Maverik Fueling Station Project

Noise Impact Study

City of Lancaster, CA

Prepared for:

Ms. Anna Choudhuri
The Altum Group
44-600 Village Court Suite 100
Palm Desert, CA 92260

Prepared by:

MD Acoustics, LLC
Samuel Hord
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

Date: 6/14/2023

MD ACOUSTICS
Sound Solutions for Planning and Design

Noise Study Reports | Vibration Studies | Air Quality | Greenhouse Gas | Health Risk Assessments

P) AZ - 602.774.1950 P) CA - 805.426.4477 www.mdacoustics.com info@mdacoustics.com

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State, and Local agencies. Consistent with the City's Noise Guidelines, the project must demonstrate compliance to the applicable noise criteria as outlined within the City of Lancaster 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 project site is located on the southwest corner of West Avenue L and 15th St W in the City of Lancaster, as shown in Exhibit A. The site is currently zoned as Rural Residential (RR-2.5) by the City of Lancaster. The project borders multifamily residential uses to the north, a Rural Residential use to the west, and vacant land zoned Rural Residential to the south and east.

1.3 Proposed Project Description

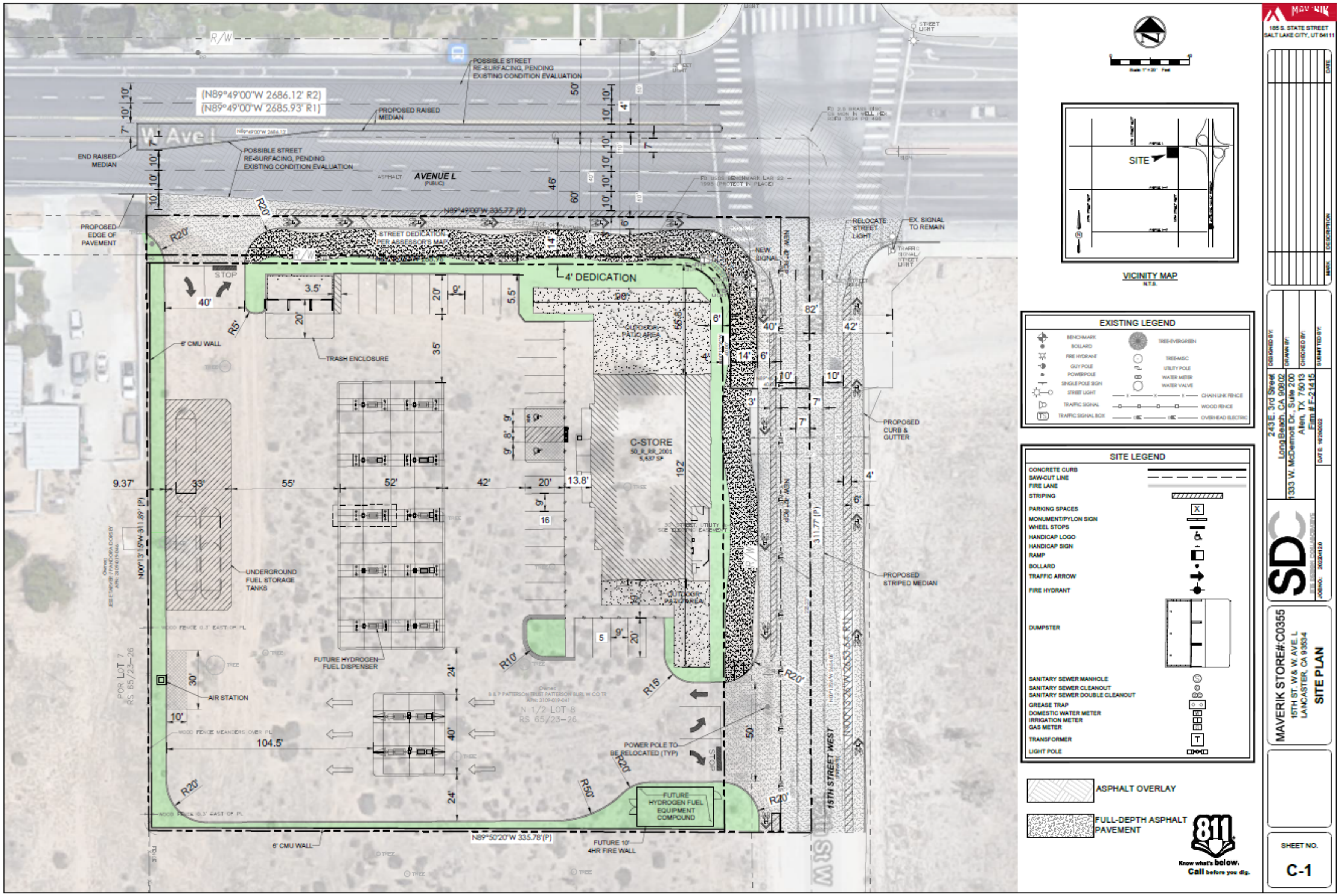
The project proposes the construction of a 5,637-square foot convenience store, a total of twenty (20) gasoline fueling stations, and a total of eight (8) diesel fueling stations on approximately 2 acres. Exhibit B demonstrates the site plan for the project.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

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

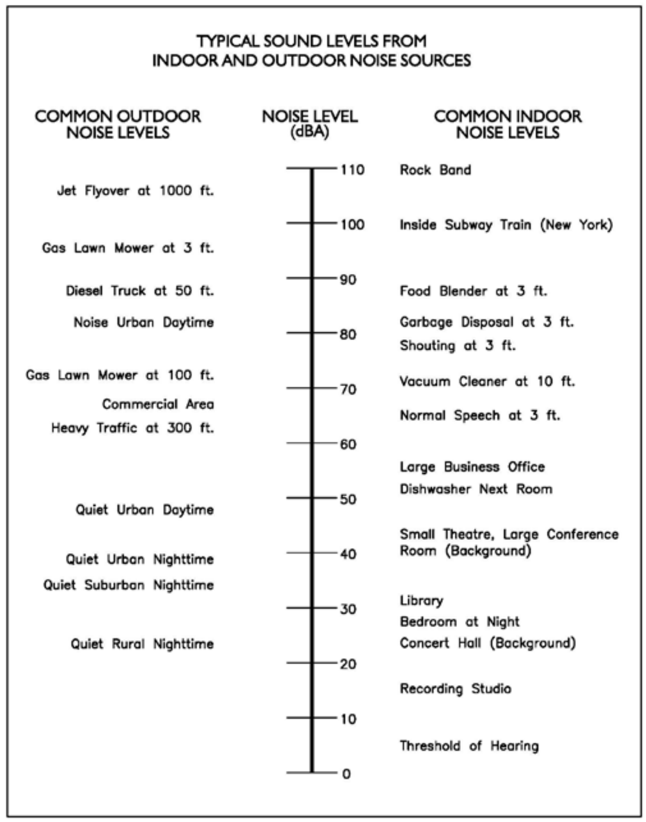
2.1 Sound, Noise, and Acoustics

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

2.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 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 the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and 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 pressure wave. The range of sound audible to the average human (from the quietest to the loudest perceptible sound) is difficult to measure on a linear scale: imagine trying to measure something from inches to miles with the same ruler. Therefore, the convention is to use a logarithmic scale, measured in decibels. A decibel is a logarithmic expression comparing a pressure to a reference pressure (20 micro-pascals) that provides a useful way to compare sounds of differing amplitudes.

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 depends on a variety of factors: volume of traffic; the speed of traffic; auto, medium truck (2-axle), and heavy truck percentage (3-axle and greater); and sound propagation. Higher traffic volume, 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 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. Although ground borne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors; therefore, the vibration level threshold is assessed at occupied structures. Therefore, all vibration impacts are assessed at the structure of an affected property.

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation. As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes 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 Cathedral City, California, 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 for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating 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 United States Housing and Urban Development (HUD) is responsible for establishing noise regulations as it relates to exterior/interior noise levels for new HUD-assisted housing developments near high noise areas.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new developments 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.

