Appendix G

Truck Repair Facility, Noise Impact Study
Town of Apple Valley, CA

MD Acoustics

October 19, 2025

Truck Repair Facility
Noise Impact Study
Town of Apple Valley, CA

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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 Town's Noise Guidelines, the project must demonstrate compliance with the applicable noise criterion as outlined within the Town of Apple Valley 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 the sensitive receptors and the project site; and
- An analysis of construction noise impacts.

1.2 Site Location and Study Area

The proposed Truck Repair Facility project site is located at 20801 – 21371 Quarry Road in the Town of Apple Valley, CA (APN: 0463-441-07). See Exhibit A for the location. The project Site's land use is Specific Plan Industrial within North Apple Valley Specific Plan (NAVSP) of the Town of Apple Valley's General Plan. The parcel is currently vacant, with no assigned address, and is bounded on the north by Quarry Road with vacant land uses beyond, on the west by vacant land, on the south by Tecaya Avenue with vacant land beyond, and on the east by vacant land.

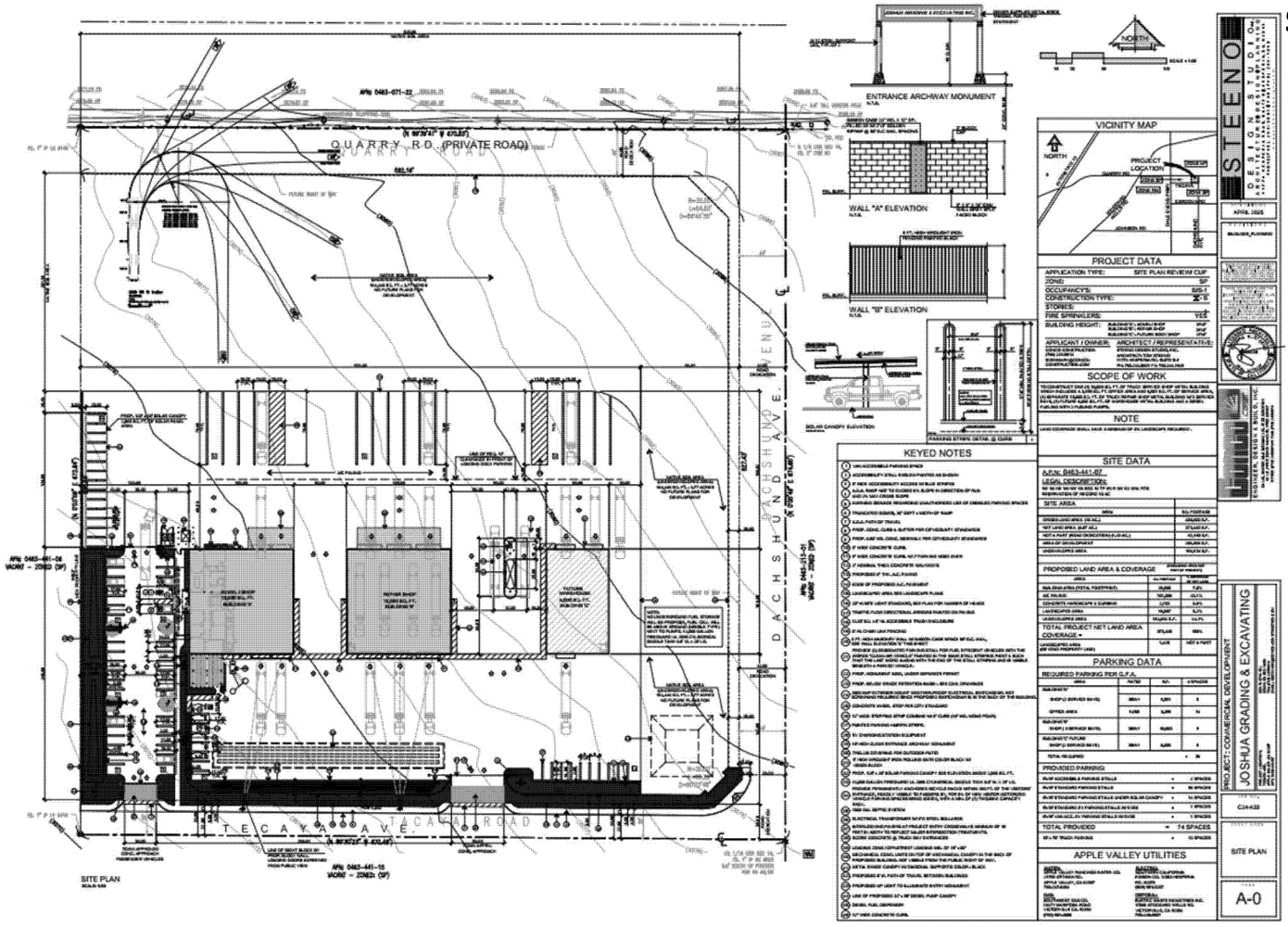
1.3 Proposed Project Description

Overall, the project would consist of three metal buildings: one 10,000 SF building for 6,501 SF for truck/equipment service and a 3,499 SF administrative building (Building A), one 10,000 SF repair shop that services its heavy-duty equipment (Building B), one 6,000 SF future warehouse (Building C), and two diesel fueling islands with one pump each. All development occurs primarily within the southern portion of the parcel, along the Tacaya Avenue frontage.

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

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.

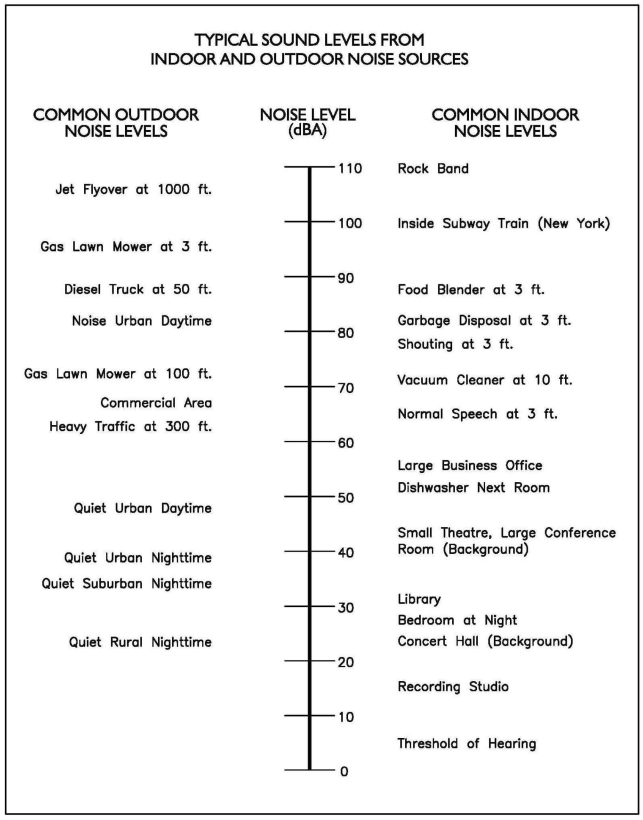
2.1 Sound, Noise, and Acoustics

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 the 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 out at 20 Hz all the way 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 reference 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 Sensitive Receptors

Noise-sensitive land uses include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly.

2.6 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 a change in 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.

Table 1: Decibel Changes and Loudness

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud
Source: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm	

2.7 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 addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00

PM and after 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 is 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.

2.8 Traffic Noise Prediction

Noise levels associated with traffic depend 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. The greater the volume of traffic, higher speeds and 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.

2.9 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 how 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.

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 proposed project is located in the Town of Apple Valley, CA, 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 jurisdiction 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, or alternatively 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 Town is restricted to regulating the noise generated by the transportation system through nuisance abatement Codes 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 regulatory 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 California Building Code (CBC), 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/town 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.

4.3 Town of Apple Valley Noise Regulations

The Town of Apple Valley outlines their noise regulations and standards within the Safety Element from the General Plan and the Noise Ordinance from the Municipal Code.

