Appendix G

Chacon Farms SFR Noise Impact Study

MD Acoustics

October 3, 2024

Chacon Farms SFR
Noise Impact Study
City of San Jacinto, CA

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TABLE OF CONTENTS

1.0 Introduction 1
1.1 Purpose of Analysis and Study Objectives 1
1.2 Site Location and Study Area 1
1.3 Proposed Project Description 1

2.0 Fundamentals of Noise 4
2.1 Sound, Noise and Acoustics 4
2.2 Frequency and Hertz 4
2.3 Sound Pressure Levels and Decibels 4
2.4 Addition of Decibels 4
2.5 Human Response to Changes in Noise Levels 5
2.6 Noise Descriptors 5
2.7 Traffic Noise Prediction 6
2.8 Sound Propagation 7

3.0 Ground-Borne Vibration Fundamentals 8
3.1 Vibration Descriptors 8
3.2 Vibration Perception 8

4.0 Regulatory Setting 10
4.1 Federal Regulations 10
4.2 State Regulations 10
4.3 City of San Jacinto Noise Regulations 11

5.0 Study Method and Procedure 18
5.1 Noise Measurement Procedure and Criteria 18
5.2 Noise Measurement Locations 18
5.3 FHWA Traffic Noise Prediction Model 18
5.4 FHWA Roadway Construction Noise Model 19

6.0 Existing Noise Environment 21
6.1 Short-Term Noise Measurement Results 21

7.0 Future Noise Environment Impacts and Mitigation 22
7.1 Future Exterior Noise 22
7.1.1 Future On/Off-Site Traffic Noise Impact 22
7.1.2 Noise Impacts to Off-Site Receptors Due to Stationary Sources 23

8.0 Construction Noise Impact 24
8.1 Construction Noise 24
8.2 Construction Vibration 25

9.0 References 28

LIST OF APPENDICES

Appendix A: Photographs and Field Measurement Data 1
Appendix B: Traffic Modeling Output 2
Appendix C: Construction Noise Modeling Output 3

LIST OF EXHIBITS

Exhibit A: Location Map 2
Exhibit B: Site Plan 3
Exhibit C: Typical A-Weighted Noise Levels 4
Exhibit D: Noise/Land Use Compatibility Matrix 12
Exhibit E: Measurements Locations 20

LIST OF TABLES

Table 1: Exterior Noise Standards for Stationary Sources 15
Table 2: Interior Noise Standards for Stationary Sources 16
Table 3: Roadway Parameters and Vehicle Distribution 19
Table 4: Long-Term Noise Measurement Data[1] 21
Table 5: Off-Site Change in Existing Noise Levels as a Result of Project 22
Table 6: On-Site Existing + Project Exterior Noise Levels 23
Table 7: Typical Construction Noise Levels[1] 24
Table 8: Construction Noise Levels at West Residences 25
Table 9: Guideline Vibration Damage Potential Threshold Criteria 26
Table 10: Vibration Source Levels for Construction Equipment[1] 26

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 construction noise impacts

1.2 Site Location and Study Area

The project site is located at 710 Cawston Avenue in the City of San Jacinto, CA (APNs: 432-260-009, 432-260-026, 432-260-027), as shown in Exhibit A. Land uses surrounding the project site include low density residential to the north, rural residential to the east, commercial to the south, and planned low density residential to the west. The land to the south of the project site is located within the jurisdiction of Hemet, CA. Cawston Avenue is to the east, 7th Street is to the north, and Esplanade Avenue is to the south.

1.3 Proposed Project Description

The project proposes the development of 419 single-family detached lots. This study assesses the operational noise and traffic noise to and from the project site and compares the results to the applicable City noise standards. In addition, the study reviews noise generated by construction activities.

Construction activities within the project area will consist of site preparation, 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.

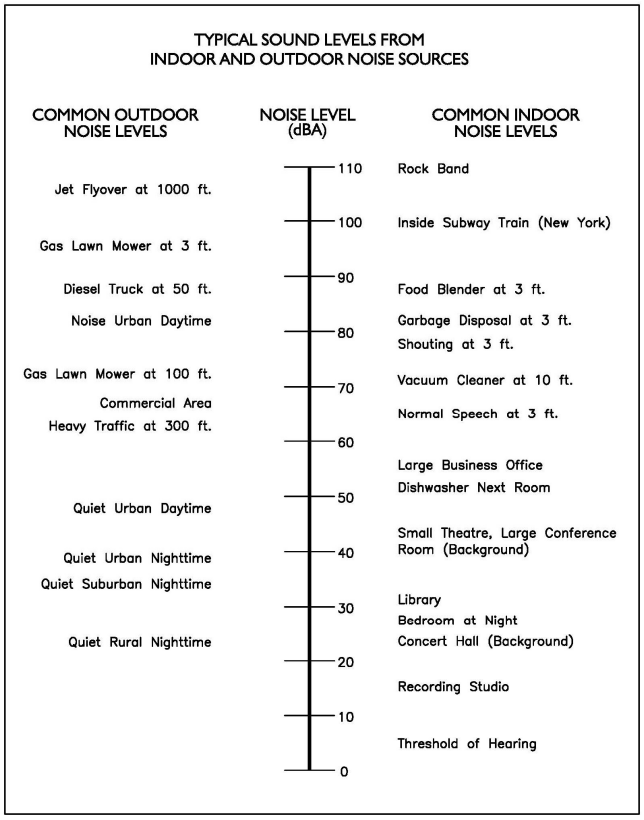
2.1 Sound, Noise and Acoustics

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 *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 from 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 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 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 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.

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

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 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.

2.7 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. A greater the 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 significantly affect noise levels when noise receivers are located 200 feet or more from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Borne 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 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 body waves carrying 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 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 City of San Jacinto 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) was originally 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) regulates noise from aircraft and airports. The Federal Highway Administration (FHWA) regulates 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 compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 of 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 adopt a noise element as part of its comprehensive general plan.

The local noise element usually recognizes 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.