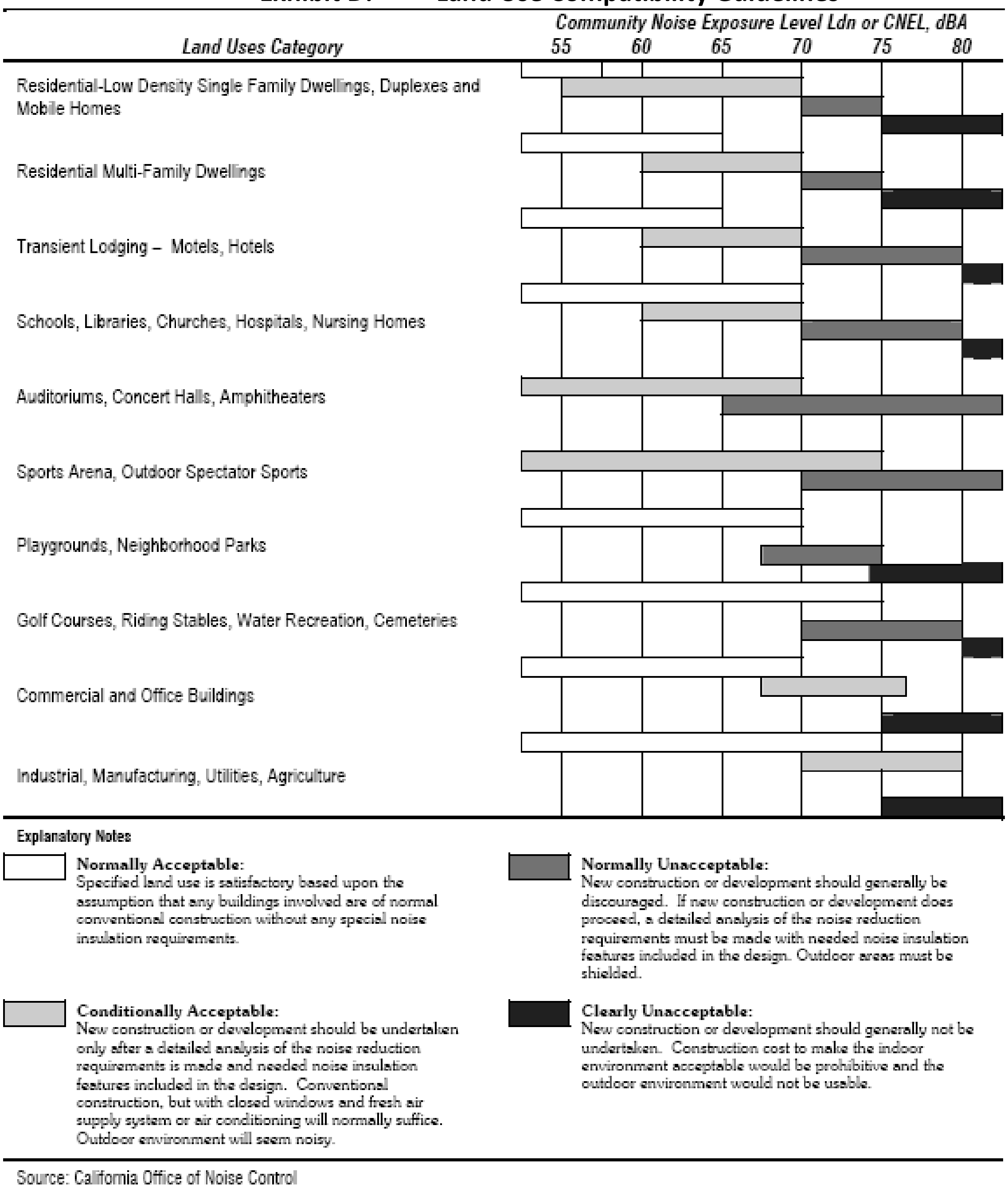
4.2 State Regulations

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 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 adopt a noise element as part of its comprehensive general plan.

The ONC publishes Land Use Compatibility Guidelines to assist planners in identifying compatible and incompatible land uses based on noise. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines



4.3 City of Lancaster Noise Regulations

City of Lancaster General Plan Noise Element:
The City outlines their noise objectives, policies, and actions within the General Plan Noise Element. The following outlines the relevant actions to the proposed project:

Objective 4.3:
Promote noise compatible land use relationships by implementing the noise standards identified in Table 3-1 (*Table 1 of this report*) to be utilized for design purposes in new development, and establishing a program to attenuate existing noise problems.

Table 2: Noise Compatible Land Use Objectives

Land Use	Maximum Exterior CNEL	Maximum Interior CNEL
Rural, Single Family, Multiple Family Residential	65 dBA	45 dBA
Schools: Classrooms Playground	 65 dBA 70 dBA	 45 dBA --
Libraries	--	50 dBA
Hospitals/Convalescent Facilities: Living Areas Sleeping Areas	 -- --	 50 dBA 40 dBA
Commercial and Industrial Office Areas	70 dBA --	-- 50 dBA

Policy 4.3.1:
Ensure that noise-sensitive land uses and noise generators are located and designed in such a manner that City noise objectives will be achieved.

Specific Actions:

4.3.1(a): Where new development is proposed for areas within which the exterior or interior noise levels outlined in Table III-1 of Objective 4.3 are likely to be exceeded by existing or planned land uses, require a detailed noise attenuation study to be prepared by a qualified acoustical engineer, in order to determine appropriate mitigation and ways to incorporate such mitigation into project design.

4.3.1(d): When proposed projects include uses that could be potentially significant noise generators, require noise analyses to be prepared by an acoustical expert, including specific recommendations for mitigation when: 1) the project is located in close proximity to noise sensitive land uses or land which is planned for noise sensitive land uses, or 2) the proposed noise source could violate the noise provisions of the General Plan or Municipal Code.

4.3.1(e): For purposes of consistency, require that noise reports incorporate the following methodology:

• Assume three (3) dBA attenuation with doubling of distance for the natural attenuation of noise emanating from roadways (with the exception of freeways where a 4.5 dBA attenuation with doubling of distance may be utilized).

• Use the daily design capacity of roadways as outlined in the City of Lancaster Transportation Master Plan and the posted speed limit to quantify the design noise levels adjacent to master planned transportation routes for mitigation purposes.

4.3.1(h): Ensure that new commercial and industrial activities (including the placement of mechanical equipment) are designed so that activities comply with the maximum noise level standards at the property line of adjacent uses, thereby minimizing impacts on adjacent uses (see Table 1).

Policy 4.3.2:
Wherever feasible, manage the generation of single event noise levels (SENL) from motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities such that SENL levels are no greater than 15 dBA above the noise objectives included in the Plan for Public Health and Safety.

Specific Actions:
4.3.2(d): As a condition of approval, limit non-emergency construction activities to daylight hours between sunrise and 8:00 pm.

Policy 4.3.3:
Ensure that the provision of noise attenuation does not create significant negative visual impacts.

Specific Actions:
4.3.3(a): In reviewing noise impacts, utilize site and architectural design features to mitigate impacts on sensitive land uses in conjunction with the provision of noise barriers. esign techniques to be considered in mitigating potential noise impacts include:

SITE DESIGN
• The use of building setbacks, landscaping and walls and dedication of noise easements to increase the distance between the noise source and receiver.

• The location of uses and orientation of buildings which are compatible with higher noise levels adjacent to noise generators or in clusters to shield more noise sensitive areas and uses.

• The placement of noise tolerant land uses, such as parking areas, between the noise source and receiver.

• The placement of noise tolerant structures such as garages or carports to shield noise-sensitive areas

• Clustering of office, commercial, or multiple family residential structures to reduce interior open space noise levels.

ARCHITECTURAL DESIGN
• The use of dense building materials.

• Tight fitting doors, ceilings, and floors.

• The use of noise reducing windows and the placement of entry doors on the side of the building facing away from the major roadway.

• Avoid balconies and patio areas facing major transportation routes.

4.3.3(b): Whenever feasible, require the use of noise barriers (walls, berms, or a combination thereof) to reduce significant noise impacts.

• Noise barriers must be massive enough to prevent significant noise transmission and high enough to shield the receiver from the noise source.

• The barrier must be carefully constructed so that there are no cracks or openings.

• The barrier must interrupt the line-of-sight between the noise source and the noise receiver.

• The effects of flanking should be minimized by bending the barrier back from the noise source at the end of the barrier. (Flanking is a term used to describe the manner by which the performance of a noise barrier is compromised by noise passing around the end of the barrier).

• Require landscaping treatment to be provided in conjunction with noise barriers to provide visual relief and to reduce aesthetic impacts.

City of Lancaster Municipal Code

8.24.030 - Loud, unnecessary and unusual noises prohibited.
Notwithstanding any other provision of this chapter, and in addition thereto, no person shall make, cause or suffer, or permit to be made upon any premises owned, occupied or controlled by him/her any unnecessary noises or sounds which are physically annoying to persons of ordinary sensitiveness which are so harsh or so prolonged or unnatural or unusual in their use, time, or place as to occasion physical discomfort to the inhabitants of any neighborhood. All animals shall be so maintained.

8.24.040 - Loud, unnecessary and unusual noises prohibited-Construction and building.
Except as otherwise provided in this chapter, a person at any time on Sunday or any day between the hours of eight p.m. and seven a.m. shall not perform any construction or repair work of any kind upon any building or structure or perform any earth excavating, filling or moving where any of the foregoing entails the use of any air compressor, jack hammer, power-driven drill, riveting machine, excavator, diesel-powered truck, tractor or other earth-moving equipment, hard hammers on steel or iron or any other machine tool, device or equipment which makes loud noises within five hundred (500) feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence.

Applicability to project

The CNEL noise standards in Table 1 will be applied to the project. The project CNEL level represents the noise due to the parking lots and gas and diesel canopies over a twenty-four hour period, with penalties added for noise during the evening and nighttime hours. This is a conservative approach, as CNEL averages all activities over a 24-hour period and is therefore meant to assess noise that would occur throughout that period. Construction activities must not occur at any time on Sunday or any day between the hours of eight p.m. and seven a.m.

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

All measurements 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:

- The sound level meter was calibrated (Piccolo-II) before and after the 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
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

The noise monitoring location was selected to obtain a baseline of the existing noise environment. One long-term noise measurement was conducted at the Project site. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the location of the measurement.

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.

The future worst-case noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces, gas and diesel canopies). The model assumes that approximately thirty (30) parking spaces, twenty (20) gasoline fueling stations, and eight (8) diesel fueling stations.

The SoundPLAN model assumes that all noise sources are operating simultaneously (worst-case scenario) when in actuality the noise will be intermittent and lower in noise level. The model is able to evaluate the noise attenuating effects of any existing or proposed property line walls.

Parking was modeled as three (3) car movements per parking space per hour during daytime hours and zero (0) car movements per sparking space per hour during nighttime hours; the gasoline fueling area was modeled as thirty-two (32) movements per pump per hour during daytime hours and fourteen (14) movements per pump per hour during nighttime hours. The diesel fueling area was modeled as five (5) movements per pump per hour during all hours. Modeling assumptions are summarized in Table 3. Input and output calculations are provided in Appendix B.

Table 3: SoundPLAN Modeling Assumptions

Noise Source	Source Type	Movements per Hour (Day/Night)
Gasoline Fueling Area	Parking Lot Tool	32/14
Diesel Fueling Area	Parking Lot Tool	5/5
Parking Area	Parking Lot Tool	3/0

5.4 Traffic Noise Prediction Modeling

The FHWA Traffic Noise Prediction Methodology (FHWA-RD-77-108) was utilized to model future traffic noise levels on the project site and existing and existing plus project traffic noise volumes along roadways affected by project generated vehicle traffic. The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL).

