise	Point	
Auto pakring	Default parking lot noise	PLot	
Truck1	Default industrial noise	Point	
Truck10	Default industrial noise	Point	
Truck9	Default industrial noise	Point	
Truck5	Default industrial noise	Point	
Truck6	Default industrial noise	Point	
Truck2	Default industrial noise	Point	

RomeHill Noise
Octave spectra of the sources in dB(A) - 001 - RomeHill: Outdoor SP

Name	Source type	I or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Auto pakring	PLot	1006.34			51.1	81.2	0.0	0.0		0	100%/24h	Typical spectrum	64.5	76.1	68.6	73.1	73.2	73.6	70.9	64.7	51.9
Auto pakring	PLot	8872.31			55.1	94.6	0.0	0.0		0	100%/24h	Typical spectrum	78.0	89.6	82.1	86.6	86.7	87.1	84.4	78.2	65.4
Truck1	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck2	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck5	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck6	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck7	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck8	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck9	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2
Truck10	Point				84.8	84.8	0.0	0.0		0	100%/24h	Backup Beeper	70.0	64.4	66.4	73.4	72.1	83.7	67.8	60.5	47.2

Appendix D:

Construction Modeling Output

Receptor - Residences to the Southeast

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
SITE PREP									
1. Tractors/Loaders/Backhoes	4	80	70	40	0.40	-2.9	-4.0	77.1	73.1
2. Rubber Tired Dozers	3	85	70	40	0.40	-2.9	-4.0	82.1	78.1
							Log Sum	88.4	84.4
GRADE									
1. Excavators	1	85	70	40	0.40	-2.9	-4.0	82.1	78.1
2. Graders	1	85	70	40	0.40	-2.9	-4.0	82.1	78.1
3. Rubber Tired Dozers	1	85	70	40	0.40	-2.9	-4.0	82.1	78.1
5. Tractors/Loaders/Backhoes	3	80	70	40	0.40	-2.9	-4.0	77.1	73.1
							Log Sum	88.0	84.1
BUILD									
1. Cranes	1	85	70	16	0.16	-2.9	-8.0	82.1	74.1
2. Forklifts	3	85	70	40	0.40	-2.9	-4.0	82.1	78.1
3.Generator Sets	1	82	225	50	0.50	-13.1	-3.0	68.9	65.9
4. Tractor/Loaders/Backhoes	3	80	70	40	0.40	-2.9	-4.0	77.1	73.1
5. Welders	1	73	70	40	0.40	-2.9	-4.0	70.1	66.1
							Log Sum	89.1	84.6
PAVE									
1. Pavers	2	85	70	50	0.50	-2.9	-3.0	82.1	79.1
2. Paving Equipment	2	85	70	40	0.40	-2.9	-4.0	82.1	78.1
3. Rollers	2	85	70	20	0.20	-2.9	-7.0	82.1	75.1
							Log Sum	89.9	85.5
ARCH COAT									
1. Air Compressors	1	80	175	40	0.40	-10.9	-4.0	69.1	65.1
							Log Sum	69.1	65.1

Receptor - Residences to the Southeast

Receiver - North P/L

Enter variables here:

Source Height H_s(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barrier Height H_B(ft)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Distance Source to barrier (ft)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Distance Receiver to Barrier (ft)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	60	60.008333	60.03332408	60.074953	60.133186	60.207973	60.299254	60.406953	60.530984	60.671245	60.827625	61	61.188234	61.392182	61.611687	61.846584
B	10.440307	10.77033	11.18033989	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.59126
C	70.064256	70.064256	70.06425622	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256	70.064256
P	0.3760503	0.7144061	1.149407744	1.6726008	2.2754849	2.9499651	3.6886216	4.4848326	5.3327963	6.2274884	7.1645885	8.1403943	9.1517343	10.195888	11.270514	12.373588
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5
H_{eff} no barrier	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
G_B	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
G_{NB}	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
$A_{barrier}$	8.8190902	11.542163	13.59943633	15.227567	16.564239	17.691647	18.662116	19.510937	20.263024	20.936604	21.545387	22.099929	22.608508	23.077725	23.512912	23.918431
$IL_{barrier}$	**8.8**	**11.5**	**13.6**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**

Barrier Height (ft)	IL (dBA)
8	9
9	12
10	14
11	15
12	15
13	15
14	15
15	15
16	15
17	15
18	15
19	15
20	15
21	15
22	15
23	15

VIBRATION LEVEL IMPACT

Project:	Rome Hill Noise	Date: 12/9/21
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Project Site	
Address:	Grand Ave, Lake Elsinore, CA	
PPV = PPVref(25/D)^n (in/sec)		

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	70.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.019**	IN/SEC	OUTPUT IN RED