4.3 City of San Jacinto Noise Regulations

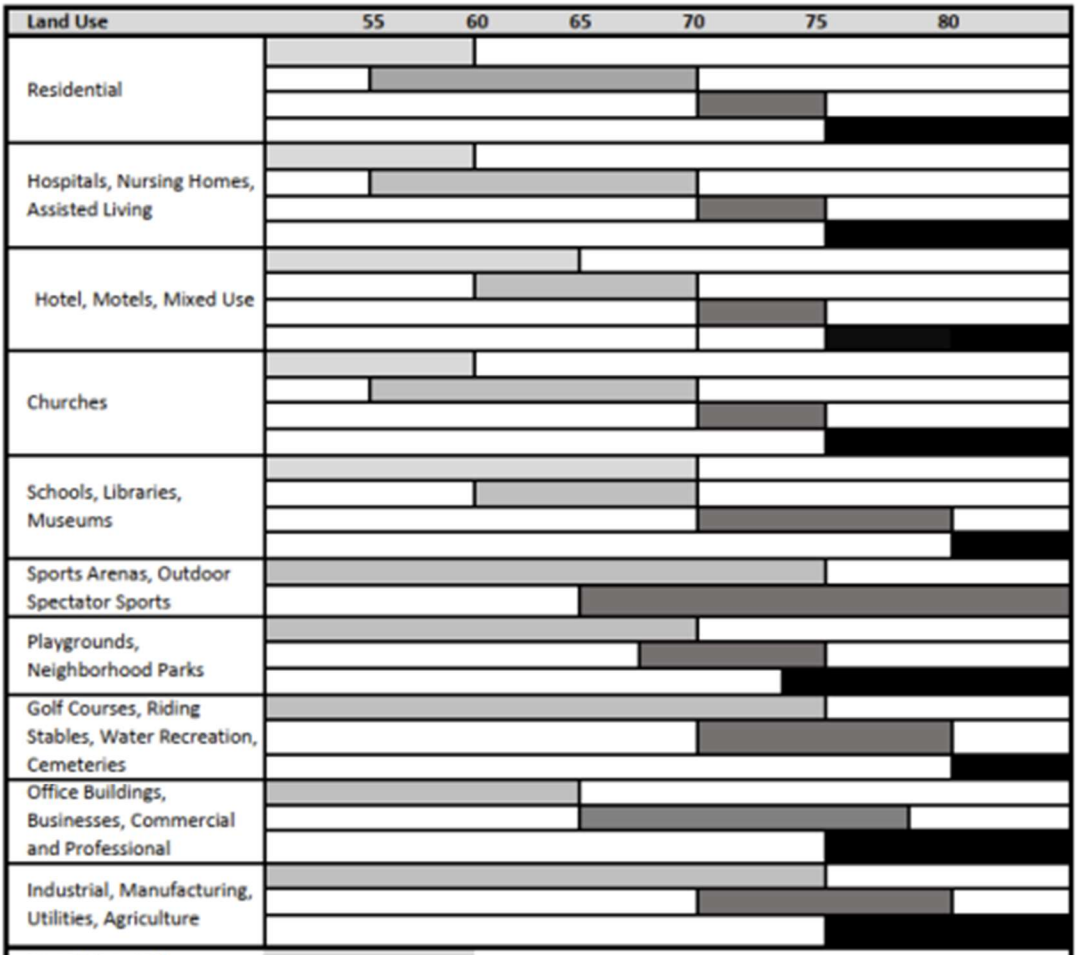
The City of San Jacinto outlines their noise regulations and standards within the Municipal Code and the Public Safety Element of the City of San Jacinto General Plan.

City of San Jacinto General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan's Public Safety Element. Table PS-1 (Exhibit D of this report) of the City's Public Safety Element outlines the exterior noise standards for community noise environments.

<Exhibit D, next page>

Exhibit D: Noise/Land Use Compatibility Matrix



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

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

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

Clearly Unacceptable
New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

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

Notes:

1. Where a proposed use is not specifically listed, the use shall comply with the standards for the most similar use as determined by the City.

2. Outdoor activity areas for residential development are considered to be the backyard patios or decks of single-family units and the common areas where people generally congregate for multi-family developments. Where common outdoor activity areas for multi-family developments comply with the outdoor noise level standard, the standard will not be applied at patios or decks of individual units provided noise-reducing measures are incorporated (e.g., orientation of patio/deck, screening of patio with masonry or other noise-attenuating material). Outdoor activity areas for non-residential developments are the common areas where people generally congregate, including pedestrian plazas, seating areas, and outside lunch facilities; not all residential developments include outdoor activity areas.

In addition to the noise standards, the City has outlined goals, policies, and actions to reduce potential noise impacts, which are presented below:

Goals, Policies, and Actions

Policies and actions from Goal PS-6 of the Public Safety Element that would mitigate potential impacts on noise include the following.

Goal PS-6: Noise. A comfortable community environment that is free from excessive noise pollution.

PS-6 Policies:

PS-6.1 **Noise Exposure.** Consider the noise compatibility of existing and future development when making land use planning decisions. Require development and infrastructure projects to be consistent with the land use compatibility standards contained in Tables PS-1, PS-2, PS-3 and PS-4 to ensure acceptable noise exposure levels for existing and future development.

PS-6.2 **Noise Mitigation.** Require new development to mitigate excessive noise to the standards indicated in Tables PS-1, PS-2, PS-3 and PS-4 to the extent feasible through best practices, including building location and orientation, building design features, placement of noise-generating equipment away from sensitive receptors, shielding of noise-generating equipment, placement of noise-tolerant features between noise sources and sensitive receptors, and use of noise-minimizing materials.

PS-6.3 **Acoustical Studies.** Require acoustical studies for new discretionary developments and transportation improvements that have the potential to affect existing noise-sensitive uses such as schools, hospitals, libraries, care facilities, and residential areas, and for projects that would introduce new noise-sensitive uses into an area where existing noise levels may exceed the thresholds identified in this element. For projects that are required to prepare an acoustical study, the following mobile and stationary noise source criteria shall be used to determine the significance of those impacts.

A. Mobile Noise Sources:

- Where existing traffic noise levels are within or below the “normally acceptable” noise criteria at the affected land use (see Table PS-1), a readily perceptible 5 dBA CNEL or greater increase in roadway noise will be considered significant;
- Where existing traffic noise levels falls within the “conditionally acceptable” noise criteria at the sensitive land use, a +3 dBA CNEL or greater increase in roadway noise levels will be considered significant; and
- Where existing traffic noise levels exceed the “conditionally acceptable” noise criteria at the sensitive land use, a + 1.5 dBA CNEL or greater increase in roadway noise levels will be considered significant.

PS-6.6 **Commercial Noise.** Require the use of noise attenuation measures, including screening and buffering techniques, for all new commercial development expected to produce excessive noise; in existing cases where the City's noise standards are exceeded, work with Code Enforcement to require compliance.

PS-6.7 **Construction Noise.** Require construction activities to reduce noise impacts on adjacent uses to the criteria identified in Tables PS-3 and PS-4, or, if the criteria cannot be met, to the maximum extent feasible complying with Chapter 8.40 of the San Jacinto Municipal Code (Noise Control) and use best practices. Construction activities outside of the permitted construction hours identified in the San Jacinto Municipal Code may be approved on a case-by-case basis by the Community Development Director.

PS-6 Actions:

PS-6b Review new development projects for compliance with the noise requirements established in this General Plan, including the standards established in Tables PS-1, PS-2, PS-3 and PS-4. Where necessary, require new development to mitigate excessive noise through best practices, including building location and orientation, building design features, placement of noise-generating equipment away from sensitive receptors, shielding of noise-generating equipment, placement of noise-tolerant features between noise sources and sensitive receptors, and use of noise-minimizing materials such as rubberized asphalt.

PS-6c Require acoustical studies for all new discretionary projects, including those related to development and transportation, which have the potential to generate noise impacts which exceed the standards identified in this General Plan. The studies shall include representative noise measurements, estimates of existing and projected noise levels, and mitigation measures necessary to ensure compliance with this element.

PS-6d Review the locations of proposed projects with the potential to generate stationary noise in relation to sensitive receptors through the discretionary project review process. Limit delivery or service hours for stores and businesses with loading areas, docks, or trash bins that front, side, border, or gain access on driveways next to residential and other noise sensitive areas. Only approve exceptions if full compliance with the nighttime limits of the noise regulations is achieved.