Project-generated vehicle traffic will result in an incremental increase in ambient noise levels. To determine the project's noise impact to the surrounding land uses, MD generated noise contours for existing ADT, and existing plus project conditions. Table 4 indicates the roadway parameters and vehicle distribution utilized for the modeling. 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 that 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 as a result of a project. The referenced traffic data and traffic noise calculation worksheets outputs are located in Appendix C.

- 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), Speeds, Percentages of autos, medium 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 4: Roadway Parameters and Vehicle Distribution

Roadway/Type	Segment	Existing ADT[1]	Existing + Project ADT[2]	Speed (MPH)	Site Conditions
West Avenue L	E. of 20th St W	29,000	32,458	50	Hard
Motor-Vehicle Type[3]		**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	97.4
Medium Trucks		84.8	4.9	10.3	1.8
Heavy Trucks		86.5	2.7	10.8	0.7

Notes:
[1] See Appendix C for Traffic Volume Flow Map for the City of Lancaster.
[2] Traffic - CEQA Initial Study prepared by the City of Lancaster. See Appendix C.
[3] https://dot.ca.gov/programs/traffic-operations/census

5.5 Construction Noise Modeling

Construction noise associated with the proposed project was calculated utilizing 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 four phases site preparation, grading, building construction, and paving.

Construction noise levels were calculated for each phase based on the CalEEMod Air Quality Model assumptions. All equipment was assumed to be situated at the center of the project site. Construction worksheets are provided in Appendix D.

6.0 Existing Noise Environment

One (1) 24-hour noise measurement was conducted at the project site to document the existing noise environment. The measurements include the 1-hour Leq, Lmin, Lmax, and other statistical data (e.g. L2, L8). The results of the noise measurement are presented in Table 5. Noise measurement field sheets are provided in Appendix A.

Table 5: Long-Term Noise Measurement Data for (LT1) (dBA)[1]

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
5/25/2023	10AM-11AM	55.7	71.6	44.8	60.9	58.6	56.9	54.9	52.0
5/25/2023	11AM-12PM	57.3	80.2	44.0	62.7	60.4	57.0	54.9	52.5
5/25/2023	12PM-1PM	56.2	77.6	43.0	73.2	58.8	56.0	55.0	51.8
5/25/2023	1PM-2PM	57.0	79.8	43.9	63.5	59.2	56.9	55.2	52.5
5/25/2023	2PM-3PM	57.9	75.3	44.5	63.5	61.0	58.6	56.3	53.8
5/25/2023	3PM-4PM	60.9	81.3	48.1	64.2	63.0	61.6	60.3	57.2
5/25/2023	4PM-5PM	61.7	85.9	48.1	65.8	63.5	61.6	60.5	58.2
5/25/2023	5PM-6PM	59.6	74.5	48.3	63.7	61.7	60.4	58.9	57.1
5/25/2023	6PM-7PM	59.9	79.4	47.1	66.2	61.8	59.8	58.8	56.3
5/25/2023	7PM-8PM	61.5	86.5	47.3	68.7	63.0	60.9	58.8	56.1
5/25/2023	8PM-9PM	59.7	83.6	46.7	65.7	61.4	59.3	57.4	54.2
5/25/2023	9PM-10PM	59.5	80.3	47.8	66.9	62.6	58.8	57.7	55.5
5/25/2023	10PM-11PM	57.2	75.1	45.2	62.2	60.8	58.3	55.9	52.0
5/25/2023	11PM-12AM	57.3	73.8	44.5	63.1	60.5	57.3	55.7	53.3
5/26/2023	12AM-1AM	56.4	70.4	43.9	60.3	59.2	57.5	56.0	52.2
5/26/2023	1AM-2AM	55.7	70.7	43.6	60.2	59.0	56.4	54.9	51.8
5/26/2023	2AM-3AM	59.1	78.6	44.3	63.2	62.2	60.2	58.4	52.8
5/26/2023	3AM-4AM	59.4	73.8	45.3	63.4	62.9	60.5	58.3	54.9
5/26/2023	4AM-5AM	60.1	73.8	47.5	64.5	62.9	61.2	59.5	56.4
5/26/2023	5AM-6AM	58.6	78.3	47.4	63.5	61.5	58.9	57.9	54.8
5/26/2023	6AM-7AM	58.7	74.1	49.3	63.5	61.0	59.4	58.3	55.5
5/26/2023	7AM-8AM	60.0	71.3	48.4	64.2	62.8	60.9	59.4	56.5
5/26/2023	8AM-9AM	59.3	79.5	48.0	63.2	61.7	60.2	58.3	54.8
5/26/2023	9AM-10AM	59.5	86.2	46.8	61.8	60.3	59.0	57.5	54.0
CNEL		65.3							

Notes:
[1.] Long-term noise monitoring location (NM1) is illustrated in Exhibit E. The quietest hourly daytime and nighttime noise interval is highlighted in orange when project operations could occur.

The data presented in Table 5 and the field notes provided in Appendix A, indicate that ambient noise levels in the project vicinity range between 56 and 62 dBA Leq. The overall CNEL was 65.3 dBA CNEL. The field data indicates that traffic along West Avenue L is the dominant noise source. The quietest ambient noise level during operational hours is highlighted in orange.

Exhibit E

Measurement Locations

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to sensitive receptors and 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. The City has established different significance thresholds for different types of noise impacts.

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 70 feet from the centerline of affected road segments. The noise levels at 70 feet both with and without project-generated vehicle traffic were compared and the increase was calculated. The distance to the 70, 65, 60, and 55 dBA CNEL noise contours are also provided for reference (Appendix C). Noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the existing year traffic noise condition and is demonstrated in Table 6.

- Existing + Project Condition: This scenario refers to the existing year plus project traffic noise condition and is demonstrated in Table 6.

As shown in Table 6, the addition of project-generated vehicle traffic to West Avenue L would result in negligible increases in ambient noise levels and would not be significant.

Table 6: Existing Scenario - Noise Levels Along Roadways (dBA CNEL)

Existing Without Project Exterior Noise Levels

Roadway	Segment	CNEL at 70 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
West Avenue L	E. of 20th St W	70.9	800	172	370	798

Existing With Project Exterior Noise Levels

Roadway	Segment	CNEL at 70 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
West Avenue L	E. of 20th St W	71.3	860	185	399	860

Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at 70 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
West Avenue L	E. of 20th St W	70.9	71.3	0.4	No

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

7.2 On-Site Traffic Noise Impact

Future noise levels associated with traffic were modeled using the FHWA Traffic Noise Model calculations to evaluate the project. The results of the FHWA calculations were compared with the City's exterior standards presented in Table 1 of this report as they apply to future traffic noise impacts to the proposed project. The Project noise level is less than the 70 dBA CNEL maximum applied to commercial properties. It will not change due to the increase in traffic levels due to the project. There are no outdoor uses for this Project, and the on-site traffic noise impact is considered less than significant.

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

The existing residential land uses located west and north of the project site are sensitive receptors that may be affected by project operational noise. Worst-case operational noise was modeled using SoundPLAN acoustical modeling software. Four (4) receptors representative of the residential adjacent sites 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 property lines. The results are presented in Table 7.

Project Operational Noise Levels

Worst-case "project only" exterior operational noise is presented in Exhibit F. Operational noise levels are expected to reach 45 to 56 dBA CNEL at the adjacent receptors.

Project Plus Ambient Operational Noise Levels

Existing plus project noise level projections are anticipated to reach up to 45 to 56 dBA CNEL at the nearest residential receptors. The project-generated operational noise is expected to result in a maximum of 0.5 dB increase at the adjacent residential sites. This does not exceed the noise ordinance and therefore the impact is less than significant.

Table 7: Operational Noise Levels (dBA, Leq)

Receptor[1]	Existing Ambient Noise Level (dBA, CNEL)[2]	Project Noise Level (dBA, CNEL)[3]	Total Combined Noise Level (dBA, CNEL)	Land Use Noise Limit (dBA, CNEL)	Change in Noise Level as Result of Project (dB)
R1	65.3	55.4	65.7	65	0.4
R2	65.3	44.9	65.3	65	0.0
R3	65.3	53.3	65.5	65	0.2
R4	65.3	56.3	65.8	65	0.5