Town of Apple Valley General Plan

Applicable policies and standards governing environmental noise in the Town of Apple Valley are set forth in the General Plan Noise Element. The land use compatibility guidelines are shown in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines

Table IV-4
Land Use Compatibility for Community Noise Environments

Land Uses	CNEL (dBA)						
	50	55	60	65	70	75	80
Residential - Single Family Dwellings, Duplex, Mobile Homes	A	A	B	B	C	D	D
Residential – Multiple Family	A	A	B	B	C	D	D
Transient Lodging: Hotels and Motels	A	A	B	B	C	C	D
School Classrooms, Libraries, Churches, Hospitals, Nursing Homes and Convalescent Hospitals	A	A	B	B	C	C	D
Auditoriums, Concert Halls, Amphitheaters	B	B	B	B	C	C	C
Sports Arenas, Outdoor Spectator Sports	B	B	B	B	B	C	C
Playgrounds, Neighborhood Parks	A	A	A	C	C	D	D
Golf Courses, Riding Stables, Water Recreation, Cemeteries	A	A	A	A	C	C	D
Office Buildings, Business, Commercial and Professional	A	A	A	B	B	D	D
Industrial, Manufacturing, Utilities, Agriculture	A	A	A	A	B	D	D

Source: *California Department of Health Services, "Guidelines for the Preparation and Content of the Noise Element of the General Plan," 1990*

A Normally Acceptable: With no special noise reduction requirements assuming standard construction.

B Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design

C **Normally Unacceptable**: New construction is discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

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

In addition to the noise standards, the Town has outlined goals, policies and programs to reduce potential noise impacts and are presented below:

Goals, Policies, and Programs

The Town utilizes the following General Plan Noise Element goal, policies and programs to assess and evaluate the project's suitability in light of noise impacts.

Goal: Noise levels that are consistent with the Town's rural character and high quality of life.

Policy 1.A: The Town shall adhere to the standards of "Land Use Compatibility for Community Environments."

Program 1.A.1: The Town shall continue to maintain and enforce its Noise Control Ordinance.

Program 1.A.2: The Town shall include noise attenuation in its development review process when development projects are proposed. Design techniques that can alleviate noise include, but are not limited to building setbacks, the installation of wall and window insulation, sound walls and earthen berms.

Program 1.A.3: The mechanical equipment associated with commercial and industrial development, including compactors, trash disposal areas, heating and air conditioning systems shall be located as far as Terra Nova / Town of Apple Valley General Plan / Noise Element Environmental Hazards IV-64 practicable from adjacent sensitive receptors, or from lands designated on the Land Use map for noise sensitive uses.

Policy 1.B: New development projects shall assure that exterior noise levels in back yards and/or useable open space do not exceed 65 dBA CNEL, and that interior noise levels are consistent with the requirements of the Building Code.

Program 1.A.4: Minimum requirements for noise analyses for proposed development projects shall be developed and distributed to applicants early in the development review process. Studies shall evaluate project impacts and the effectiveness of proposed mitigation measures.

Program 1.A.6: Commercial and industrial projects proposed adjacent to sensitive receptors, or lands designated for sensitive receptors, including residential, school or hospital sites, shall be required to submit a noise analysis in conjunction with entitlement applications.

Town of Apple Valley Municipal Code

Chapter 9.73 of the Town's Municipal Code outlines Noise Regulations in the Town of Apple Valley.

9.73.040 - General Noise Regulations

A. General Noise Regulations. Notwithstanding any other provision of this chapter, and in addition thereto, it shall be unlawful for any person to willfully or negligently make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace and quiet enjoyment of any neighborhood or which causes any discomfort or annoyance to any reasonable person of normal sensitivity residing in the area.

The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The sound level of the objectionable noise;
2. The sound level of the ambient noise;
3. The proximity of the noise to residential sleeping facilities;
4. The nature and zoning of the area within which the noise emanates;
5. The number of persons affected by the noise source;
6. The time of day or night the noise occurs;
7. The duration of the noise and its tonal, informational or musical content;
8. Whether the noise is continuous, recurrent, or intermittent;
9. Whether the noise is produced by a commercial or noncommercial activity.

B. Noise Measurement Procedure

a. Utilizing the "A" weighting scale of the sound level meter and the "slow" meter response (use "fast" response for impulsive type sounds), the noise level shall be measured at a position or positions at any point on the receiver's property.

b. In general, the microphone shall be located four to five feet above the ground; ten feet or more from the nearest reflective surface where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized. If the noise complaint is related to interior noise levels, interior noise measurements shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling, or floor nearest the noise source, with windows in the normal seasonal configuration. Calibration of the measurement equipment, utilizing an acoustic calibration, shall be performed immediately prior to recording any noise data.

9.73.050 – External and Internal Noise Standards

A. External Noise Standards

1. Maximum Permissible Sound Levels by Receiving Land Use.

a. The noise standards for the various categories of land use identified by the Noise Control Officer as presented in Table 9.73.050-A (Table 2 in this report) shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

Table 2: Exterior Noise Limits

Receiving Land Use Category	Maximum Allowable Noise Levels (Leq, dBA)	
	10 pm – 7 am	7 am – 10 pm
Single-Family Residential	40	50
Multiple Dwelling Residential, Public Space	45	50
Limited Commercial & Office	55	60
General Commercial	60	65
Light Industrial	70	70
Heavy Industrial	75	75

b. No person shall produce or cause to be produced any sound at any location within the incorporated Town or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property, either incorporated or unincorporated, to exceed:

   1) The noise standard for that land use as specified in Table 9.73.050-A for a cumulative period of more than thirty (30) minutes in any hour; or

   2) The noise standard plus five (5) dBA for a cumulative period of more than fifteen (15) minutes in any hour; or

   3) The noise standard plus ten (10) dBA for a cumulative period of more than five (5) minutes in any hour; or

   4) The noise standard plus fifteen (15) dBA for a cumulative period of more than one (1) minute in any hour; or

   5) The noise standard plus twenty (20) dBA or the maximum measured ambient level, for any period of time.

c. If the measured ambient level differs from that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dBA increments in each category as appropriate to encompass or reflect said ambient noise level.

   In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

d. If the measurement location is on a boundary between two different zones, the noise level limit applicable to the lower noise zone plus five (5) dBA shall apply.

e. If possible, the ambient noise shall be measured at the same location along the property line utilized in paragraph 9.73.050.A.1.b of this Chapter with the alleged offending noise source inoperative. If, for any reason, the alleged offending noise source cannot be shut down, the ambient noise must be estimated by performing a measurement in the same general area of

the source but at a sufficient distance such that the noise from the source is at least ten (10) dBA below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five (5) to ten (10) dBA, then the level of the ambient itself can be reasonably determined by subtracting a one decibel correction to account for the contribution of the source.

2. Correction for Character of Sound. In the event the alleged offensive noise, as judged by the NCO, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 9.73.050-A shall be reduced by five (5) dBA.

B. Interior Noise Standards

1. Maximum Permissible Dwelling Interior Sound Levels

   a. The interior noise standards for multi-family residential dwellings as presented in Table 9.73.050-B (Table 3 in this report) shall apply, unless otherwise specifically indicated, within all such dwellings with windows in their normal seasonal configuration.

Table 3: Interior Noise Limits

Noise Zone	Type of Land Use	Time Interval	Allowable Interior Noise Level (dBA)
All	Multi-Family	10 p.m. – 7 a.m.	35
	Residential	7 a.m. – 10 p.m.	45

   b. No person shall operate or cause to be operated within a dwelling unit any source of sound or allow the creation of any noise which causes the noise level, when measured inside a neighboring receiving dwelling unit, to exceed:

      1) The noise standard as specified in Table 9.73.050-B for a cumulative period of more than five (5) minutes in any hour; or

      2) The noise standard plus five (5) dBA for a cumulative period of more than one (1) minute in any hour; or

      3) The noise standard plus ten (10) dBA or the maximum measured ambient, for any period of time.

   c. If the measured ambient level differs from that permissible within any of the noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dBA increments in each category as appropriate to reflect said ambient noise level.