PS-6e Require all construction activity to comply with the limits (maximum noise levels, hours and days of allowed activity) established in the City noise regulations (Title 24 California Code of Regulations, Noise Ordinance) in order to reduce impacts associated with temporary construction noise to the extent feasible. Trucks associated with construction activities shall follow the designated truck routes described in the Mobility Element.

City of San Jacinto Municipal Code

Chapter 8.40 – Noise Control in the Municipal Code outlines the City's exterior noise limits as it relates to stationary noise sources.

8.40.050. Stationary noise source standards, exterior and interior.

(a) The following noise standards for maximum allowable noise level due to stationary noise sources shall apply to all development and infrastructure projects, unless otherwise specifically indicated:

Table 1: Exterior Noise Standards for Stationary Sources

Type of Land Use	Allowed Equivalent Noise Level (dBA Leq)	
	7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
All single-family residential properties	65	45
All multifamily residential properties and mobile home parks	65	50
All commercial property	65	60
The residential portion of mixed-use properties	70	70
All manufacturing or industrial properties and all other uses	70	70

1. If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.
2. Measurements for compliance are made on the affected property pursuant to Section 8.40.160.
3. It is unlawful for any person at any location within the incorporated area of the city to create noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:
    a. The noise standard for the applicable zone for any fifteen (15) minute period;
    b. A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).
4. In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.
5. The residential portion of mixed-use properties standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use if the noise originates from that commercial property or use.
6. If the measurement location is on a boundary between two different types of land uses, the lower noise level standard applicable to types of land uses shall apply.

(b) The following allowable interior noise standards due to stationary noise sources shall apply to all development and infrastructure projects, unless otherwise specifically indicated:

Table 2: Interior Noise Standards for Stationary Sources

Type of Land Use	Allowed Equivalent Noise Level (dBA Leq)	
	7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
All single-family residential properties	45	40
All multifamily residential properties and mobile home parks	45	40
All commercial property	45	40
Residential portion of mixed use	45	40

1. If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.
2. Measurements for compliance are made on the affected property pursuant to Section 8.40.160.
3. It is unlawful for any person at any location within the incorporated area of the city to create noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:
    a. The noise standard for the applicable zone for any fifteen (15) minute period;
    b. A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).
4. In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.
5. The residential portion of mixed-use properties standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use if the noise originates from that commercial property or use.
6. If the measurement location is on a boundary between two different types of land uses, the lower noise level standard applicable to types of land uses shall apply.

8.40.060. Sensitive uses development projects.

(a) New residential developments, mixed-use developments with a residential component, and other noise-sensitive development (including, but not limited to, schools, day cares, hospitals) shall be designed to minimize noise exposure to sensitive uses through the incorporation of site planning and architectural techniques.

New discretionary projects which have the potential to generate noise impacts which exceed the standards identified in this chapter shall be required to submit acoustical studies. The studies shall include representative noise measurements, estimates of existing and projected noise

levels, and mitigation measures necessary to ensure compliance with the noise standards established in this chapter.

8.40.090 Construction activity noise regulations

A. The erection (including excavation), demolition, alteration or repair of any building shall occur between the hours of seven a.m. and seven p.m. on weekdays and Saturdays, and between nine a.m. and six p.m. on Sundays and holidays, except when such work complies with the terms of a temporary use permit which may be issued by the community development director or his or her designee, upon a showing of sufficient need due to hot or inclement weather, or the use of an unusually long process material, or other circumstances of unusual and compelling nature.
B. No landowner, construction company owner, contractor, subcontractor or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment or machine in violation of the provisions of this section.
C. Exceptions.
    1. The provisions of this section shall not apply to emergency construction work performed by a private party when authorized by the city manager or his or her designee;
    2. The maintenance, repair or improvement of any public work or facility by public employees, by any person or persons acting pursuant to a public works contract, or by any person or persons performing such work or pursuant to the direction of, or on behalf of, any public agency; provided, however, this exception shall not apply to the city of San Jacinto, or its employees, contractors or agents, unless:
        a. The city manager or a department head determines that the maintenance, repair or improvement is immediately necessary to maintain public services; or
        b. The maintenance, repair or improvement is of a nature that cannot feasibly be conducted during normal business hours; or
        c. The city council has approved project specifications, contract provisions, or an environmental document that specifically authorizes construction during hours of the day that would otherwise be prohibited pursuant to this section;
    3. Any construction that complies with the noise limits specified in Section 8.40.040 or 8.40.050. (Ord. 22-13 § 3 (Exh. A); Ord. 15-07 § 1; Ord. 07-17 § 2 (part))

8.40.140 Heating, venting, pool/spa and air conditioning—Special provisions.

Permits for heating, venting and air conditioning (HVAC) and pool/spa equipment in or adjacent to residential areas shall be issued only after the installation contractor signs an acknowledgment that the installation will meet the noise limits established in Section 8.40.050. Applications for residential mechanical permits for air conditioners may use the methodology specified in Standard 275 “Standard Application of Sound Rated Outdoor Unitary Equipment” of the Air Conditioning and Refrigeration Institute (ARI), 1984, as amended. Applicants of mechanical permits for commercial HVAC equipment shall be required to submit a detailed acoustical study that demonstrates compliance with the noise limits established in Section 8.40.050. (Ord. 22-13 § 3 (Exh. A); Ord. 07-17 § 2 (part))

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, 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 to the City's and Caltrans (TeNS) technical noise specifications. All measurement 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

The noise monitoring locations were selected to obtain a baseline of the existing noise environment. Two (2) short-term 15-minute noise measurements were conducted at the project site. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

5.3 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 percentages correspond to the San Jacinto General Plan Noise Element. Trip generation for the project was taken from the Chacon Farms Trip Generation Analysis prepared by TJW Engineering. 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 outer most 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 through-out a 24-hour period

Table 3 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 3: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT[1]	Existing + Project ADT[2]	Speed (MPH)	Site Conditions
Cawston Ave	East of Project Site	3,100	7,052	40	Soft
7th Street	North of Project Site	9,650	13,602	45	Soft
Esplanade Ave	South of Project Site	5800	9,752	45	Soft
Vehicle Distribution and Mix[3]					
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		73.4	8.2	18.4	90.13
Medium Trucks		74.5	4.8	20.7	6.89
Heavy Trucks		71.8	6.8	21.4	2.98

Notes:
[1] Existing ADT from San Jacinto General Plan Noise Element.
[2] Trip generation from TJW Engineering, Inc. Assuming 3,952 project trips applied to every segment.
[3] Typical Riverside County Vehicle Distribution and Mix.

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. The construction noise calculation output worksheet is in Appendix C.