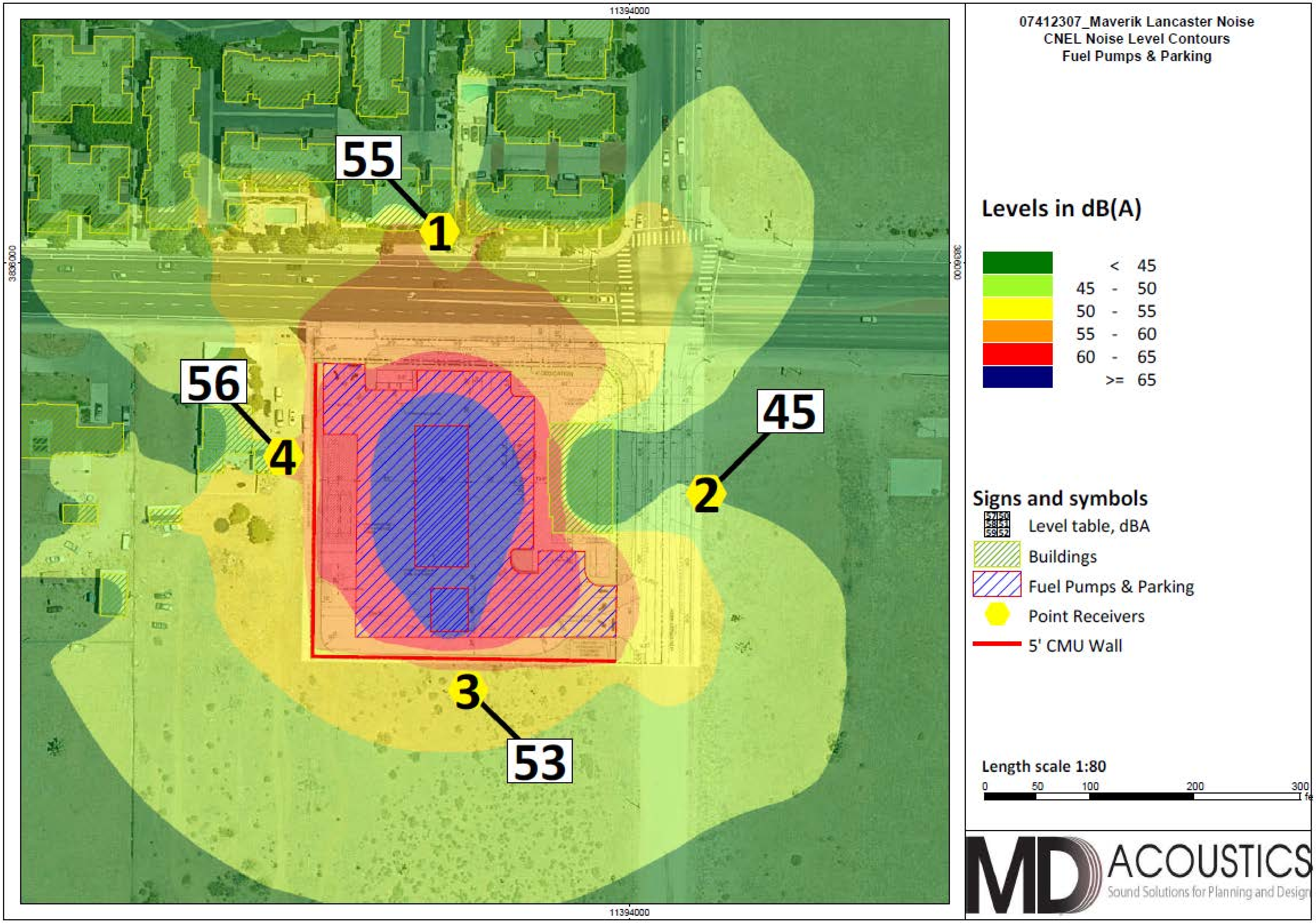
Notes:

1. R1 is existing multifamily residential. R2 and R3 are vacant land zoned rural residential; R4 is existing rural residential.
2. See Table 6 for measured ambient noise levels.
3. See Exhibit E for the operational CNEL noise level projections at said receptors.

The existing ambient noise level (65.3 dBA CNEL) already exceeds the maximum exterior noise limit (65.0 dBA CNEL). Operational noise from the proposed project is 9 dBA below the existing ambient noise level, and the change in noise level due to the project is anticipated to range from 0.0 to 0.5 dBA, which is well below the 3 dBA threshold of a just noticeable difference. Therefore, the impact would be less than significant.

Exhibit F

Project Leq Operational Noise Levels



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 (5) phases: site preparation, grading, building construction, paving, and finishing. This section summarizes and 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 8.

Table 8: Typical Construction Equipment Noise Levels[1]

EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Ground)	80
Front Loaders	80
Backhoes	80
Tractors	84
Scrapers, Graders	85
Pavers	85
Trucks	84
Materials Handling	
Concrete Mixers	85
Concrete Pumps	82
Cranes	85
Stationary	
Pumps	77
Generators	82
Compressors	80

IMPACT EQUIPMENT

Type	Noise Levels (dBA) at 50 Feet
Concrete Saws	90
Vibratory Pile Driver	95

Notes:
[1] Referenced Noise Levels from the FHWA Construction Noise Handbook

Construction noise associated with each phase of the project was calculated at nearby sensitive receptors utilizing methodology presented in the Federal Highway Administration (FHWA) Construction Noise Model 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 was modeled from the edge of the site to the nearest adjacent properties in use.

Construction activities are anticipated to include five phases: site preparation, grading, building construction, paving, and architectural coating. Noise levels associated with each phase are shown in Table 9. The construction noise calculation output worksheet is located in Appendix D.

Table 9: Construction Noise Level by Phase (dBA, Leq)

Location	Phase	Construction Noise Level (dBA, Leq)
North Residential	Prep	65.8
	Grade	66.5
	Build	64.2
	Paving	63.7
	Finish	54.6
West Residential	Prep	71.5
	Grade	72.3
	Build	69.9
	Paving	69.5
	Finish	60.4

As shown in Table 9, project construction noise will range between 55 to 72 dBA Leq at the nearest sensitive receptors, which are the residential uses at the western property line and north across West Avenue L from the project.

The Project will be required to adhere to Section 08.24.040 of the City of Lancaster Municipal Code which outlines the allowed times for construction. Therefore, the impact is less than significant.

In addition to complying with Section 08.24.040 of the City of Lancaster Municipal Code, the following best practices are recommended to reduce construction noise:

1. During construction, the contractor shall ensure that all construction equipment is equipped with appropriate noise attenuating devices.

2. The contractor should locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

3. Idling equipment should be turned off when not in use.

4. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

8.2 Construction Vibration

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

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

Where: PPV_{ref} = reference PPV at 100ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.5 (the value related to the attenuation rate through the ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 10 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 10: 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 11 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

<Table 11, next page>

Table 11: 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 existing building is 163 feet west of the center of the project site. At this distance, a large bulldozer would yield a worst-case 0.011 PPV (in/sec) which is not perceptible and will not result in architectural damage. The impact is not significant. The ground-borne vibration worksheet is provided in Appendix E.

9.0 CEQA Analysis

The California Environmental Quality Act Guidelines (Appendix D) establishes thresholds for noise impact analysis as presented below:

(a) Would the project result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise Code, or applicable standards of other agencies?

Transportation Noise Impacts

Transportation noise impacts would be considered significant if the existing plus project levels are expected to increase by more than 3 dB. Compared to existing traffic noise levels, future traffic volumes are expected to increase 0.4 dBA CNEL at existing land uses. The impact is therefore less than significant.

Stationary Noise Sources

Stationary noise impacts would be considered significant if they result in exceedances of Section 08.24.040 of the Municipal Code. Implementation of the proposed project may result in stationary noise related to parking, idling cars, idling heavy trucks, and rooftop HVAC units. All equipment is required to meet the stationary noise limits of 65 dBA CNEL at the adjacent sensitive receptors

Operational noise levels are expected to reach 45 to 56 dBA CNEL at the residential receptors. These noise levels do not exceed the City's daytime noise standard of 65 dBA. Therefore, the impact would be less than significant.

Construction Noise and Vibration

Construction noise will be significant if construction activities occur outside of the permitted construction hours specified in Section 08.24.040 of the City of Lancaster Municipal Code.

Noise due to construction will result in short-term noise impacts associated with construction activities.

The site preparation and building phases of on-site construction activities will generate the highest temporary noise levels. The loudest construction equipment on the site will be tractors, graders, scrapers, and dozers. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings. The maximum Leq level for the loudest phase of construction is expected to be 72.3 dBA Leq and 82.3 dBA Lmax at the nearest existing adjacent residential building.

b) Generate excessive ground-borne vibration or ground-borne noise levels?

Construction vibration will be significant if vibration exceeds levels that would result in structural damage to existing buildings. Construction activity is not anticipated to occur within 50 feet of sensitive receptors. At a distance of 63 feet, the nearest residential building to the project property line, a large bulldozer would yield a worst-case 0.011 PPV (in/sec) which is below the threshold of any risk of damage. The project may result in temporary daytime residential annoyance. Construction activity is not expected to fall within the limits of structural damage, and therefore, the impact is less than significant.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The nearest airport to the project site is the Palmdale Regional Airport. The Palmdale Regional Airport is approximately 5 miles to the southeast of the project. The project would be located outside the noise contours of Palmdale Regional Airport. Therefore, no substantial noise exposure from airport noise would occur and it would have no impact.

10.0 References

City of Lancaster
2009 2030 General Plan
2023 Municipal Code

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)
2006 Construction Noise Handbook

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
2019 SoundPLAN Essential 8.1 Manual.

Appendix A:

Field Measurement Data

24-Hour Continuous Noise Measurement Datasheet

Project Name: Maverik Lancaster Noise

Project: #/Name: 0741-2023-007

Site Address/Location: 15th Street West and West Avenue

Date: 05/25/2023

Field Tech/Engineer: Dennis Jordan / Samuel Hord

Sound Meter: Piccolo-II, Soft dB **SN:** PO222040501

Settings: A-weighted, slow, 1-min, 24-hour duration

Site Id: LT-1

Site Observations:

65°, sunny and clear with a few clouds, winds 0 to 5 mph, traffic light to moderate

MD ACOUSTICS

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project Name: Maverik Lancaster Noise

Site Address/Location: 15th Street West and West Avenue

Site Id: LT-1

Figure 1: LT-1 24 hr

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project Name: Maverik Lancaster Noise
Site Address/Location: 15th Street West and West Avenue
Site Id: LT-1

Site Topo: Flat
Meteorological Cond.: 65 degrees, winds 0 to 5 mph, sunny and clear with a few clouds
Ground Type: Dirt and desert vegetation

