Chula Vista Nirvana Business Park

Noise Impact Study

City of Chula Vista, CA

Prepared for:

Mr. Steven Schwarz
VWP-OP Nirvana Owner, LLC
2390 E. Camelback Rd. Ste. 305
Phoenix, AZ 85016

Prepared by:

MD Acoustics, LLC
Mike Dickerson, INCE
Robert Pearson
1197 Los Angeles Avenue, Ste 256
Simi Valley, CA 93065

Date: 1/24/2023

MD ACOUSTICS
Sound Solutions for Planning and Design

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An evaluation of the existing ambient noise environment
- An analysis of stationary noise impacts from the project site to adjacent land uses
- Construction noise and vibration evaluation

1.2 Site Location and Study Area

The project site is located at 821 Main Street between Nirvana Avenue and Heritage Road in the City of Chula Vista, San Diego County, California as shown in Exhibit A. The site is currently designated Limited Industrial (IL) according to the City of Chula Vista General Plan Land Use Diagram and the proposed use is industrial. Land uses surrounding the site include retention area for Escaya to the east, heavy industrial uses to the north like LKQ Pick Your Part ,heavy industrial uses to the west like Bradford Powder Coating, and Main Street to the south with open space further south. The closest existing sensitive receptors (to the site area) are the single-family residential land uses located approximately 1,425 feet (~435 meters) northeast and 1,430 feet (~436 meters) southwest of the project site.

1.3 Proposed Project Description

The approximately 13.31-acre project site is proposed to be developed with three new industrial buildings and one new storage building totaling 299,218 square feet of industrial building. Hours of operation for the business park are planned to be Monday through Friday 6:00 a.m. to 6:00 p.m. and Saturday 6:00 a.m. to noon. The self-storage facilities will have 24/7 access. Exhibit B demonstrates the site plan for the project.