Exhibit E

Measurement Locations

= Short-Term 15-minute Monitoring Locations



Exhibit E:
Measurements Locations

6.0 Existing Noise Environment

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

6.1 Short-Term Noise Measurement Results

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

Table 4: Long-Term Noise Measurement Data[1]

Location	Start	Stop	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
NM1	10:01 AM	10:16 AM	46.9	68.0	36.9	53.6	48.7	44.9	41.7	38.6
NM2	9:39 AM	9:54 AM	64.4	83.8	41.4	72.6	65.1	59.9	56.5	50.4

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

Noise data indicates the ambient noise level ranged from 47 to 64 dBA Leq at the project site. Field notes indicate that the primary source of noise was traffic from surrounding roads. Additional field notes and photographs are provided in Appendix A.

7.0 Future Noise Environment Impacts and Mitigation

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

7.1 Future Exterior Noise

The exterior noise level off-site of the project will be impacted by transportation-related sources and stationary sources from the site. The following outlines the impacts associated with exterior noise levels.

7.1.1 Future Off-Site Traffic Noise Impact

A worst-case project generated traffic noise level was modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. Traffic noise levels were calculated at the nearest sensitive receptor to each analyzed roadway. The modeling takes into account existing walls and barriers that reduce noise. The potential off-site noise impacts caused by an increase of traffic from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

Existing Year (without Project): This scenario refers to existing year traffic noise conditions.

Existing Year (Plus Project): This scenario refers to existing year + project traffic noise conditions.

Table 5 compares the without and with project scenarios and shows the change in traffic noise levels as a result of the proposed project. The noise level at the existing residences to the east of the project site (off Cawston Avenue) is "normally acceptable" per the General Plan noise compatibility matrix, while the noise level at the existing residences to the north of the project site (off 7th Street) is "conditionally acceptable". Per Policy PS-6.3, it takes a change of 5 dBA or more to be significant for "normally acceptable" uses and a change of 3 dBA or more to be significant for "conditionally acceptable" uses. Although there is an increase in traffic noise levels, the impact is considered to have no impact as the change in noise levels will be less than the applicable threshold criteria per the General Plan.

Table 5: Off-Site Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at Nearest Sensitive Receptor, dBA[2]				
		Existing Without Project	Existing With Project	Change in Noise Level	Noise Level Increase Threshold (dBA)	Potential Significant Impact
Cawston Ave	East of Project Site	52.2	55.8	3.6	5.0	No
7th Street	North of Project Site	67.8	69.3	1.5	3.0	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated at the nearest sensitive receptors.

7.1.2 Future On-Site Traffic Noise Impact

Traffic noise from the local roadway network was evaluated and compared to the City's Exterior Noise Standard. Per the City's Exterior Noise Standard (Table N-2 from the City's General Plan, Noise Element), the single-family residential noise limit is 65 dBA CNEL. As shown in Table 6, existing plus project traffic 65 dBA CNEL noise projections from the loudest street (7th Street) will reach up to 133 feet from the centerline of the road. Residential yard properties are located approximately 50 feet away from the centerline of 7th Street and have a projected noise level of 71 dBA CNEL. Thus MD recommends that walls of at least 6 feet be constructed along the borders of the project site to reduce noise levels to 65 dBA CNEL and under.

Table 6: On-Site Existing + Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA), No Wall	CNEL at 50 Ft (dBA), With Wall	Distance to Contour, No Wall (Ft)			
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Cawston Ave	East of Project Site	67.5	61.1	34	73	158	340
7th St	North of Project Site	71.4	64.9	62	133	288	619
Esplanade Ave	South of Project Site	69.9	63.4	49	106	228	473

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

The nearest sensitive receptors that may be affected by project operational noise include adjacent residential uses to the north.

On-site operational noise includes transformers and HVAC units. HVAC equipment will be ground mounted in the backyards of each unit behind fences/walls. Equipment will be at least 100 feet away from the nearest residential uses to the north. The maximum sound power level from a single unit is 73 dBA. At 100 feet away, the sound pressure level a single unit is estimated to be 32 dBA. Assuming all units are running simultaneously in each unit's backyard, the sound level is 43 dBA Leq at the nearest residential receptors. The noise due to the HVAC units operating simultaneously will thus meet the City's nighttime noise level limit of 45 dBA for residential properties.

Per ANSI and NEPA requirements for transformer noise, transformers will be no louder than 65 dBA at 6 feet. Operational noise complies with the stationary noise standards set in section 8.40.050 of the City's Municipal Code. The impact is, therefore, less than significant.

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. The construction noise and vibration level projections are provided in the sections below.

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 7.

Table 7: Typical Construction 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)

The City's Municipal Code specifies a noise level limit of 65 dBA Leq for construction activities at single-family residential receivers. The Municipal code also requires that all construction activities occur between 7am to 7pm on Monday through Saturday and between 9am to 6pm on Sundays and holidays.

Construction noise is considered a short-term impact and would be considered significant if construction activities do not follow the above recommendations. 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 nearest sensitive land uses to the project site are the residential uses to the north. These uses are as close as 100 feet from construction activities.

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 8. A likely worst-case construction noise scenario assumes equipment operating as close as 100 feet and an average of 430 feet from the nearest sensitive receptor. 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.

Table 8: Construction Noise Levels at West Residences

Phase	dBA Lmax	dBA Leq
Prep	76	50
Grading	77	50
Build	76	48
Paving	75	44
Arch Coating	70	36
Notes: Const Equip from CalEEMod.		

The noise due to construction at the nearest residential receptor will be 36 to 50 dBA Leq and 70 to 77 dBA Lmax. The noise due to construction will not exceed the construction noise limit of 65 dBA Leq provided in the City's Municipal code. Thus, the construction noise impact is less than significant.

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 vibratory roller has a vibration impact of 0.210 inches per second peak particle velocity (PPV) at 25 feet.

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

$$PPV_{equipment} = PPV_{ref} (100/D_{rec})^n$$

Where: PPV_{ref} = reference PPV at 100ft.
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 9 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 9: 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 10 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 10: 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.

All proposed structures are at least 100 feet from any existing structures. At a distance of 100 feet, a vibratory roller would yield a worst-case 0.046 PPV (in/sec), which may be perceptible but below any risk of damage (0.5 in/sec PPV is the threshold of old residential structures). The impact is less than significant, and no mitigation is required.

9.0 References

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

City of San Jacinto: General Plan Noise Element.

City of San Jacinto: Municipal Code – Noise Control.

Caltrans Noise Technical Manual. 2013

Konan Vibration Criteria

Federal Highway Administration. Noise Barrier Design Handbook. June 2017.