Day: 1 of 1
Noise Source(s) w/ Distance:
Road Noise 150 ft W Ave L

Table 1: Baseline Noise Measurement Summary

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
5/25/2023	10:00 AM	11:00 AM	55.7	71.6	44.8	60.9	58.6	56.9	54.9	52
5/25/2023	11:00 AM	12:00 PM	57.3	80.2	44	62.7	60.4	57	54.9	52.5
5/25/2023	12:00 PM	1:00 PM	56.2	77.6	43	63.2	58.8	56	55	51.8
5/25/2023	1:00 PM	2:00 PM	57	79.8	43.9	63.5	59.2	56.9	55.2	52.5
5/25/2023	2:00 PM	3:00 PM	57.9	75.3	44.5	63.5	61	58.6	56.3	53.8
5/25/2023	3:00 PM	4:00 PM	60.9	81.3	48.1	64.2	63	61.6	60.3	57.2
5/25/2023	4:00 PM	5:00 PM	61.7	85.9	48.1	65.8	63.5	61.6	60.5	58.2
5/25/2023	5:00 PM	6:00 PM	59.6	74.5	48.3	63.7	61.7	60.4	58.9	57.1
5/25/2023	6:00 PM	7:00 PM	59.9	79.4	47.1	66.2	61.8	59.8	58.8	56.3
5/25/2023	7:00 PM	8:00 PM	61.5	86.5	47.3	68.7	63	60.9	58.8	56.1
5/25/2023	8:00 PM	9:00 PM	59.7	83.6	46.7	65.7	61.4	59.3	57.4	54.2
5/25/2023	9:00 PM	10:00 PM	59.5	80.3	47.8	66.9	62.6	58.8	57.7	55.5
5/25/2023	10:00 PM	11:00 PM	57.2	75.1	45.2	62.2	60.8	58.3	55.9	52
5/25/2023	11:00 PM	12:00 AM	57.3	73.8	44.5	63.1	60.5	57.3	55.7	53.3
5/26/2023	12:00 AM	1:00 AM	56.4	70.4	43.9	60.3	59.2	57.5	56	52.2
5/26/2023	1:00 AM	2:00 AM	55.7	70.7	43.6	60.2	59	56.4	54.9	51.8
5/26/2023	2:00 AM	3:00 AM	59.1	78.6	44.3	63.2	62.2	60.2	58.4	52.8
5/26/2023	3:00 AM	4:00 AM	59.4	73.8	45.3	63.4	62.9	60.5	58.3	54.9
5/26/2023	4:00 AM	5:00 AM	60.1	73.8	47.5	64.5	62.9	61.2	59.5	56.4
5/26/2023	5:00 AM	6:00 AM	58.6	78.3	47.4	63.5	61.5	58.9	57.9	54.8
5/26/2023	6:00 AM	7:00 AM	58.7	74.1	49.3	63.5	61	59.4	58.3	55.5
5/26/2023	7:00 AM	8:00 AM	60	71.3	48.4	64.2	62.8	60.9	59.4	56.5
5/26/2023	8:00 AM	9:00 AM	59.3	79.5	48	63.2	61.7	60.2	58.3	54.8
5/26/2023	9:00 AM	10:00 AM	59.5	86.2	46.8	61.8	60.3	59	57.5	54

	DNL	64.9

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project Name: Maverik Lancaster Noise

Site Address/Location: 15th Street West and West Avenue

Site Id: LT-1

Site Topo: Flat

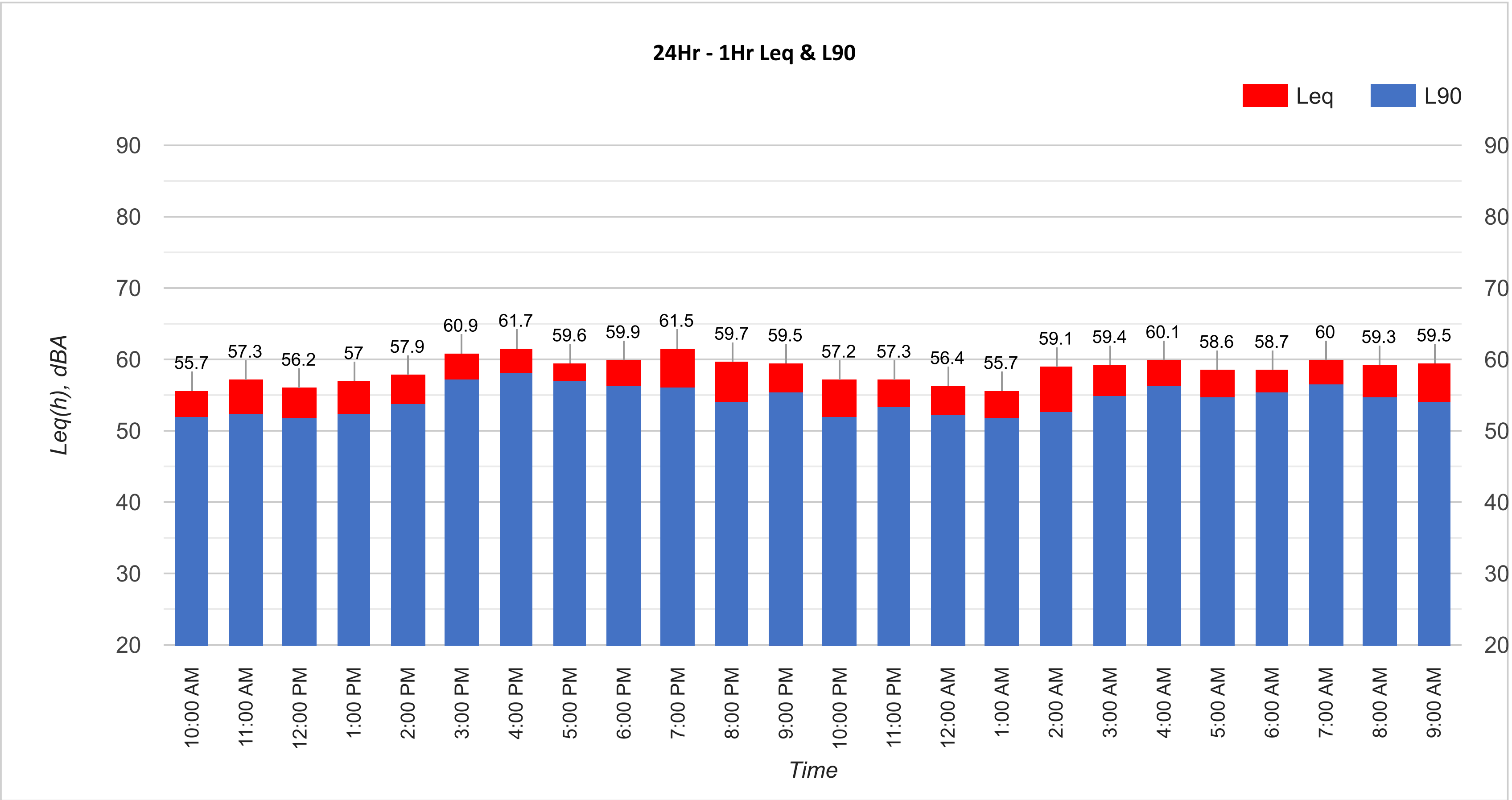
Meteorological Cond.: 65 degrees, winds 0 to 5 mph, sunny and clear with a few clouds

Ground Type: Dirt and desert vegetation

Day: 1 of 1

Noise Source(s) w/ Distance:

Road Noise 150 ft W Ave L



MD ACOUSTICS

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project Name: Maverik Lancaster Noise

Site Address/Location: 15th Street West and West Avenue

Site Id: LT-1

Site Topo: Flat

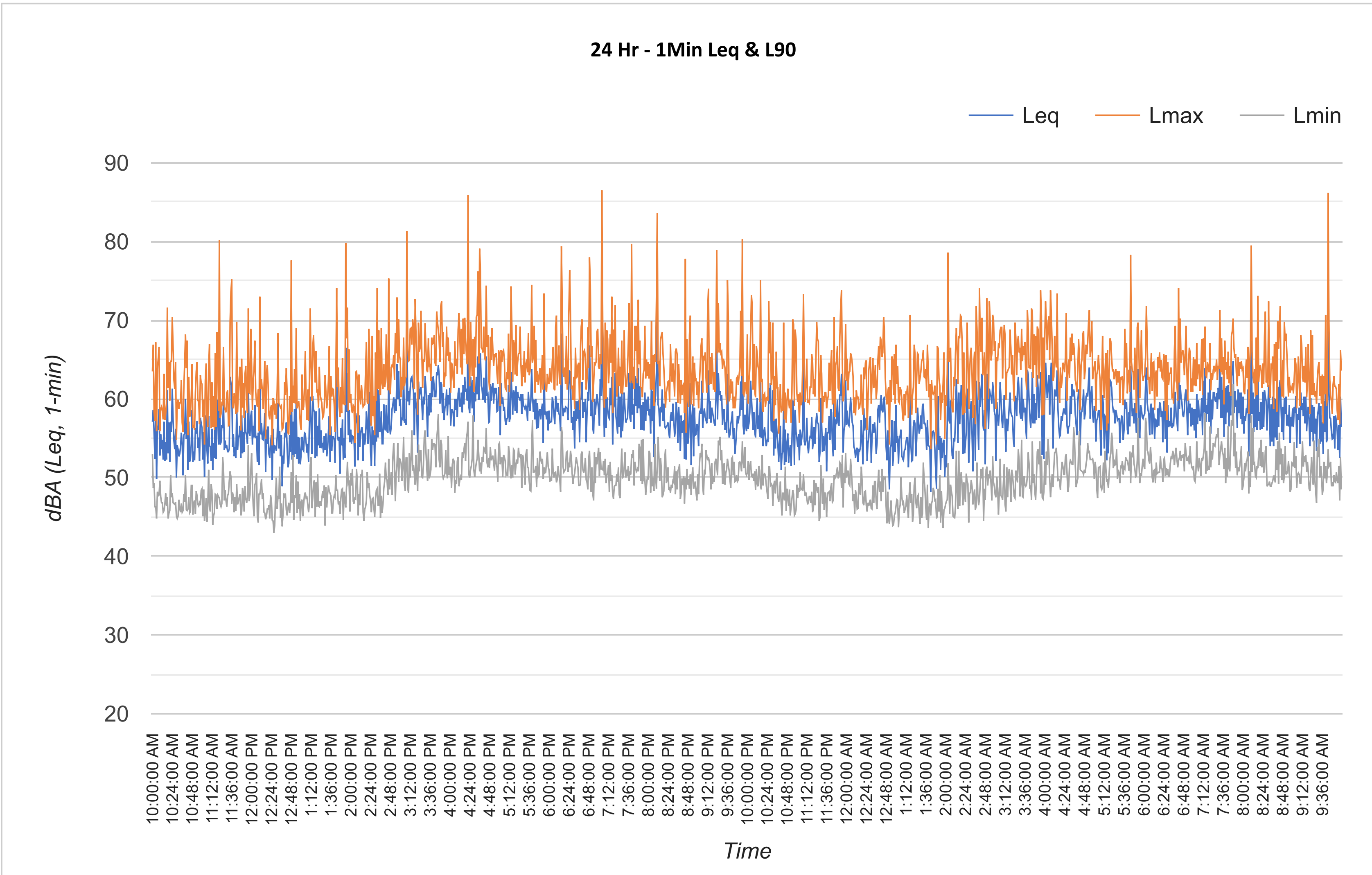
Meteorological Cond.: 65 degrees, winds 0 to 5 mph, sunny and clear with a few clouds