2. Correction for Character of Sound. In the event the alleged offensive noise, as judged by the NCO, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as

hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 9.73.050-B shall be reduced by five (5) dBA.

9.73.060 – Prohibited Noise and Vibration

No person shall unnecessarily make, continue, or cause to be made or continued, any noise disturbance. The following acts, and the causing or permitting thereof, are declared to be in violation of this ordinance:

E. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans, or similar objects between the hours of 10 p.m. and 7 a.m. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of 9.73.050.A.1.

F. Construction/Demolition

1. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the Town.

2. Noise Restrictions at Affected Properties. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

<Table 4, next page>

Table 4: Maximum Noise Levels at Residential Properties

Mobile Equipment: Maximum noise levels for nonscheduled intermittent, short-term operation (less than 10 days) of mobile equipment:			
	Type I Areas Single-Family Residential	**Type II Areas Multi-Family Residential**	**Type III Areas Semi-Residential/Commercial**
Daily, except Sundays and Legal Holidays, 7 a.m. to 7 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and Legal Holidays	60 dBA	65 dBA	70 dBA
Stationary Equipment: Maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:			
	Type I Areas Single-Family Residential	**Type II Areas Multi-Family Residential**	**Type III Areas Semi-Residential/Commercial**
Daily, except Sundays and Legal Holidays, 7 a.m. to 7 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA
Mobile Equipment: Maximum noise levels for nonscheduled intermittent, short-term operation of mobile equipment: Daily, including Sundays and legal holidays, all hours: maximum of 85 dBA.			
Stationary Equipment: Maximum noise levels for repetitively scheduled and relatively long-term operation of stationary equipment: Daily, including Sundays and legal holidays, all hours: maximum of 75 dBA.			

G. Vibration**.** Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty (150) feet (46 meters) from the source if on a public space or public right-of-way.

I. Stationary Nonemergency Signaling Devices

1. Sounding or permitting the sounding of any electronically-amplified signal from any stationary bell, chime, siren, whistle, or similar device, intended primarily for nonemergency purposes, from any place for more than 10 seconds in any hourly period. Houses of religious worship shall be exempt from this provision.

2. Sound sources covered by this provision and not exempted under subsection 1 above may be exempted by an exception issued by the Town.

L. Domestic Power Tools, Machinery

1. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between 10 p.m. and 7 a.m., so as to create a noise disturbance across a residential or commercial real property line.
2. Any motor, machinery, pump, such as swimming pool equipment, etc., shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with Section 9.73.050.

4.4 North Apple Valley Specific Plan

The North Apple Valley Specific Plan describes how it adheres to the noise requirements outlined in the Apple Valley General Plan.

Goal N-1: The Town will incorporate noise considerations into its various decisions in order to mitigate existing adverse noise conditions and establish noise-compatible land use for future development.

The Specific Plan includes buffer areas specifically designed to provide distance between surrounding residential land uses and the industrial and commercial development proposed. The Specific Plan EIR includes mitigation measures to assure that the individual projects proposed within the Specific Plan Area mitigate their noise impacts to levels which do not significantly impact the local and regional environment.

5.0 Study Method and Procedure

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

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, such as the first row of houses
- 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 the Caltrans TeNS manual. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). MD noise measurement procedures are presented below:

- 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 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 to obtain a baseline of the existing noise environment. Two short-term noise measurements were conducted at the project site. Appendix A includes photos, field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

5.3 SoundPLAN Noise Model (Operational Noise)

SoundPLAN acoustical modeling software was utilized to model project operational noise at nearby sensitive receptors. The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. It allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations. It also calculates noise level increases due to the reflection of noise from hard surfaces.

Referenced sound level data was utilized to model the various stationary on-site noise sources associated with project operation, (i.e. HVAC, parking movements, loading and unloading operations).

Sources of project operational noise include parking, HVAC, truck fueling stations, and loading and unloading noise. Noise associated with proposed truck and automobile parking areas was modeled using the SoundPLAN parking tool. The project proposes 74 automobile parking spaces and 13 truck parking spaces. The CalEEMod estimates 75 total daily trips to and from the project site, including 27 daily automobile trips and 48 truck trips. Assuming 25% of trips occur during the peak hour, there would be approximately 0.1 automobile movements per space per hour and 0.92 truck movements per space per hour. As a worst-case, the parking lot was modeled with a lot-wide average of 1 movement per space per hour. The SoundPLAN model assumed 1 ton of HVAC equipment per 350 square feet of climate-controlled area. Thus, the model includes three (3) 10-ton HVAC rooftop units on buildings "A" and "B" and two (2) 10-ton HVAC rooftop units on building "C". The rooftop units were modeled as continuous point sources, each with a sound power level of 80 dBA.

Noise due to loading and unloading operations at the warehouse loading doors was modeled using idling truck back-up beepers. Back-up beepers were assumed to be continuously blaring 24 hours a day. This is a very conservative assumption, as back-up beepers are likely to be in use for only a fraction of that time. The truck fueling stations were modeled as point sources operating 24 hours a day. SoundPLAN noise modeling input and results are provided in Appendix B.

5.4 FHWA Traffic Noise Prediction Model

Traffic noise from vehicular traffic was projected using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) standards. The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and project trip generation data correspond to the Trip Generation Assessment prepared for this project by Integrated Engineering Group. The referenced traffic data was applied to the model and is in Appendix B. The following outlines the key adjustments made to the REMEL for the roadway inputs:

- Roadway classification – (e.g., freeway, major arterial, arterial, secondary, collector, etc.),
- Roadway Active Width – (distance between the center of the outermost travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Travel Speeds, Percentages of automobiles, medium trucks and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g., soft vs. hard)
- Percentage of total ADT which flows each hour throughout a 24-hour period

Table 5 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 5: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT[1]	Existing + Project ADT[1]	Speed (MPH)	Site Conditions
Quarry Road	West of Dale Evans Pkwy	297	372	35	Soft
Dale Evans Pkwy	South of Quarry Road	1,384	1,459	55	Soft
Vehicle Distribution and Mix[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		77.5	12.9	9.6	97.5
Medium Trucks		84.8	4.9	10.3	1.8
Heavy Trucks		86.5	2.7	10.8	0.7

Notes:
[1] Existing ADT estimated with trackingcalifornia.org
[2] Typical California Vehicle Distribution and Mix.

To determine the project's noise impact to the surrounding land uses, MD generated noise contours for projected traffic conditions. Noise contours are used to provide a characterization of sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a worst-case scenario and do not take into account structures, sound walls, topography, and/or other sound attenuating features which may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways because of a project.

5.5 Construction Noise Modeling

Construction noise associated with the proposed project was calculated utilizing the methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018), together with several key construction parameters, including distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Construction activities are anticipated to include five phases: site preparation, grading, building construction, paving, and architectural coating.

Construction noise levels were calculated for each phase based on CalEEMod Air Quality Model assumptions. All equipment was assumed to be situated at the edge of the project site closest to the sensitive receptor. Construction equipment typically moves back and forth across the site, so this is a conservative assumption. Construction worksheets are provided in Appendix C.

6.0 Existing Noise Environment

Two (2) 15-minute noise measurements were conducted at the project site in order to document the existing noise environment. The measurements include the Leq, Lmin, Lmax and other statistical data (e.g. L2, L8). The results of the noise measurements are presented in Table 3. Noise measurement field sheets are provided in Appendix A.