Federal Transit Administration. Transit Noise and Vibration Impact Assessment Manual. September 2018

Appendix A:

Photographs and Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name: Chacon Farms - Noise

Site Address/Location: Cawtson Ave & Esplanade Ave

Site Id: NM1, NM2

Figure 1: NM1



Figure 2: NM1



Figure 3: NM2



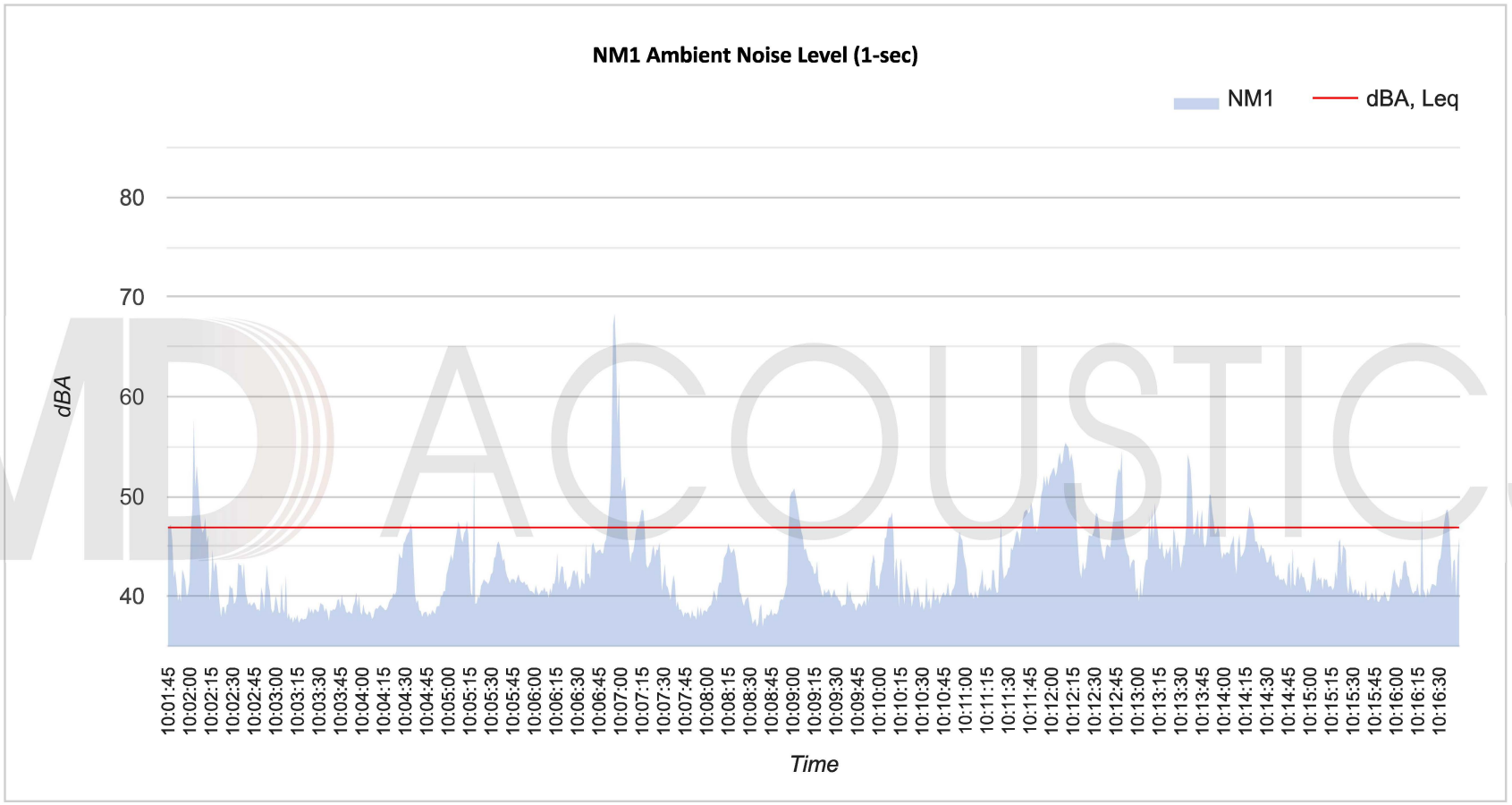
Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	10:01 AM	10:16 AM	46.9	68.0	36.9	53.6	48.7	44.9	41.7	38.6
NM2	9:39 AM	9:54 AM	64.4	83.8	41.4	72.6	65.1	59.9	56.5	50.4

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

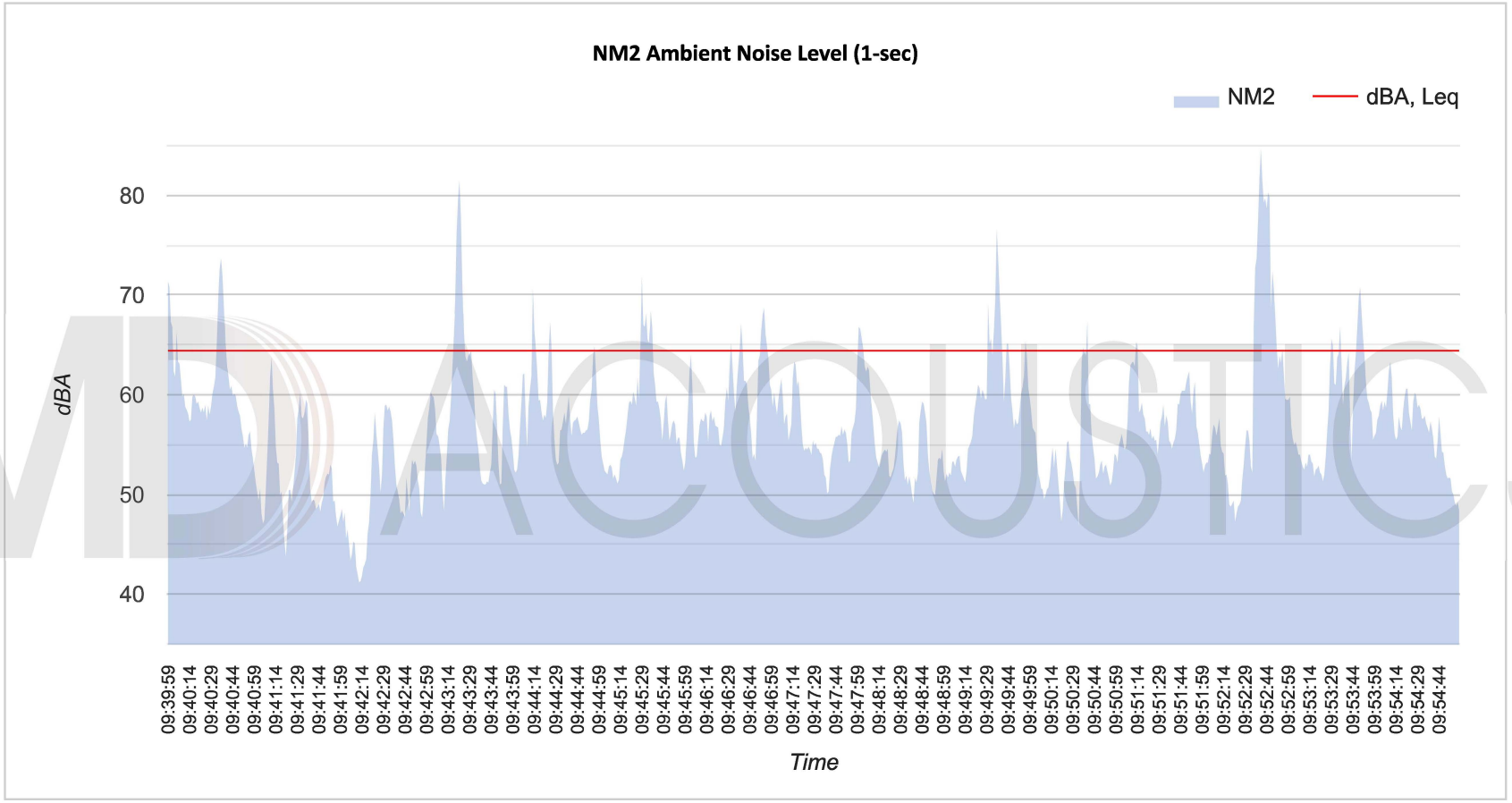
Project Name:	Chacon Farms - Noise	**Site Topo:**	Flat desert conditions	**Noise Source(s) w/ Distance:**	
Site Address/Location:	Cawtson Ave & Esplanade Ave	**Meteorological Cond.:**	78F Sunny winds 0-5MPH	Road Noise	
Site Id:	NM1	**Ground Type:**	Sandy soil and clay		