Ground Type: Dirt and desert vegetation

Day: 1 of 1

Noise Source(s) w/ Distance:

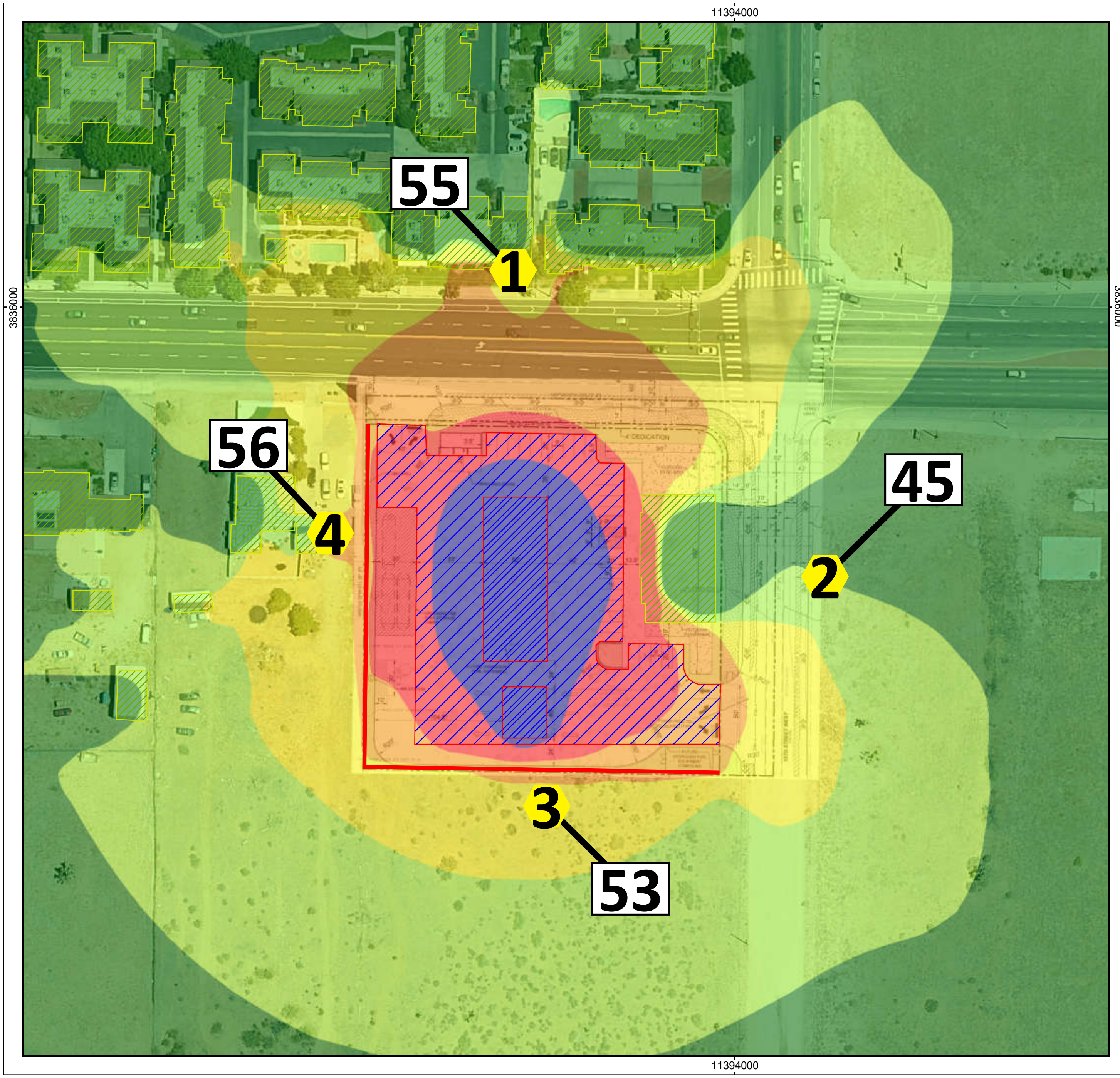
Road Noise 150 ft W Ave L



Appendix B:

SoundPLAN Noise Modeling Data

07412307_Maverik Lancaster Noise
CNEL Noise Level Contours
Fuel Pumps & Parking



Levels in dB(A)

Dark green	< 45
Light green	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Blue	>= 65

Signs and symbols

- Level table, dBA
- Buildings
- Fuel Pumps & Parking
- Point Receivers
- 5' CMU Wall

Length scale 1:80

0 50 100 200 300 fe

MD ACOUSTICS
Sound Solutions for Planning and Design

Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	12.5kHz dB(A)	16kHz dB(A)	20kHz dB(A)
Receiver R1 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 51.5 dB(A) Leq,e 51.7 dB(A) Leq,n 47.6 dB(A)																												
Leq,d	33.7	15.8	15.8	15.8	24.3	24.3	24.3	10.2	10.2	10.2	17.2	17.2	17.2	21.9	21.9	21.9	22.5	22.5	22.5	18.7	18.7	18.7	3.1	3.1	3.1	-38.1	-38.1	-38.1
Leq,e	33.7	15.8	15.8	15.8	24.3	24.3	24.3	10.2	10.2	10.2	17.2	17.2	17.2	21.9	21.9	21.9	22.5	22.5	22.5	18.7	18.7	18.7	3.1	3.1	3.1	-38.1	-38.1	-38.1
Leq,n	33.7	15.8	15.8	15.8	24.3	24.3	24.3	10.2	10.2	10.2	17.2	17.2	17.2	21.9	21.9	21.9	22.5	22.5	22.5	18.7	18.7	18.7	3.1	3.1	3.1	-38.1	-38.1	-38.1
Leq,d	50.8	32.1	32.1	32.1	41.3	41.3	41.3	28.8	28.8	28.8	35.1	35.1	35.1	39.1	39.1	39.1	39.7	39.7	39.7	35.3	35.3	35.3	23.1	23.1	23.1	-6.7	-6.7	-6.7
Leq,e	51.0	32.3	32.3	32.3	41.5	41.5	41.5	29.0	29.0	29.0	35.3	35.3	35.3	39.3	39.3	39.3	39.9	39.9	39.9	35.5	35.5	35.5	23.3	23.3	23.3	-6.5	-6.5	-6.5
Leq,n	47.4	28.7	28.7	28.7	37.9	37.9	37.9	25.4	25.4	25.4	31.7	31.7	31.7	35.7	35.7	35.7	36.3	36.3	36.3	31.9	31.9	31.9	19.8	19.8	19.8	-10.1	-10.1	-10.1
Leq,d	43.0	24.0	24.0	24.0	33.2	33.2	33.2	20.8	20.8	20.8	27.2	27.2	27.2	31.3	31.3	31.3	32.1	32.1	32.1	28.0	28.0	28.0	16.3	16.3	16.3	-10.8	-10.8	-10.8
Leq,e	43.4	24.4	24.4	24.4	33.6	33.6	33.6	21.2	21.2	21.2	27.6	27.6	27.6	31.7	31.7	31.7	32.4	32.4	32.4	28.4	28.4	28.4	16.7	16.7	16.7	-10.4	-10.4	-10.4
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Receiver R2 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 41.4 dB(A) Leq,e 41.6 dB(A) Leq,n 36.9 dB(A)																												
Leq,d	31.3	11.8	11.8	11.8	21.0	21.0	21.0	10.3	10.3	10.3	16.2	16.2	16.2	20.1	20.1	20.1	20.6	20.6	20.6	16.1	16.1	16.1	4.6	4.6	4.6	-29.5	-29.5	-29.5
Leq,e	31.3	11.8	11.8	11.8	21.0	21.0	21.0	10.3	10.3	10.3	16.2	16.2	16.2	20.1	20.1	20.1	20.6	20.6	20.6	16.1	16.1	16.1	4.6	4.6	4.6	-29.5	-29.5	-29.5
Leq,n	31.3	11.8	11.8	11.8	21.0	21.0	21.0	10.3	10.3	10.3	16.2	16.2	16.2	20.1	20.1	20.1	20.6	20.6	20.6	16.1	16.1	16.1	4.6	4.6	4.6	-29.5	-29.5	-29.5
Leq,d	38.9	24.2	24.2	24.2	30.4	30.4	30.4	17.6	17.6	17.6	19.2	19.2	19.2	26.6	26.6	26.6	26.7	26.7	26.7	21.7	21.7	21.7	6.5	6.5	6.5	-30.8	-30.8	-30.8
Leq,e	39.1	24.4	24.4	24.4	30.6	30.6	30.6	17.8	17.8	17.8	19.4	19.4	19.4	26.8	26.8	26.8	26.9	26.9	26.9	21.9	21.9	21.9	6.8	6.8	6.8	-30.6	-30.6	-30.6
Leq,n	35.5	20.8	20.8	20.8	27.0	27.0	27.0	14.2	14.2	14.2	15.8	15.8	15.8	23.2	23.2	23.2	23.3	23.3	23.3	18.4	18.4	18.4	3.2	3.2	3.2	-34.2	-34.2	-34.2
Leq,d	36.7	18.1	18.1	18.1	26.3	26.3	26.3	16.1	16.1	16.1	21.5	21.5	21.5	25.3	25.3	25.3	25.8	25.8	25.8	22.2	22.2	22.2	11.4	11.4	11.4	-14.6	-14.6	-14.6
Leq,e	37.1	18.5	18.5	18.5	26.7	26.7	26.7	16.5	16.5	16.5	21.8	21.8	21.8	25.6	25.6	25.6	26.2	26.2	26.2	22.6	22.6	22.6	11.7	11.7	11.7	-14.3	-14.3	-14.3
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												