Table 6: Short-Term Noise Measurement Data (dBA)[1]

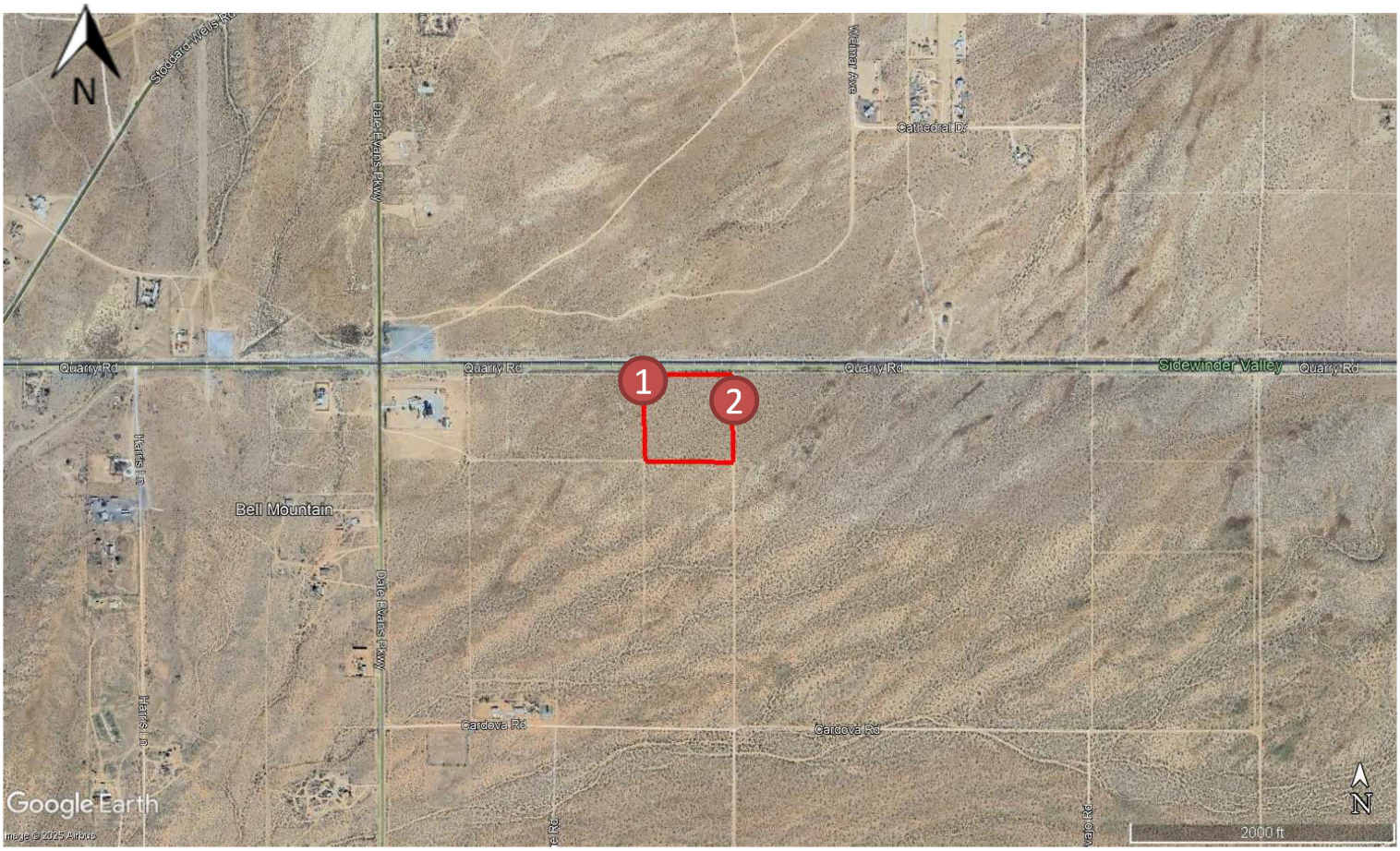
Location	Start Time	Stop Time	L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
NM1	1:20 PM	1:34 PM	66.6	83.8	41.9	71.8	71.1	69	62.8	51.1
NM2	1:53 PM	2:07 PM	69.6	86.3	48.0	73.6	72.3	70.8	68.8	61.6

Notes:
[1.] Short-term noise monitoring locations are illustrated in Exhibit E.

The data presented in Table 6 and the field notes provided in Appendix A indicate that ambient noise levels in the project vicinity range from 67 to 70 dBA Leq. However, the measurements were performed during high winds which inflated the measurement levels due to the sound of the wind moving the windscreen on the sound level meter. The actual existing noise levels along Quarry Road will be closer to the L90 level measured at NM1. The observations indicate that traffic on Quarry Road is the dominant non-wind source of noise. Rail noise was also noted as a less consistent noise source, but was not captured in the measurement.

Exhibit E
Measurement Locations

= Short-Term Monitoring Location



7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to surrounding receptors and compares the results to the Town's Noise Standards. The analysis details the estimated exterior noise levels associated with stationary noise sources and traffic from adjacent roadway sources.

7.1 Off-Site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the project were calculated at a distance of 263 feet from Quarry Road and 180 feet from Dale Evans Parkway. These distances are representative of approximate distances to the existing single-family home closest to the subject roadways impacted by the project. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference.

<Table 7, next page>

Table 7: Existing/Existing + Project Scenario – Noise Levels Along Roadways (dBA CNEL)

Existing Exterior Noise Levels

Roadway	Segment	CNEL at Nearest Home (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Quarry Road	West of Dale Evans Pkwy	37.8	2	4	9	19
Dale Evans Pkwy	South of Quarry Road	51.9	11	24	52	112

Existing + Project Exterior Noise Levels

Roadway	Segment	CNEL at Nearest Home (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Quarry Road	West of Dale Evans Pkwy	38.8	2	5	10	22
Dale Evans Pkwy	South of Quarry Road	52.1	12	25	54	116

Change in Noise Levels as a Result of Projects

Roadway[1]	Segment	CNEL at Nearest Home dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
Quarry Road	West of Dale Evans Pkwy	37.8	38.8	1.1	No
Dale Evans Pkwy	South of Quarry Road	51.9	52.1	0.2	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated from centerline of subject roadway.

Table 7 provides the Existing and Existing + Project noise conditions and shows the change in traffic noise level because of the proposed project. The addition of the project will cause a small increase in traffic noise of 1.1 dBA and 0.2 dBA at the nearest residence from the centerlines of Quarry Road and Dale Evans Parkway, respectively. This will be inaudible (see Section 2.5), and therefore, the impact is less than significant, and no mitigation is required.

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

Worst-case operational noise was modeled using SoundPLAN acoustical modeling software (see Exhibit F). Five (5) receptors representing adjacent land uses were modeled using the SoundPLAN noise model to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent an existing building, a property line, or a sensitive receptor.

Operational Noise Levels

Worst-case "project only" exterior operational noise is presented in Exhibit F. Receptors 1 through 4 represent the noise level at the property lines to the north, east, south, and west, respectively. Receptor 5 represents the noise level at the nearest residential property line, 1,350 feet to the west of the project site. The operational noise model assumes that the HVAC equipment, truck fueling, and parking lot operate at full capacity throughout the hour.

Tables 8 and 9 present the ambient noise level, the project's noise level, and the combined project plus ambient noise level condition. Table 8 is the L50 condition, which includes parking, HVAC, and loading noise. Table 9 is the Lmax condition, which includes those noise sources and the Lmax of all backup beepers. As a conservative worst-case scenario, maximum project operations are compared to nighttime ambient noise levels. Nighttime ambient noise levels were calculated using the FHWA Traffic Noise Prediction Model traffic conditions from Quarry Road.

Table 8: Operational Noise Levels (dBA L50)

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, L50)[3]	Total Combined Noise Level (dBA, L50)	Stationary Noise Limit (dBA, L50)	Potential Significant Impact?
R1	35	41	42	**70**	No
R2	32	44	44	**70**	No
R3	32	42	42	**70**	No
R4	29	48	48	**70**	No
R5	32	29	34	**40**	No

Notes:
1. Receptors 1 through 4 are adjacent industrial, receptor 5 is residential.
2. Nighttime ambient noise levels were calculated through FHWA TNM methodology.
3. See Exhibit F for the operational noise level projections at said receptors.