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

Exhibit A

Location Map

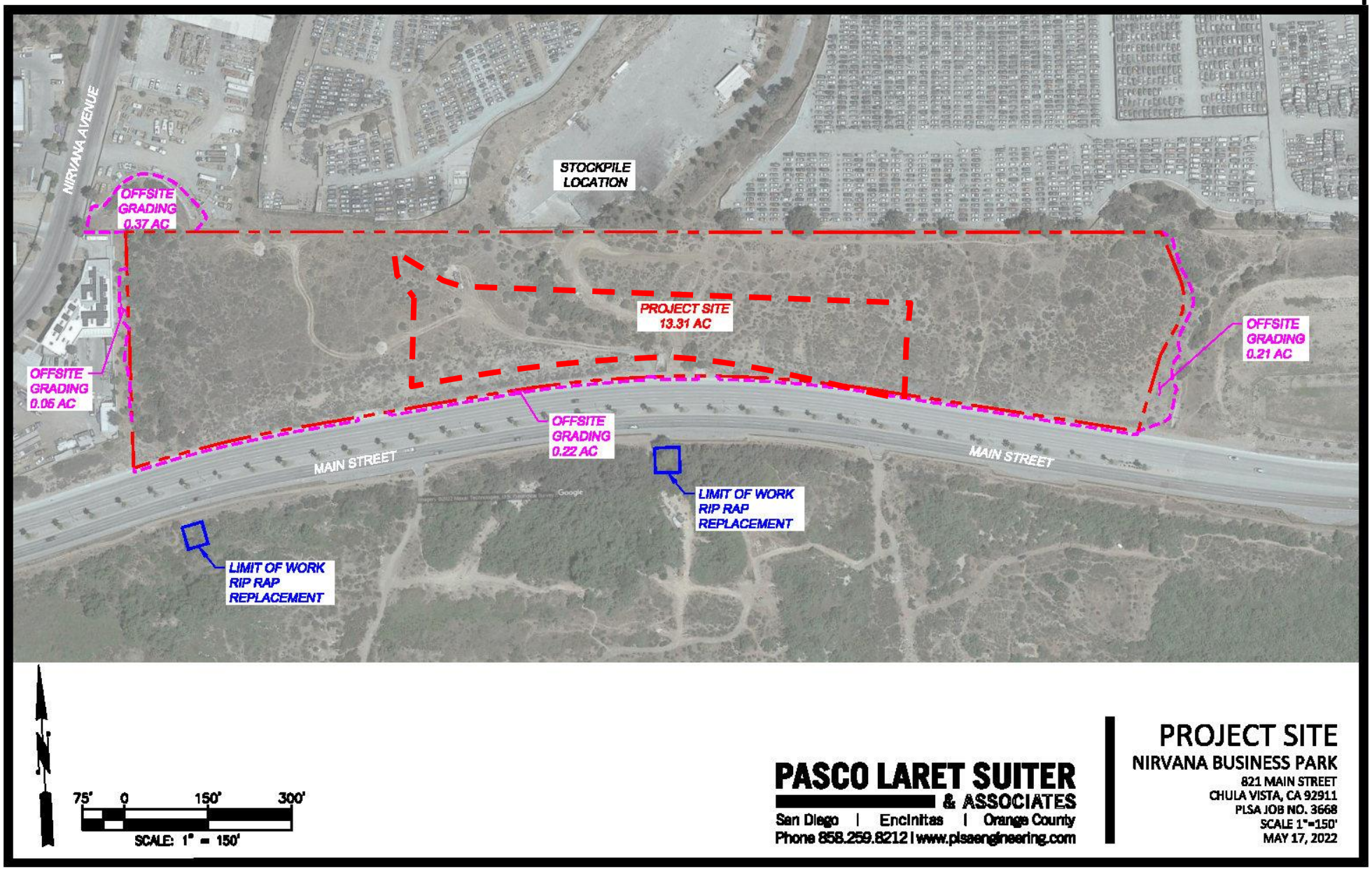
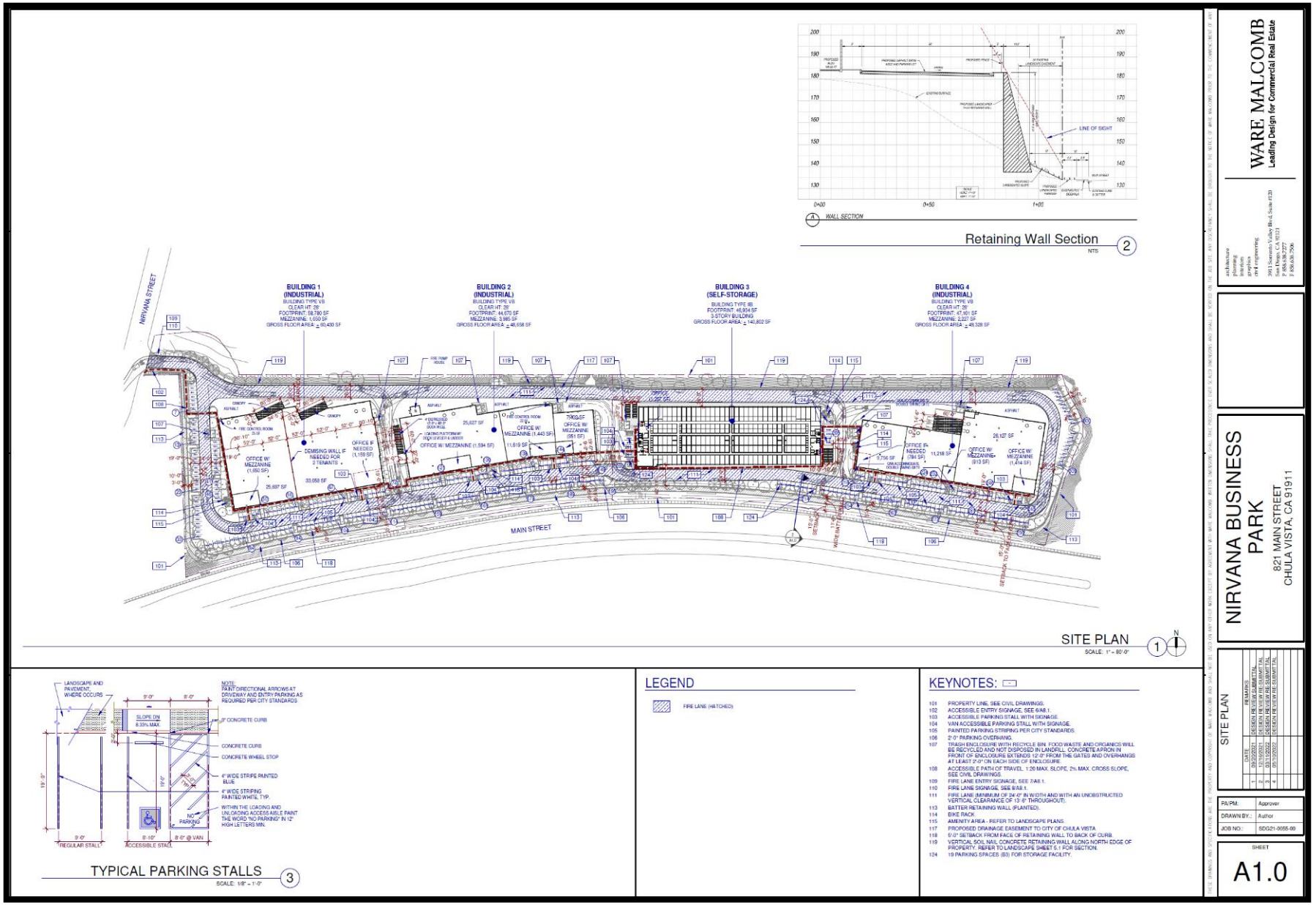