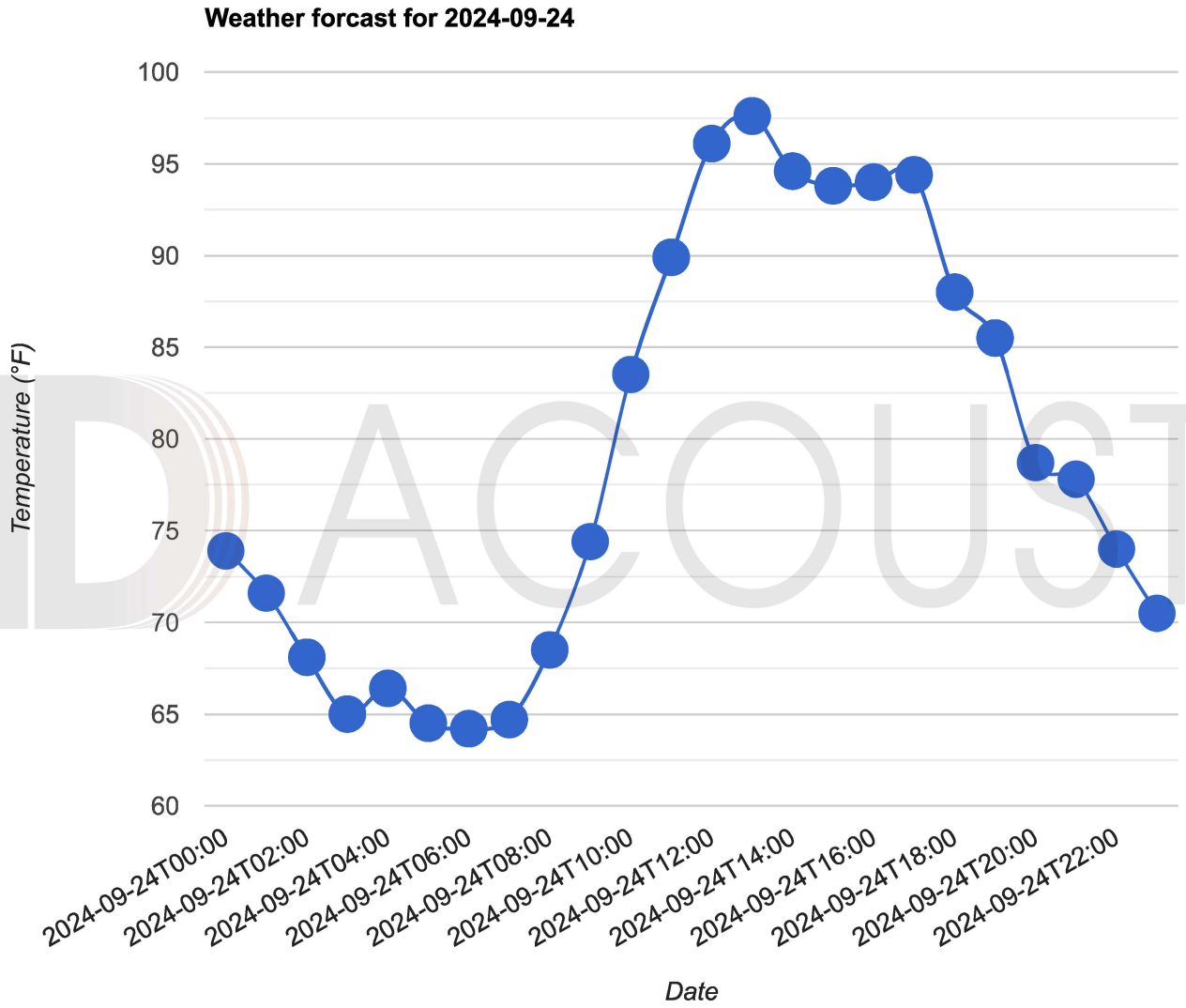
MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

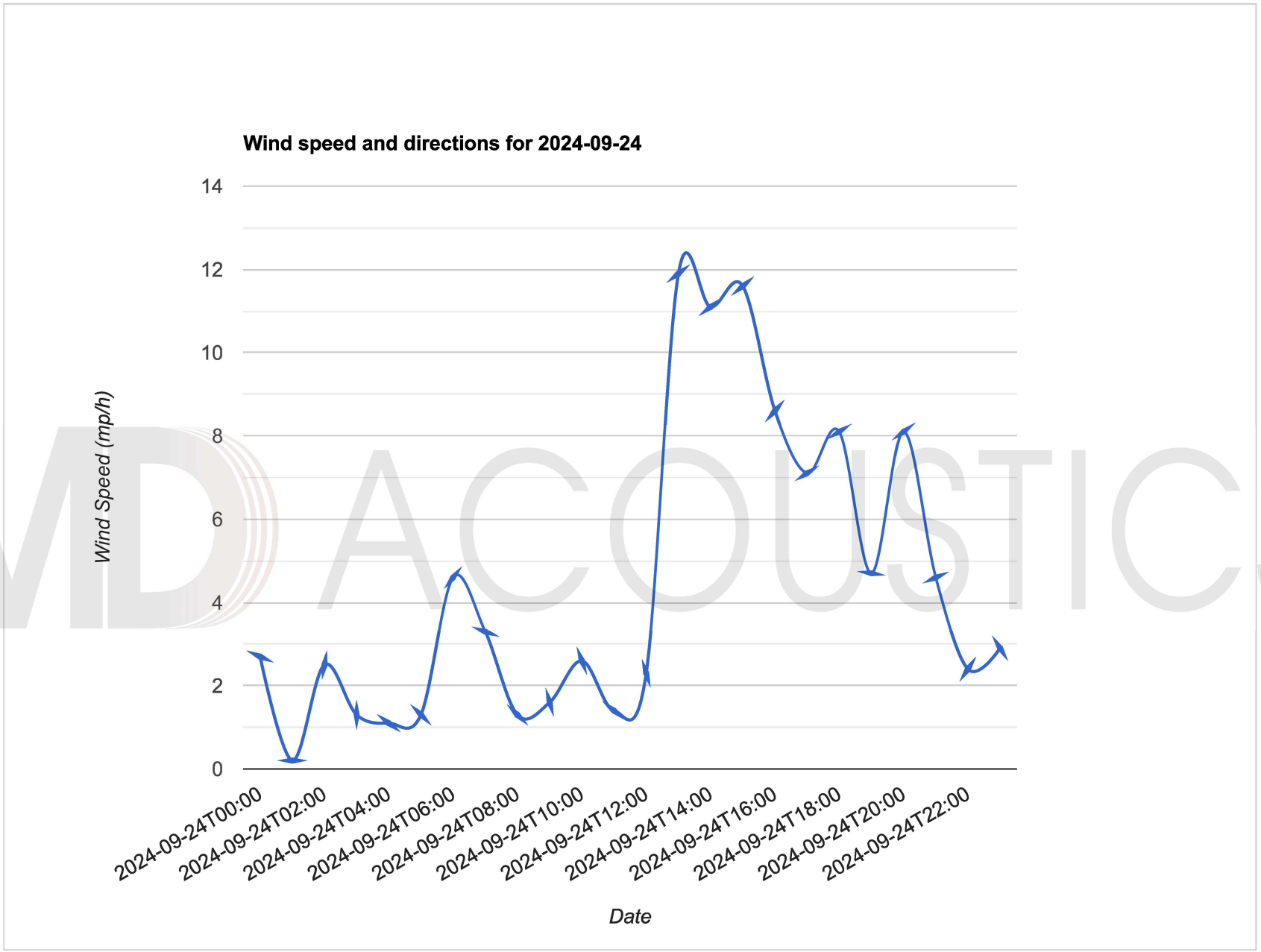
Project Name:	Chacon Farms - Noise	**Site Topo:**	Flat desert conditions	**Noise Source(s) w/ Distance:**	
Site Address/Location:	Cawtson Ave & Esplanade Ave	**Meteorological Cond.:**	78F Sunny winds 0-5MPH	Road Noise	
Site Id:	NM2	**Ground Type:**	Sandy soil and clay		