As shown in Table 8, project plus existing noise levels are expected to be 42 to 48 dBA L50 at adjacent industrial receptors and will meet the Town's 70 dBA L50 noise limit for industrial uses. The project plus existing noise level at the residential receptors is expected to be up to 34 dBA L50 and meets the Town's 40 and 50 dBA L50 nighttime and daytime noise limit for single-family residential uses. Thus, the impact is less than significant.

Table 9: Operational Noise Levels (dBA Lmax)

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Lmax)[3]	Total Combined Noise Level (dBA, Lmax)	Stationary Noise Limit (dBA, Lmax)	Potential Significant Impact?
R1	35	56	56	**90**	No
R2	32	59	59	**90**	No
R3	32	43	43	**90**	No
R4	29	58	58	**90**	No
R5	32	42	42	**60**	No

Notes:
1. Receptors 1 through 4 are adjacent industrial, receptor 5 is residential.
2. Nighttime ambient noise levels were calculated through FHWA TNM methodology.
3. See Exhibit F for the operational noise level projections at said receptors.

As shown in Table 9, project plus existing noise levels are expected to be 43 to 59 dBA Lmax at adjacent industrial receptors and will meet the Town's 90 dBA Lmax noise limit for industrial uses. The project plus existing noise level at the residential receptors is expected to be up to 42 dBA Lmax and meets the Town's 60 and 70 dBA Lmax nighttime and daytime noise limit for single-family residential uses. Thus, the impact is less than significant.

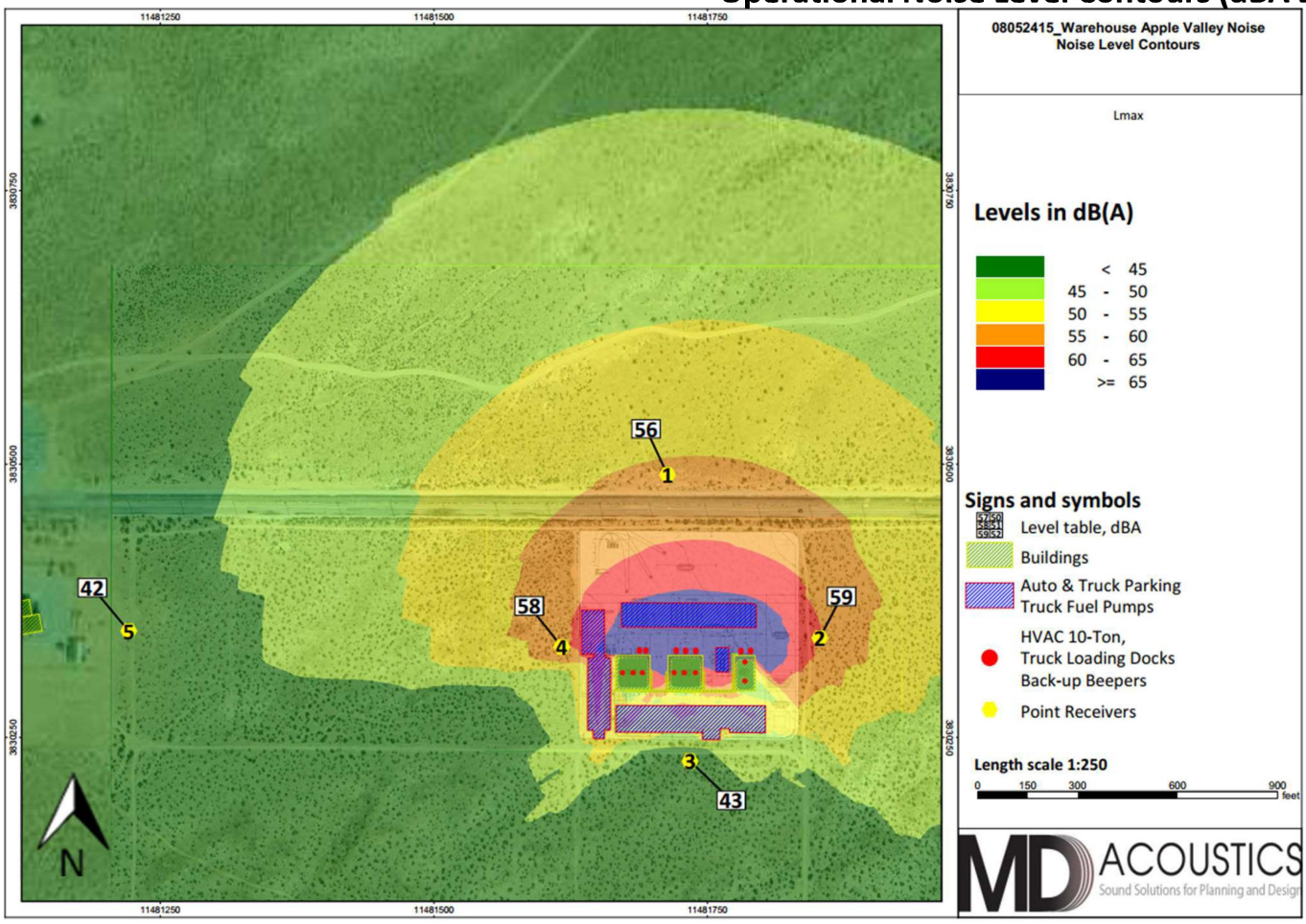
The noise due to the project will not exceed the Town's noise standards at the surrounding receptors. Thus, the impact is less than significant, and no mitigation is required.

Exhibit F

Operational Noise Level Contours (dBA L50)

Exhibit G

Operational Noise Level Contours (dBA Lmax)



8.0 Construction Noise and Vibration Impacts

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. project construction will occur in five phases, site preparation, grading, building construction, paving, and architectural coating. This section summarizes discusses noise and ground-borne vibration modeling efforts, impact analysis, and mitigation, if necessary.

8.1 Construction Noise

Typical construction equipment noise levels are presented in Table 10.

Table 10: 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 noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the Town's Municipal Code (Section 9.73.060(F)). Construction is anticipated to occur during the permissible hours of 7 a.m. to 7 p.m. on

weekdays and Saturdays. Per Section 9.73.060(F) of the Town's Municipal Code, construction noise from stationary construction equipment must not exceed 60 dBA at single-family residential areas.

Construction noise is considered a short-term impact and would be considered significant if construction occurs outside the allowable times as described in the Town's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. The construction noise impact is considered less than significant; however, construction noise level projections are provided.

The closest sensitive land use to the project is the residential use to the west of the site. The residential property is an average of 1,675 feet away from construction activities and as close as 1,350 feet to construction activities.

Construction equipment was taken from the project's CalEEMod. 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. Noise levels are in Table 10. A likely worst-case construction noise scenario assumes equipment operating as close as 1,350 feet and an average of 1,650 feet from the property line of the nearest sensitive receptor, the residence to the west. The Lmax levels represent maximum levels when construction occurs adjacent to the residential receptors. Leq levels represent the average construction noise level during each phase. The construction noise calculation output worksheet is located in Appendix C.

Table 11: Construction Noise Level by Phase (dBA, Leq)

Activity	Noise Levels at Nearest Sensitive Receptor	
	Leq	Lmax
Site Preparation	47	47
Grading	47	47
Building Construction	46	46
Paving	47	52
Architectural Coating	34	40
Notes: Construction Modeling Worksheets are provided in Appendix C.		

As shown in Table 11, project construction noise is expected to range between 34 to 47 dBA Leq and 40 to 52 dBA Lmax at the nearest sensitive receptor. The project will adhere to the allowed times for construction and 60 dBA stationary equipment noise limit outlined in the Municipal Code in Section 9.73.060(F). The impact is less than significant, and no mitigation is required.