Maverik Lancaster Noise
Contribution spectra - 001 - Maverik Lancaster Day Evening Night: Outdoor SP

Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	12.5kHz dB(A)	16kHz dB(A)	20kHz dB(A)
Leq,e																												
Leq,n																												
Receiver R3 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 49.1 dB(A) Leq,e 49.3 dB(A) Leq,n 45.7 dB(A)																												
Leq,d	40.5	21.5	21.5	21.5	31.0	31.0	31.0	22.6	22.6	22.6	27.0	27.0	27.0	27.9	27.9	27.9	28.4	28.4	28.4	25.1	25.1	25.1	16.7	16.7	16.7	-2.0	-2.0	-2.0
Leq,e	40.5	21.5	21.5	21.5	31.0	31.0	31.0	22.6	22.6	22.6	27.0	27.0	27.0	27.9	27.9	27.9	28.4	28.4	28.4	25.1	25.1	25.1	16.7	16.7	16.7	-2.0	-2.0	-2.0
Leq,n	40.5	21.5	21.5	21.5	31.0	31.0	31.0	22.6	22.6	22.6	27.0	27.0	27.0	27.9	27.9	27.9	28.4	28.4	28.4	25.1	25.1	25.1	16.7	16.7	16.7	-2.0	-2.0	-2.0
Leq,d	47.4	28.7	28.7	28.7	37.9	37.9	37.9	29.7	29.7	29.7	34.2	34.2	34.2	34.8	34.8	34.8	35.5	35.5	35.5	31.4	31.4	31.4	20.5	20.5	20.5	-4.7	-4.7	-4.7
Leq,e	47.7	28.9	28.9	28.9	38.1	38.1	38.1	29.9	29.9	29.9	34.4	34.4	34.4	35.0	35.0	35.0	35.7	35.7	35.7	31.6	31.6	31.6	20.7	20.7	20.7	-4.5	-4.5	-4.5
Leq,n	44.1	25.3	25.3	25.3	34.6	34.6	34.6	26.3	26.3	26.3	30.8	30.8	30.8	31.4	31.4	31.4	32.1	32.1	32.1	28.0	28.0	28.0	17.1	17.1	17.1	-8.1	-8.1	-8.1
Leq,d	41.7	22.9	22.9	22.9	32.2	32.2	32.2	23.9	23.9	23.9	28.4	28.4	28.4	29.0	29.0	29.0	29.6	29.6	29.6	25.7	25.7	25.7	15.8	15.8	15.8	-5.8	-5.8	-5.8
Leq,e	42.1	23.3	23.3	23.3	32.6	32.6	32.6	24.2	24.2	24.2	28.8	28.8	28.8	29.4	29.4	29.4	30.0	30.0	30.0	26.1	26.1	26.1	16.2	16.2	16.2	-5.4	-5.4	-5.4
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Receiver R4 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 52.4 dB(A) Leq,e 52.7 dB(A) Leq,n 48.4 dB(A)																												
Leq,d	34.5	15.1	15.1	15.1	24.2	24.2	24.2	15.9	15.9	15.9	20.6	20.6	20.6	22.4	22.4	22.4	23.1	23.1	23.1	20.0	20.0	20.0	9.1	9.1	9.1	-18.1	-18.1	-18.1
Leq,e	34.5	15.1	15.1	15.1	24.2	24.2	24.2	15.9	15.9	15.9	20.6	20.6	20.6	22.4	22.4	22.4	23.1	23.1	23.1	20.0	20.0	20.0	9.1	9.1	9.1	-18.1	-18.1	-18.1
Leq,n	34.5	15.1	15.1	15.1	24.2	24.2	24.2	15.9	15.9	15.9	20.6	20.6	20.6	22.4	22.4	22.4	23.1	23.1	23.1	20.0	20.0	20.0	9.1	9.1	9.1	-18.1	-18.1	-18.1
Leq,d	51.6	32.2	32.2	32.2	41.4	41.4	41.4	33.2	33.2	33.2	38.2	38.2	38.2	39.5	39.5	39.5	40.3	40.3	40.3	36.3	36.3	36.3	25.8	25.8	25.8	1.7	1.7	1.7
Leq,e	51.8	32.4	32.4	32.4	41.6	41.6	41.6	33.4	33.4	33.4	38.4	38.4	38.4	39.7	39.7	39.7	40.5	40.5	40.5	36.6	36.6	36.6	26.0	26.0	26.0	1.9	1.9	1.9
Leq,n	48.3	28.8	28.8	28.8	38.0	38.0	38.0	29.9	29.9	29.9	34.8	34.8	34.8	36.1	36.1	36.1	36.9	36.9	36.9	33.0	33.0	33.0	22.4	22.4	22.4	-1.7	-1.7	-1.7
Leq,d	44.2	24.9	24.9	24.9	34.3	34.3	34.3	25.9	25.9	25.9	30.7	30.7	30.7	31.9	31.9	31.9	32.6	32.6	32.6	29.0	29.0	29.0	19.2	19.2	19.2	-1.7	-1.7	-1.7
Leq,e	44.6	25.3	25.3	25.3	34.6	34.6	34.6	26.3	26.3	26.3	31.1	31.1	31.1	32.3	32.3	32.3	33.0	33.0	33.0	29.3	29.3	29.3	19.5	19.5	19.5	-1.3	-1.3	-1.3
Leq,n																												
Leq,d																												
Leq,e																												
Leq,n																												
Leq,d																												
Leq,e																												

Maverik Lancaster Noise
Contribution spectra - 001 - Maverik Lancaster Day Evening Night: Outdoor SP

Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	12.5kHz dB(A)	16kHz dB(A)	20kHz dB(A)
Leq,n Leq,d Leq,e Leq,n																												

Maverik Lancaster Noise
Contribution level - 001 - Maverik Lancaster Day Evening Night:

Source group	Source type	Tr. lane	Leq,d dB(A)	Leq,e dB(A)	Leq,n dB(A)	A dB
Receiver R1 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 51.5 dB(A) Leq,e 51.7 dB(A) Leq,n 47.6 dB(A)						
Default parking lot noise	PLot		43.0	43.4		0.0
Default parking lot noise	PLot		33.7	33.7	33.7	0.0
Default parking lot noise	PLot		50.8	51.0	47.4	0.0
Receiver R2 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 41.4 dB(A) Leq,e 41.6 dB(A) Leq,n 36.9 dB(A)						
Default parking lot noise	PLot		36.7	37.1		0.0
Default parking lot noise	PLot		31.3	31.3	31.3	0.0
Default parking lot noise	PLot		38.9	39.1	35.5	0.0
Receiver R3 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 49.1 dB(A) Leq,e 49.3 dB(A) Leq,n 45.7 dB(A)						
Default parking lot noise	PLot		41.7	42.1		0.0
Default parking lot noise	PLot		40.5	40.5	40.5	0.0
Default parking lot noise	PLot		47.4	47.7	44.1	0.0
Receiver R4 Fl G Lr,lim dB(A) Lr,lim dB(A) Lr,lim dB(A) Leq,d 52.4 dB(A) Leq,e 52.7 dB(A) Leq,n 48.4 dB(A)						
Default parking lot noise	PLot		44.2	44.6		0.0
Default parking lot noise	PLot		34.5	34.5	34.5	0.0
Default parking lot noise	PLot		51.6	51.8	48.3	0.0

Maverik Lancaster Noise
Octave spectra of the sources in dB(A) - 001 - Maverik Lancaster Day Evening Night: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
	PLot	140.20			54.6	76.0	0.0	0.0		0	Diesel Fuel	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
	PLot	643.81			54.5	82.6	0.0	0.0		0	Pump Hours	Typical spectrum	66.0	77.6	70.1	74.6	74.7	75.1	72.4	66.2	53.4
Auto Parking	PLot	4487.71			48.7	85.3	0.0	0.0		0	Convenience Store	Typical spectrum	68.6	80.2	72.7	77.2	77.3	77.7	75.0	68.8	56.0

Appendix C:

FHWA Roadway Noise Modeling Worksheets


TRAFFIC VOLUME FLOW MAP
LEGEND
0 - 10,000
10,001 - 20,000
20,001 - 30,000
30,001 - 40,000
40,001 +
24 HRS (Mid block) volumes shown on map in thousands (000) based on counts made 2000, 2001, 2003, 2004, 2005, 2006, 2007, 2008, 2010, 2012, 2013, 2014, 2019
110th St W
100th St W
90th St W
80th St W
70th St W
60th St W
50th St W
40th St W
30th St W
20th St W
10th St W
Sierra Hwy
Division St
Challenger Way
20th St E
30th St E
40th St E
50th St E
60th St E
70th St E
80th St E
90th St E
100th St E
Avenue E
Avenue F
Avenue G
Avenue H
Avenue I
Lancaster Blvd
Avenue J
Avenue K
Avenue L
Columbia Way
Avenue N
Los Angeles County
LANCASTER

City of Lancaster
TRAFFIC - CEQA INITIAL STUDY

Tracking Number: PR 22-23 *Date:* 8/24/2022

Project Location: SWC Ave L & 15th W
Description: 20-fueling station mini-mart, 6,100 SF MINI-MART
Buildout Date: ?
Existing Land Uses: None
Existing Land Use Active: No

Project Trip Generation

Land Use		Size		Trip Rate			Trips		
Classification	Code	U/M	Qty	Daily	AM	PM	Daily	AM	PM
Mini-Mart w/ Fueling Sta	960	FS	20.000	345.75	31.60	26.90	6,915	632	538
50% By-Pass Reduction							-3,458	-316	-269
Net Total Mini-Mart							3,458	316	269
NEW NET TRIPS							3,458	316	269

* ITE Trip Generation 11th Edition

Site access and circulation are NOT A PART of ths initial assessment.