MD ACOUSTICS



MD ACOUSTICS



Source: Global Forecast System (GFS) weather forcast model

MD ACOUSTICS

Appendix B:

Traffic Modeling Output

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

September 17, 2024

Richard Michael
RAMONA DAIRY, LLC
2451 Ramona Expressway
San Jacinto, CA 92582

SUBJECT: Chacon Farms Trip Generation Analysis, City of San Jacinto

Dear Mr. Michael,

TJW Engineering, Inc. (TJW) is pleased to submit this Trip Generation Analysis for the proposed project located at 710 Cawston Avenue in the City of San Jacinto. The proposed project is for the construction of 419 single family detached residential units. The purpose of this memorandum is to summarize the project Trip Generation Analysis.

Proposed Project

The proposed site is bound by 7th Street on the north, Cawston Avenue on the east, and Esplanade Avenue on the south. The project proposes to construct 419 single family detached residential units. Site access will be provided at each of the three (3) adjacent streets, Cawston Avenue, Esplanade Avenue, and 7th Street. A site plan is attached for reference.

Trip Generation Analysis

The trip generation for the proposed project was developed based on the *City of Jurupa Valley Traffic Impact Analysis Guidelines)* (November 2020). Per the *City Guidelines*, trip generation rates are to be obtained from the *Institute of Transportation Engineers Trip Generation Manual (ITE Manual)* (11th Edition, 2021). Trip generation volumes are based on the proposed land use for Single-Family Detached Housing. As shown in **Table 1** below, the proposed project is expected to generate a total of 294 AM peak hour trips, 394 PM peak hour trips, and 3,952 daily trips.

Table 1
Project Trip Generation

Proposed Land Use[1]	ITE Code	Qty	Unit[2]	Daily		AM Peak Hour					PM Peak Hour				
				Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
								In	Out	Total			In	Out	Total
Single-Family Detached Housing	210	419	DU	9.43	3,952	0.7	26:74	76	218	294	0.94	63:37	248	146	394

1: Trip generation and pass-by rates from ITE Trip Generation (11th Edition, 2021).
2: DU = Dwelling Units.

Summary

This memorandum provides an overview of the trip generation analysis for the proposed project and will generate a total of 294 AM peak hour trips, 394 PM peak hour trips, and 3,952 daily trips. It should be noted that a Draft Transportation Impact Study for the proposed project was conducted in March 2024. This study evaluated a project that generates a total of 364 AM peak hour trips, 454 PM peak hour trips, and 5,223 daily trips. As the project now generates fewer trips, the findings and conclusion of the March 2024 study would remain and be considered conservative.

It is recommended that City staff review this trip generation memorandum to determine if additional traffic analysis is warranted.

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

Sincerely,

Thomas Wheat, PE, TE
President

David Chew, PTP
Transportation Planner





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

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: CAWSTON AVE - EXISTING
LOCATION: NEAREST SENSITIVE RECEPTOR

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	3,100	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DI	13	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	310	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	300	
DIST C/L TO WALL =	0	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	300	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	299.95	- -
MEDIUM TRUCKS	4.0	299.93	- -
HEAVY TRUCKS	8.0	299.94	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	47.5	45.4	41.9	40.6	48.0	48.2
MEDIUM TRUCKS	45.3	43.2	37.3	38.9	46.1	46.2
HEAVY TRUCKS	46.5	44.3	40.1	40.3	47.4	47.6
NOISE LEVELS (dBA)	51.3	49.2	44.9	44.8	52.0	52.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	47.5	45.4	41.9	40.6	48.0	48.2
MEDIUM TRUCKS	45.3	43.2	37.3	38.9	46.1	46.2
HEAVY TRUCKS	46.5	44.3	40.1	40.3	47.4	47.6
NOISE LEVELS (dBA)	51.3	49.2	44.9	44.8	52.0	52.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	20	42	91	195
LDN	19	41	88	189

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: CAWSTON AVE - EXISTING + PROJECT
LOCATION: NEAREST SENSITIVE RECEPTOR

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	7,052	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DI	13	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	705	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	300	
DIST C/L TO WALL =	0	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	300	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	299.95	- -
MEDIUM TRUCKS	4.0	299.93	- -
HEAVY TRUCKS	8.0	299.94	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	51.1	49.0	45.5	44.2	51.5	51.8
MEDIUM TRUCKS	48.9	46.8	40.9	42.5	49.6	49.8
HEAVY TRUCKS	50.1	47.9	43.7	43.8	50.9	51.2
NOISE LEVELS (dBA)	54.9	52.7	48.5	48.3	55.5	55.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	51.1	49.0	45.5	44.2	51.5	51.8
MEDIUM TRUCKS	48.9	46.8	40.9	42.5	49.6	49.8
HEAVY TRUCKS	50.1	47.9	43.7	43.8	50.9	51.2
NOISE LEVELS (dBA)	54.9	52.7	48.5	48.3	55.5	55.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	34	73	157	338
LDN	33	70	151	326

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: CAWSTON AVE - EXISTING + PROJECT
LOCATION: 50 FT FROM CENTERLINE

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	7,052	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DI	13	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	705	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	50	
DIST C/L TO WALL =	46	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	4	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	49.88	- -
MEDIUM TRUCKS	4.0	49.73	- -
HEAVY TRUCKS	8.0	49.69	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.8	60.6	57.2	55.9	63.2	63.5
MEDIUM TRUCKS	60.6	58.5	52.6	54.2	61.3	61.5
HEAVY TRUCKS	61.8	59.6	55.4	55.6	62.7	62.9
NOISE LEVELS (dBA)	66.6	64.4	60.2	60.0	67.2	67.5