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 vibratory roller. A large vibratory roller has a vibration impact of 0.210 inches per second peak particle velocity (PPV) at 25 feet which is 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 25 ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 12 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 12: 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, April 2020.
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 13 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

<Table 13, next page>

Table 13: Vibration Source Levels for Construction Equipment

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
Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2018.		

The nearest building facade is a residential building 1,350 feet west of the project site. At this distance, a vibratory roller would yield a worst-case 0.003 PPV (in/sec) which will not be perceptible and will not result in architectural damage (0.3 PPV in/sec is the threshold of damage for older residential structures). Thus, the vibration levels created by project construction abide by the vibration regulations outlined in Section 9.73.060(G) of the Town's Municipal Code. The impact is not significant and no mitigation is required. The ground-borne vibration worksheet is provided in Appendix D.

9.0 References

Town of Apple Valley
2009 General Policy Plan
2025 Municipal Code
2022 Specific Plan

California Department of Transportation (Caltrans)
2013 Transportation and Construction Induced Vibration Guidance Manual.
2018 Technical Noise Supplement to the Traffic Noise Analysis Protocol. Sept.

Federal Highway Administration (FHWA)
2010 Highway Traffic Noise Analysis and Abatement Policy and Guidance.
https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

Federal Transit Administration (FTA)
2018 Transit Noise and Vibration Impact Assessment Manual

Governor's Office of Planning and Research
State of California General Plan Guidelines, 1998

SoundPLAN International, LLC
2020 SoundPLAN Essential 5.1 Manual.

Appendix A:

Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet - NM1, NM2

Project Name:	Truck Repair Facility Apple Valley Noise
Project: #/Name:	0805-2024-015
Site Address/Location:	20801 Quarry Road
Date:	02/11/2025
Field Tech/Engineer:	Jason Schuyler / Sarah Ostergaard

Site Observations:

53F winds 15-30MPH hazy conditions with sand dust blowing across the desert scrubs. The primary noise source was Quarry Rd, a train did go by but was not captured in the NMs. Primary noise source in NMs is caused by wind blowing over microphone windscreen.

Sound Meter:	XL2, NTI	**SN:**	A2A-07095-E0
Settings:	A-weighted, slow, 1-sec, 15-minute interval		
Site Id:	NM1, NM2		

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1, NM2

Project Name:	Truck Repair Facility Apple Valley Noise	**Calibrator:**	
Site Address/Location:	20801 Quarry Road	**Cal Check: Pre-test:**	**Post Test:**
Site Id:	NM1, NM2		

Figure 1: NM1

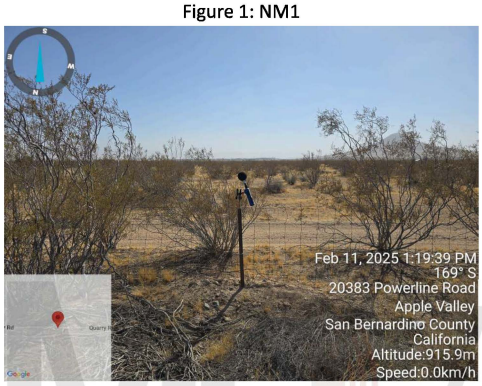


Figure 2: NM1

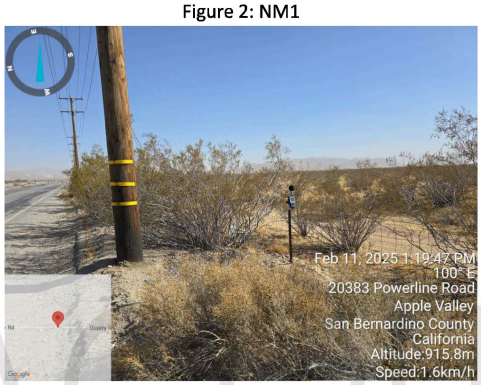


Figure 3: NM2

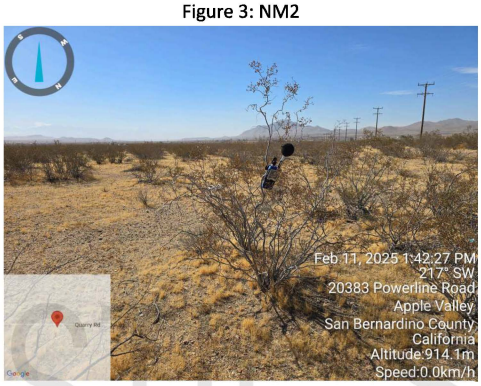
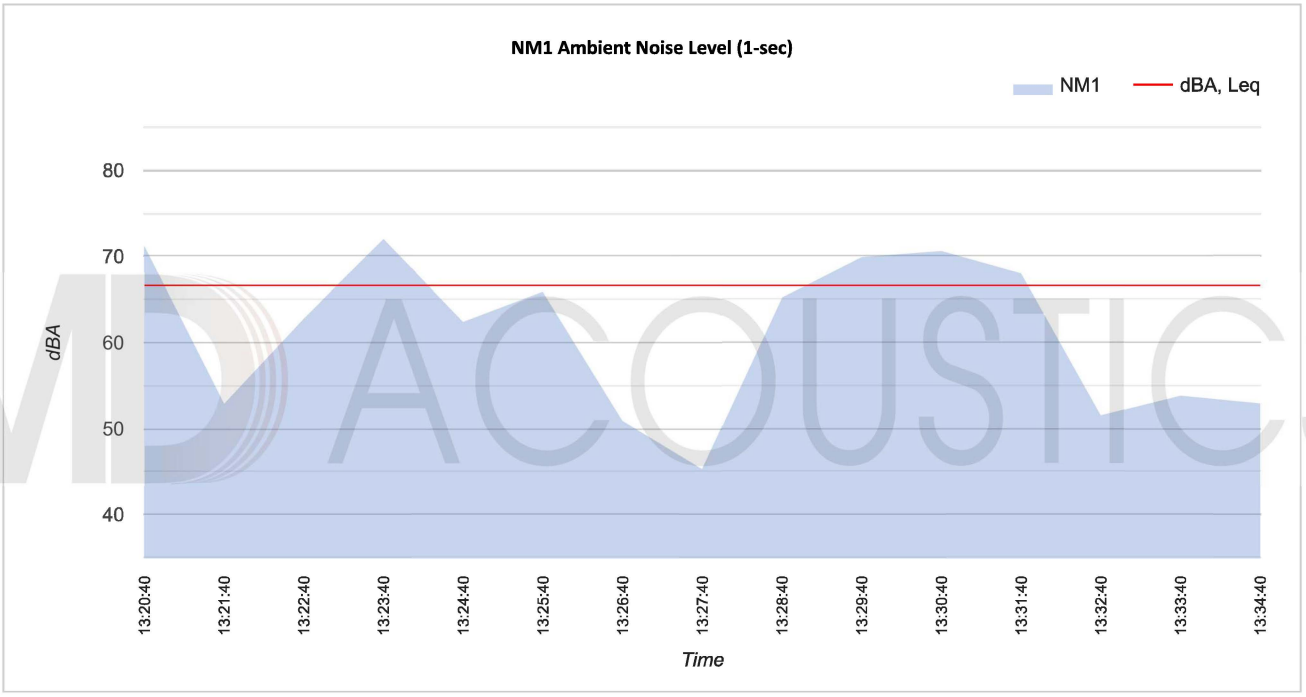


Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	1:20 PM	1:34 PM	66.6	83.8	41.9	71.8	71.1	69	62.8	51.1
NM2	1:53 PM	2:07 PM	69.6	86.3	48.0	73.6	72.3	70.8	68.8	61.6