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Maverik Lancaster
ROADWAY: West Avenue L
LOCATION: West Avenue L (E) ST1

JOB #: 0741-2023-07
DATE: 13-Jun-23
ENGINEER: S. Hord

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,000
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DI:	60
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	2,900

RECEIVER INPUT DATA

RECEIVER DISTANCE =		152
DIST C/L TO WALL =		80
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		72
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15
MEDIUM TRUCKS =	15
HEAVY TRUCKS =	15

(10 = HARD SITE, 15 = SOFT SITE)

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	149.05	- -
MEDIUM TRUCKS	4.0	149.02	- -
HEAVY TRUCKS	8.0	149.03	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	64.9	63.0	61.3	55.2	63.8	64.4
MEDIUM TRUCKS	55.4	53.8	47.5	45.9	54.4	54.6
HEAVY TRUCKS	55.6	54.2	45.2	46.4	54.8	54.9
NOISE LEVELS (dBA)	65.8	64.0	61.5	56.2	64.7	65.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.9	63.0	61.3	55.2	63.8	64.4
MEDIUM TRUCKS	55.4	53.8	47.5	45.9	54.4	54.6
HEAVY TRUCKS	55.6	54.2	45.2	46.4	54.8	54.9
NOISE LEVELS (dBA)	65.8	64.0	61.5	56.2	64.7	65.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	74	159	342	736
LDN	68	146	315	679

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Maverik Lancaster
ROADWAY: West Avenue L
LOCATION: West Avenue L (E+P) ST1

JOB #: 0741-2023-07
DATE: 13-Jun-23
ENGINEER: S. Hord

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT = 32,458
SPEED = 50
PK HR % = 10
NEAR LANE/FAR LANE DIS 60
ROAD ELEVATION = 0.0
GRADE = 1.0 %
PK HR VOL = 3,246

RECEIVER INPUT DATA

RECEIVER DISTANCE = 152
DIST C/L TO WALL = 80
RECEIVER HEIGHT = 5.0
WALL DISTANCE FROM RECEIVER 72
PAD ELEVATION = 0.5
ROADWAY VIEW: LF ANGLE= -90
RT ANGLE= 90
DF ANGLE= 180

SITE CONDITIONS

AUTOMOBILES = 15
MEDIUM TRUCKS = 15
HEAVY TRUCKS = 15

(10 = HARD SITE, 15 = SOFT SITE)

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	149.05	- -
MEDIUM TRUCKS	4.0	149.02	- -
HEAVY TRUCKS	8.0	149.03	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	65.4	63.5	61.7	55.7	64.3	64.9
MEDIUM TRUCKS	55.8	54.3	48.0	46.4	54.9	55.1
HEAVY TRUCKS	56.1	54.7	45.7	46.9	55.3	55.4
NOISE LEVELS (dBA)	66.3	64.5	62.0	56.7	65.2	65.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.4	63.5	61.7	55.7	64.3	64.9
MEDIUM TRUCKS	55.8	54.3	48.0	46.4	54.9	55.1
HEAVY TRUCKS	56.1	54.7	45.7	46.9	55.3	55.4
NOISE LEVELS (dBA)	66.3	64.5	62.0	56.7	65.2	65.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	79	171	368	793
LDN	73	158	340	732

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Maverik Lancaster	JOB #:	0741-2023-07
ROADWAY:	West Avenue L	DATE:	13-Jun-23
LOCATION:	West Avenue L (E) ST2	ENGINEER:	S. Hord

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,000
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIS	60
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	2,900

RECEIVER INPUT DATA

RECEIVER DISTANCE =		70
DIST C/L TO WALL =		80
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		(10)
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15
MEDIUM TRUCKS =	15
HEAVY TRUCKS =	15

(10 = HARD SITE, 15 = SOFT SITE)

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	63.34	- -
MEDIUM TRUCKS	4.0	63.26	- -
HEAVY TRUCKS	8.0	63.30	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	70.5	68.6	66.8	60.8	69.4	70.0
MEDIUM TRUCKS	60.9	59.4	53.1	51.5	60.0	60.2
HEAVY TRUCKS	61.2	59.8	50.7	52.0	60.3	60.5
NOISE LEVELS (dBA)	71.4	69.6	67.1	61.7	70.3	70.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	70.5	68.6	66.8	60.8	69.4	70.0
MEDIUM TRUCKS	60.9	59.4	53.1	51.5	60.0	60.2
HEAVY TRUCKS	61.2	59.8	50.7	52.0	60.3	60.5
NOISE LEVELS (dBA)	71.4	69.6	67.1	61.7	70.3	70.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	80	172	370	798
LDN	74	159	342	736

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Maverik Lancaster	JOB #:	0741-2023-07
ROADWAY:	West Avenue L	DATE:	13-Jun-23
LOCATION:	West Avenue L (E+P) ST2	ENGINEER:	S. Hord

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	32,458
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIS	60
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	3,246

RECEIVER INPUT DATA

RECEIVER DISTANCE =		70
DIST C/L TO WALL =		80
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		(10)
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15
MEDIUM TRUCKS =	15
HEAVY TRUCKS =	15

(10 = HARD SITE, 15 = SOFT SITE)

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	63.34	- -
MEDIUM TRUCKS	4.0	63.26	- -
HEAVY TRUCKS	8.0	63.30	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	71.0	69.1	67.3	61.3	69.9	70.5
MEDIUM TRUCKS	61.4	59.9	53.6	52.0	60.5	60.7
HEAVY TRUCKS	61.7	60.3	51.2	52.5	60.8	61.0
NOISE LEVELS (dBA)	71.9	70.1	67.6	62.2	70.8	71.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	71.0	69.1	67.3	61.3	69.9	70.5
MEDIUM TRUCKS	61.4	59.9	53.6	52.0	60.5	60.7
HEAVY TRUCKS	61.7	60.3	51.2	52.5	60.8	61.0
NOISE LEVELS (dBA)	71.9	70.1	67.6	62.2	70.8	71.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	86	185	399	860
LDN	79	171	368	793

Appendix D:

Construction Noise Modeling Output

Receptor - Residences 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									
Grader	1	85	63	163	40	0.66	0.40	82.3	67.4
Scraper	1	84	63	163	40	0.66	0.40	81.3	66.4
Tractor	1	84	63	163	40	0.66	0.40	81.3	66.4
							Log Sum	82.3	71.5
GRADE									
Grader	1	85	63	163	40	0.66	0.40	82.3	67.4
Dozer	1	82	63	163	40	0.66	0.40	79.3	64.4
Tractor	2	84	63	163	40	0.66	0.40	81.3	66.4
								82.3	72.3
BUILD									
Crane	1	81	63	163	16	0.66	0.16	78.3	59.4
Man lift	2	75	63	163	20	0.66	0.20	72.3	54.4
Generator	1	81	63	163	50	0.66	0.50	78.3	64.3
Tractor	1	84	63	163	40	0.66	0.40	81.3	66.4
Welder/Torch	3	74	63	163	40	0.66	0.40	71.3	56.4
								81.3	69.9
PAVE									
Paver	1	77	63	163	50	0.66	0.50	74.3	60.3
Compactor (ground)	1	83	63	163	20	0.66	0.20	80.3	62.4
Roller	2	80	63	163	20	0.66	0.20	77.3	59.4
Tractor	1	84	63	163	40	0.66	0.40	81.3	66.4
Drum Mixer	1	80	63	163	50	0.66	0.50	77.3	63.3
								81.3	69.5
ARCH COAT									
Compressor (air)	1	78	63	163	40	0.66	0.40	75.3	60.4
								75.3	60.4

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

[2]FTA Transit Noise and Vibration Impact Assesment Manual Section 7.1, 0.66 for soft ground and 0 for hard ground

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									
Grader	1	85	116	268	40	0.66	0.40	75.3	61.6
Scraper	1	84	116	268	40	0.66	0.40	74.3	60.6
Tractor	1	84	116	268	40	0.66	0.40	74.3	60.6
							Log Sum	75.3	65.8
GRADE									
Grader	1	85	116	268	40	0.66	0.40	75.3	61.6
Dozer	1	82	116	268	40	0.66	0.40	72.3	58.6
Tractor	2	84	116	268	40	0.66	0.40	74.3	60.6
								75.3	66.5
BUILD									
Crane	1	81	116	268	16	0.66	0.16	71.3	53.6
Man lift	2	75	116	268	20	0.66	0.20	65.3	48.6
Generator	1	81	116	268	50	0.66	0.50	71.3	58.6
Tractor	1	84	116	268	40	0.66	0.40	74.3	60.6
Welder/Torch	3	74	116	268	40	0.66	0.40	64.3	50.6
								74.3	64.2
PAVE									
Paver	1	77	116	268	50	0.66	0.50	67.3	54.6
Compactor (ground)	1	83	116	268	20	0.66	0.20	73.3	56.6
Roller	2	80	116	268	20	0.66	0.20	70.3	53.6
Tractor	1	84	116	268	40	0.66	0.40	74.3	60.6
Drum Mixer	1	80	116	268	50	0.66	0.50	70.3	57.6
								74.3	63.7
ARCH COAT									
Compressor (air)	1	78	116	268	40	0.66	0.40	68.3	54.6
								68.3	54.6

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

[2]FTA Transit Noise and Vibration Impact Assesment Manual Section 7.1, 0.66 for soft ground and 0 for hard ground

Appendix E:

Construction Vibration Modeling Output

VIBRATION LEVEL IMPACT

Project:	Date Palm Rosemount	Date: 6/13/23
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Adjacent residences	
Address:	Date Palm and Rosemount	

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

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	163.00	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 =	**0.011**	IN/SEC	OUTPUT IN RED