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	55.9	53.7	50.3	49.0	56.3	56.6
MEDIUM TRUCKS	54.1	52.0	46.1	47.7	54.8	55.0
HEAVY TRUCKS	56.0	53.8	49.6	49.8	56.9	57.1
NOISE LEVELS (dBA)	60.2	58.0	53.8	53.6	60.9	61.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	34	73	157	339
LDN	33	71	152	328

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: 7TH ST- EXISTING
LOCATION: NEAREST SENSITIVE RECEPTOR

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	9,650	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	20	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	965	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	45	
DIST C/L TO WALL =	40	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	5	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	5.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.89	- -
MEDIUM TRUCKS	4.0	43.76	- -
HEAVY TRUCKS	8.0	43.95	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.4	64.3	60.8	59.5	66.9	67.2
MEDIUM TRUCKS	63.6	61.5	55.6	57.2	64.3	64.5
HEAVY TRUCKS	64.4	62.2	58.0	58.2	65.3	65.5
NOISE LEVELS (dBA)	69.8	67.6	63.4	63.2	70.4	70.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	61.4	59.2	55.7	54.5	61.8	62.1
MEDIUM TRUCKS	58.6	56.5	50.7	52.2	59.4	59.5
HEAVY TRUCKS	64.4	62.2	58.0	58.2	65.3	65.5
NOISE LEVELS (dBA)	67.0	64.8	60.6	60.4	67.6	67.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	50	107	230	496
LDN	48	103	222	479

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: 7TH ST - EXISTING + PROJECT
LOCATION: NEAREST SENSITIVE RECEPTOR

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	13,602	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	20	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,360	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	45	
DIST C/L TO WALL =	40	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	5	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	5.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.89	- -
MEDIUM TRUCKS	4.0	43.76	- -
HEAVY TRUCKS	8.0	43.95	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.9	65.8	62.3	61.0	68.4	68.7
MEDIUM TRUCKS	65.1	63.0	57.1	58.7	65.8	66.0
HEAVY TRUCKS	65.9	63.7	59.5	59.7	66.8	67.0
NOISE LEVELS (dBA)	71.3	69.1	64.9	64.7	71.9	72.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.8	60.7	57.2	55.9	63.3	63.6
MEDIUM TRUCKS	60.1	58.0	52.1	53.7	60.9	61.0
HEAVY TRUCKS	65.9	63.7	59.5	59.7	66.8	67.0
NOISE LEVELS (dBA)	68.4	66.3	62.1	61.9	69.1	69.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	62	134	289	624
LDN	60	130	279	602

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: 7TH ST - EXISTING + PROJECT
LOCATION: 50 FT FROM CENTERLINE

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	13,602	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	20	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,360	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	50	
DIST C/L TO WALL =	46	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	4	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	49.25	- -
MEDIUM TRUCKS	4.0	49.09	- -
HEAVY TRUCKS	8.0	49.05	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.2	65.1	61.6	60.3	67.6	67.9
MEDIUM TRUCKS	64.3	62.2	56.4	57.9	65.1	65.2
HEAVY TRUCKS	65.2	63.0	58.8	59.0	66.1	66.3
NOISE LEVELS (dBA)	70.5	68.4	64.2	63.9	71.2	71.4

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	60.3	58.2	54.7	53.4	60.7	61.0
MEDIUM TRUCKS	57.8	55.7	49.9	51.4	58.6	58.7
HEAVY TRUCKS	59.4	57.2	53.0	53.2	60.3	60.5
NOISE LEVELS (dBA)	64.1	61.9	57.8	57.5	64.7	64.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	62	133	287	618
LDN	60	129	277	597

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CHACON FARMS SFR
ROADWAY: ESPLANADE AVE- EXISTING + PROJECT
LOCATION: 50 FT FROM CENTERLINE

JOB #: 1310-2024-02
DATE: 30-Sep-24
ENGINEER: N. Jensen

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	9,752	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	13	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	975	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	50	
DIST C/L TO WALL =	46	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	4	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.734	0.082	0.184	0.9013
MEDIUM TRUCK	0.745	0.048	0.207	0.0689
HEAVY TRUCKS	0.718	0.068	0.214	0.0298

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	49.88	- -
MEDIUM TRUCKS	4.0	49.73	- -
HEAVY TRUCKS	8.0	49.69	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.7	63.5	60.0	58.8	66.1	66.4
MEDIUM TRUCKS	62.8	60.7	54.8	56.4	63.6	63.7
HEAVY TRUCKS	63.7	61.4	57.3	57.4	64.5	64.7
NOISE LEVELS (dBA)	69.0	66.8	62.7	62.4	69.6	69.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	58.8	56.6	53.1	51.9	59.2	59.5
MEDIUM TRUCKS	56.3	54.2	48.3	49.9	57.1	57.2
HEAVY TRUCKS	57.9	55.6	51.5	51.6	58.7	58.9
NOISE LEVELS (dBA)	62.5	60.4	56.2	56.0	63.2	63.4

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	49	105	227	489
LDN	47	102	219	472

Appendix C:

Construction Noise Modeling Output

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41

Receptor - Residences to the North

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									
Tractor	4	84	100	1350	40	0.66	0.40	76.0	41.9
Dozer	3	82	100	1350	40	0.66	0.40	74.0	39.9
							Log Sum	76.0	49.6
GRADE									
Excavator	2	81	100	1350	40	0.66	0.40	73.0	38.9
Grader	1	85	100	1350	40	0.66	0.40	77.0	42.9
Dozer	1	82	100	1350	40	0.66	0.40	74.0	39.9
Scraper	2	84	100	1350	40	0.66	0.40	76.0	41.9
Tractor	2	84	100	1350	40	0.66	0.40	76.0	41.9
								77.0	50.3
BUILD									
Crane	1	81	100	1350	16	0.66	0.16	73.0	35.0
Man lift	3	75	100	1350	20	0.66	0.20	67.0	29.9
Generator	1	81	100	1350	50	0.66	0.50	73.0	39.9
Tractor	3	84	100	1350	40	0.66	0.40	76.0	41.9
Welder/Torch	1	74	100	1350	40	0.66	0.40	66.0	31.9
								76.0	48.1
PAVE									
Paver	2	77	100	1350	50	0.66	0.50	69.0	35.9
Compactor (ground)	2	83	100	1350	20	0.66	0.20	75.0	37.9
Roller	2	80	100	1350	20	0.66	0.20	72.0	34.9
								75.0	44.2
ARCH COAT									
Compressor (air)	1	78	100	1350	40	0.66	0.40	70.0	35.9
								70.0	35.9

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

VIBRATION LEVEL IMPACT

Project:	Chacon Farms SFT	Date: 9/30/24
Source:	Vibratory Roller	
Scenario:	Unmitigated	
Location:	North residences	
Address:	South Loop Rd, Placer County	

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 =	100.00	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 =	**0.046**	IN/SEC	OUTPUT IN RED