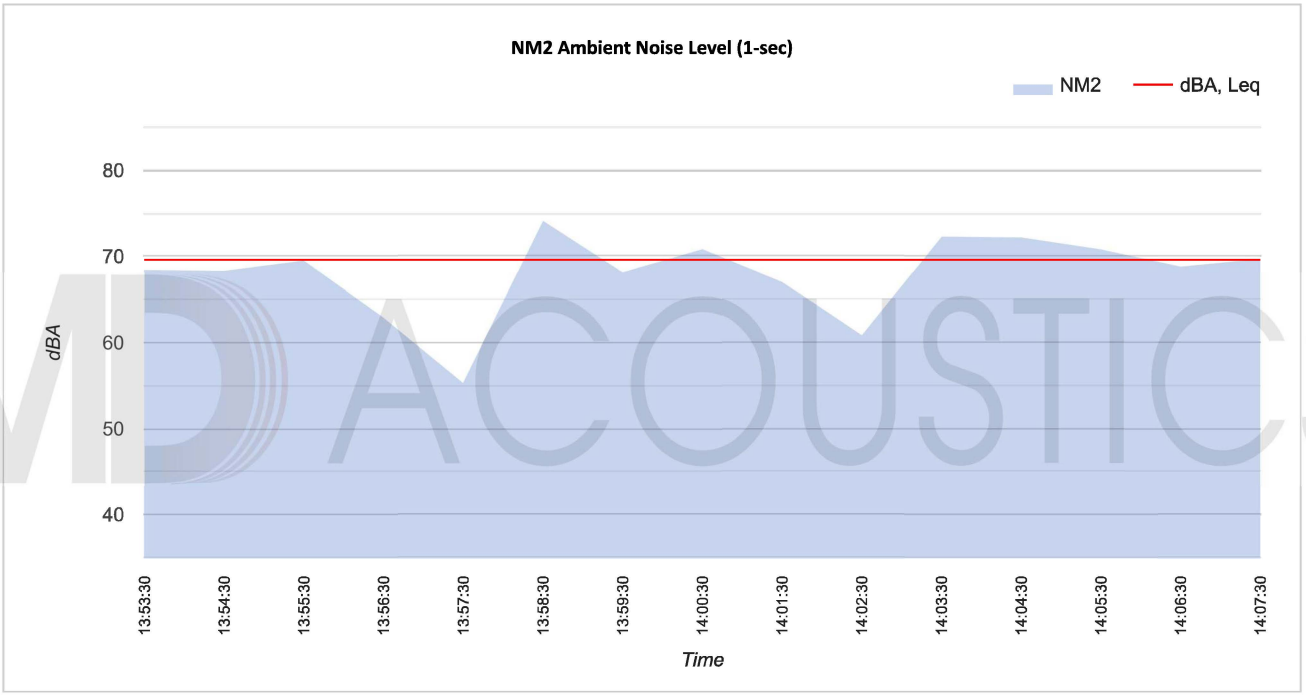
15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1

Project Name:	Truck Repair Facility Apple Valley Noise	**Site Topo:**	Flat desert conditions	**Noise Source(s) w/ Distance:**
Site Address/Location:	20801 Quarry Road	**Meteorological Cond.:**	53F winds 15-30MPH Hazy	Wind and Road noise
Site Id:	NM1	**Ground Type:**	Sandy soil	



15-Minute Continuous Noise Measurement Datasheet - Cont. - NM2

Project Name:	Truck Repair Facility Apple Valley Noise	**Site Topo:**	Flat desert conditions	**Noise Source(s) w/ Distance:**
Site Address/Location:	20801 Quarry Road	**Meteorological Cond.:**	53F winds 15-30MPH Hazy	Wind and Road noise
Site Id:	NM2	**Ground Type:**	Sandy soil	



Appendix B:

SoundPLAN Noise Modeling Data

Source	Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB	
Receiver R1 FI G Lr,lim dB(A) Leq,d 55.8 dB(A)						
Back-Up Alterter	Default industrial noise	Point		48.2	0.0	
Back-Up Alterter	Default industrial noise	Point		48.2	0.0	
Back-Up Alterter	Default industrial noise	Point		48.1	0.0	
Back-Up Alterter	Default industrial noise	Point		48.0	0.0	
Back-Up Alterter	Default industrial noise	Point		47.4	0.0	
Back-Up Alterter	Default industrial noise	Point		47.2	0.0	
Truck Parking	Default parking lot noise	PLot		39.6	0.0	
Back-Up Alterter	Default industrial noise	Point		35.1	0.0	
Auto Parking	Default parking lot noise	PLot		30.6	0.0	
Truck Loading Cargo	Default industrial noise	Point		26.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		26.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		25.6	0.0	
Truck Loading Cargo	Default industrial noise	Point		25.4	0.0	
Truck Loading Cargo	Default industrial noise	Point		25.2	0.0	
Truck Fuel Pumps	Default parking lot noise	PLot		24.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		22.8	0.0	
Truck Loading Cargo	Default industrial noise	Point		22.8	0.0	
Truck Loading Cargo	Default industrial noise	Point		22.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.4	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		18.2	0.0	
Auto Parking	Default parking lot noise	PLot		17.4	0.0	
Receiver R2 FI G Lr,lim dB(A) Leq,d 59.2 dB(A)						
Back-Up Alterter	Default industrial noise	Point		54.9	0.0	
Back-Up Alterter	Default industrial noise	Point		53.6	0.0	
Back-Up Alterter	Default industrial noise	Point		49.3	0.0	
Back-Up Alterter	Default industrial noise	Point		48.6	0.0	
Back-Up Alterter	Default industrial noise	Point		48.0	0.0	
Back-Up Alterter	Default industrial noise	Point		46.1	0.0	
Truck Parking	Default parking lot noise	PLot		41.2	0.0	
Truck Loading Cargo	Default industrial noise	Point		33.8	0.0	
Back-Up Alterter	Default industrial noise	Point		32.7	0.0	
Truck Loading Cargo	Default industrial noise	Point		32.7	0.0	
HVAC 10-Ton	Default industrial noise	Point		30.2	0.0	
Truck Fuel Pumps	Default parking lot noise	PLot		30.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		29.1	0.0	
Truck Loading Cargo	Default industrial noise	Point		28.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		27.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		26.6	0.0	

Source	Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB	
Auto Parking	Default parking lot noise	PLot		26.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		25.8	0.0	
Auto Parking	Default parking lot noise	PLot		25.8	0.0	
Truck Loading Cargo	Default industrial noise	Point		25.4	0.0	
HVAC 10-Ton	Default industrial noise	Point		23.4	0.0	
HVAC 10-Ton	Default industrial noise	Point		22.9	0.0	
HVAC 10-Ton	Default industrial noise	Point		22.9	0.0	
HVAC 10-Ton	Default industrial noise	Point		19.7	0.0	
HVAC 10-Ton	Default industrial noise	Point		19.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		18.7	0.0	
Receiver R3 FI G Lr,lim dB(A) Leq,d 43.1 dB(A)						
Auto Parking	Default parking lot noise	PLot		38.5	0.0	
Auto Parking	Default parking lot noise	PLot		33.7	0.0	
Truck Parking	Default parking lot noise	PLot		32.7	0.0	
Back-Up Alterter	Default industrial noise	Point		29.8	0.0	
Back-Up Alterter	Default industrial noise	Point		29.5	0.0	
Back-Up Alterter	Default industrial noise	Point		29.5	0.0	
Truck Fuel Pumps	Default parking lot noise	PLot		29.4	0.0	
Back-Up Alterter	Default industrial noise	Point		29.4	0.0	
Back-Up Alterter	Default industrial noise	Point		29.3	0.0	
Back-Up Alterter	Default industrial noise	Point		29.0	0.0	
HVAC 10-Ton	Default industrial noise	Point		27.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		26.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		26.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		26.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		25.8	0.0	
HVAC 10-Ton	Default industrial noise	Point		24.8	0.0	
HVAC 10-Ton	Default industrial noise	Point		24.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		24.1	0.0	
Back-Up Alterter	Default industrial noise	Point		16.1	0.0	
Truck Loading Cargo	Default industrial noise	Point		4.5	0.0	
Truck Loading Cargo	Default industrial noise	Point		4.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		4.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		4.3	0.0	
Truck Loading Cargo	Default industrial noise	Point		4.2	0.0	
Truck Loading Cargo	Default industrial noise	Point		3.9	0.0	
Truck Loading Cargo	Default industrial noise	Point		3.9	0.0	
Receiver R4 FI G Lr,lim dB(A) Leq,d 57.7 dB(A)						
Back-Up Alterter	Default industrial noise	Point		53.0	0.0	
Back-Up Alterter	Default industrial noise	Point		49.9	0.0	
Back-Up Alterter	Default industrial noise	Point		49.1	0.0	
Back-Up Alterter	Default industrial noise	Point		48.4	0.0	
Auto Parking	Default parking lot noise	PLot		46.6	0.0	
Back-Up Alterter	Default industrial noise	Point		45.6	0.0	

Source	Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB	
Back-Up Alterter	Default industrial noise	Point		45.1	0.0	
Back-Up Alterter	Default industrial noise	Point		40.8	0.0	
Truck Parking	Default parking lot noise	PLot		39.6	0.0	
Truck Loading Cargo	Default industrial noise	Point		32.7	0.0	
Truck Loading Cargo	Default industrial noise	Point		31.6	0.0	
HVAC 10-Ton	Default industrial noise	Point		29.4	0.0	
Truck Loading Cargo	Default industrial noise	Point		27.8	0.0	
Truck Loading Cargo	Default industrial noise	Point		26.7	0.0	
HVAC 10-Ton	Default industrial noise	Point		26.7	0.0	
HVAC 10-Ton	Default industrial noise	Point		24.5	0.0	
Auto Parking	Default parking lot noise	PLot		23.9	0.0	
Truck Loading Cargo	Default industrial noise	Point		23.5	0.0	
Truck Fuel Pumps	Default parking lot noise	PLot		23.4	0.0	
HVAC 10-Ton	Default industrial noise	Point		20.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		19.9	0.0	
Truck Loading Cargo	Default industrial noise	Point		19.9	0.0	
Truck Loading Cargo	Default industrial noise	Point		19.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		19.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		18.2	0.0	
HVAC 10-Ton	Default industrial noise	Point		15.1	0.0	
Receiver R5 Fl G Lr,lim dB(A) Leq,d 42.2 dB(A)						
Back-Up Alterter	Default industrial noise	Point		35.1	0.0	
Back-Up Alterter	Default industrial noise	Point		34.5	0.0	
Back-Up Alterter	Default industrial noise	Point		34.3	0.0	
Back-Up Alterter	Default industrial noise	Point		34.1	0.0	
Back-Up Alterter	Default industrial noise	Point		33.3	0.0	
Back-Up Alterter	Default industrial noise	Point		33.1	0.0	
Truck Parking	Default parking lot noise	PLot		26.0	0.0	
Auto Parking	Default parking lot noise	PLot		24.9	0.0	
Back-Up Alterter	Default industrial noise	Point		22.3	0.0	
HVAC 10-Ton	Default industrial noise	Point		14.1	0.0	
Truck Loading Cargo	Default industrial noise	Point		12.6	0.0	
Auto Parking	Default parking lot noise	PLot		12.5	0.0	
Truck Loading Cargo	Default industrial noise	Point		11.6	0.0	
Truck Fuel Pumps	Default parking lot noise	PLot		11.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		10.7	0.0	
HVAC 10-Ton	Default industrial noise	Point		9.9	0.0	
HVAC 10-Ton	Default industrial noise	Point		9.1	0.0	
HVAC 10-Ton	Default industrial noise	Point		8.9	0.0	
HVAC 10-Ton	Default industrial noise	Point		8.9	0.0	
HVAC 10-Ton	Default industrial noise	Point		8.7	0.0	
Truck Loading Cargo	Default industrial noise	Point		8.5	0.0	
Truck Loading Cargo	Default industrial noise	Point		8.0	0.0	
HVAC 10-Ton	Default industrial noise	Point		7.9	0.0	
Truck Loading Cargo	Default industrial noise	Point		7.6	0.0	

Source	Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB	
Truck Loading Cargo	Default industrial noise	Point		6.4	0.0	
Truck Loading Cargo	Default industrial noise	Point		6.2	0.0	

Warehouse Apple Valley Noise
Octave spectra of the sources in dB(A) - 001 - Warehouse Apple Valley: 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 Parking	PLot	3414.48			47.0	82.3	0.0	0.0		0	100%/24h	Typical spectrum	65.6	77.2	69.7	74.2	74.3	74.7	72.0	65.8	53.0
Auto Parking	PLot	2299.62			54.9	88.6	0.0	0.0		0	100%/24h	Typical spectrum	71.9	83.5	76.0	80.5	80.6	81.0	78.3	72.1	59.3
Truck Fuel Pumps	PLot	263.80			58.8	83.0	0.0	0.0		0	100%/24h	Typical spectrum	66.4	78.0	70.5	75.0	75.1	75.5	72.8	66.6	53.8
Truck Parking	PLot	2721.94			58.3	92.6	0.0	0.0		0	100%/24h	Typical spectrum	76.0	87.6	80.1	84.6	84.7	85.1	82.4	76.2	63.4
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	Beeper						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
Back-Up Alterter	Point				103.0	103.0	0.0	0.0		0	100%/24h						103.0				
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
HVAC 10-Ton	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	56.3	65.1	67.9	72.7	74.4	74.2	71.2	66.8	55.1
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	

Warehouse Apple Valley Noise
Octave spectra of the sources in dB(A) - 001 - Warehouse Apple Valley: 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)
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Truck Loading Cargo	Point				80.0	80.0	0.0	0.0		0	100%/24h	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	

Appendix C:

Construction Noise Modeling Output

Receptor - Residence to the West

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Edge of Site to Receptor, feet	Center of Site to Receptor, feet	Item Usage Percent[1]	Ground Factor[2]	Usage Factor	Receptor Item Lmax, dBA	Recptor. Item Leq, dBA
SITE PREP									
Dozer	3	82	1350	1675	40	0.66	0.40	43.9	37.5
Tractor	4	84	1350	1675	40	0.66	0.40	45.9	39.5
							Log Sum	45.9	47.2
GRADE									
Grader	1	85	1350	1675	40	0.66	0.40	46.9	40.5
Excavator	1	81	1350	1675	40	0.66	0.40	42.9	36.5
Tractor	3	84	1350	1675	40	0.66	0.40	45.9	39.5
Dozer	1	82	1350	1675	40	0.66	0.40	43.9	37.5
								46.9	46.8
BUILD									
Crane	1	81	1350	1675	16	0.66	0.16	42.9	32.5
Man lift	3	75	1350	1675	20	0.66	0.20	36.9	27.4
Generator	1	81	1350	1675	50	0.66	0.50	42.9	37.4
Welder/Torch	1	74	1350	1675	40	0.66	0.40	35.9	29.5
Tractor	3	84	1350	1675	40	0.66	0.40	45.9	39.5
								45.9	45.6
PAVE									
Tractor	1	84	1350	1675	40	0.66	0.40	45.9	39.5
Concrete Mixer Truck	2	79	1350	1675	40	0.66	0.40	40.9	34.5
Paver	1	77	1350	1675	50	0.66	0.50	38.9	33.4
Pavement Scarifier	2	90	1350	1675	20	0.66	0.20	51.9	42.4
Roller	2	80	1350	1675	20	0.66	0.20	41.9	32.4
								51.9	47.4
ARCH COAT									
Compressor (air)	1	78	1350	1675	40	0.66	0.40	39.9	33.5
								39.9	33.5

[1]FHWA Construction Noise Handbook: Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors

Appendix D:

Construction Vibration Modeling Output

VIBRATION LEVEL IMPACT

Project:	Truck Repair Facility	Date: 10/19/25
Source:	Vibratory Roller	
Scenario:	Unmitigated	
Location:	West Residence	
Address:	Apple Valley, CA	

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	1,350.00	Distance from Equipment to Receiver (ft)	
n =	1.10	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 =	**0.003**	IN/SEC	OUTPUT IN RED