Exhibit B

Site Plan



2.0 Fundamentals of Noise

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

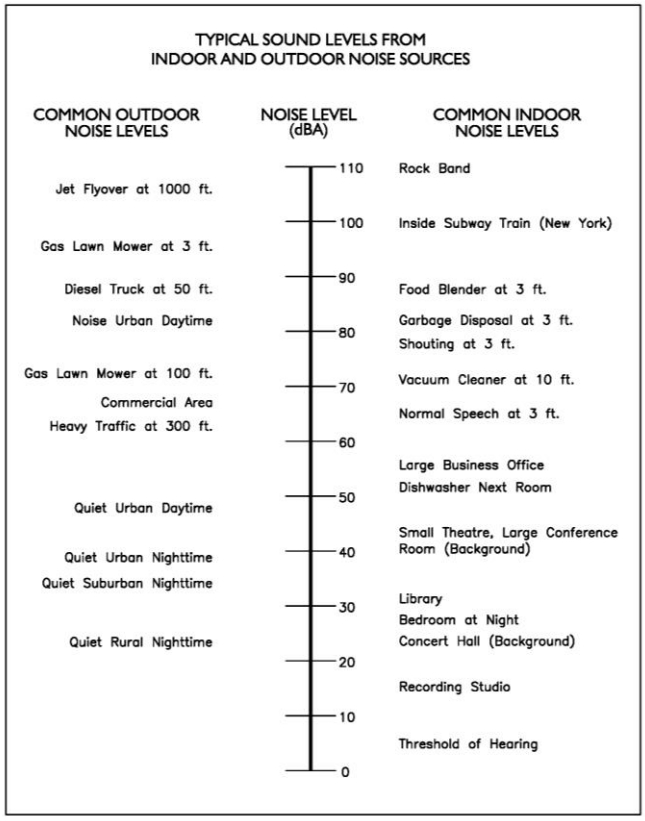
2.1 Sound, Noise and Acoustics

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 out at 20 Hz all the way to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter ($\mu N/m^2$), also called micro-Pascal (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels, abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

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

2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, 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), a scale designed to account for the frequency-dependent sensitivity of the ear. 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.

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 addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 Sound Propagation

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

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver.

Soft site conditions such as grass, soft dirt or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

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

3.0 Ground-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.

3.3 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

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

4.0 Regulatory Setting

The proposed project is located in the City of Chula Vista, 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 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 development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the 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 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan.

The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines

TABLE 9-2
EXTERIOR LAND USE/NOISE COMPATIBILITY GUIDELINES

	Annual CNEL in Decibels					
Land Use	50	55	60	65	70	75
Residential						
Schools, Libraries, Daycare Facilities, Convalescent Homes, Outdoor Use Areas, and Other Similar Uses Considered Noise Sensitive						
Neighborhood Parks, Playgrounds						
Community Parks, Athletic Fields						
Offices and Professional						
Places of Worship (excluding outdoor use areas)						
Golf Courses						
Retail and Wholesale Commercial, Restaurants, Movie Theaters						
Industrial, Manufacturing						

4.3 City of Chula Vista Noise Regulations

The City of Chula Vista outlines their noise regulations and standards within the Municipal Code Chapter 19.68 and Chapter 9 of the Environmental Element of the City of Chula Vista General Plan.

City of Chula Vista Municipal Code

SEC. 19.68.030 – Exterior noise limits

19.68.030(A)(4) No person shall operate, or cause to be operated, any source of sound at any location within the City or allow the creation of any noise on property owned, leased occupied or otherwise controlled by such person which causes the noise level to exceed the environmental and/or nuisance interpretation of the applicable limits given in Table III.

Table 1: Table III Exterior Noise Limits

Sound Level Standards (dBA Leq)*

Receiving Land Use Category	Noise Level [dB(A)]	
	10 p.m. to 7 a.m. (Weekdays)	7 a.m. to 10 p.m. (Weekdays)
	10 p.m. to 8 a.m. (Weekends)	8 a.m. to 10 p.m. (Weekends)
All residential (except multiple dwelling)	45	55
Multiple dwelling residential	50	60
Commercial	60	65
Light industry - I-R and I-L zone	70	70
Heavy industry – I zone	80	80

SEC. 19.68.040 – Interior noise limits.

No person shall operate, or cause to be operated, any source of sound within a residential dwelling unit or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured inside a neighboring receiving dwelling unit to exceed the environmental and/or nuisance interpretation of the applicable limits given in Table IV.

Table 2: Table IV Maximum permissible dwelling interior sound levels

		Noise Level [dB(A)]		
Type of Land Use	Time Interval	Any time	1 min in 1 hr	5 min in 1 hr
Multifamily	10 pm – 7 am	45	40	35
Residential	7 am – 10 pm	55	50	45

Sec. 19.68.060(C) - Exemptions.

Exemption from Exterior Noise Standards. The provisions of CVMC 19.68.030 shall not apply to activities covered by the following sections:
(2) Construction/demolition.

City of Chula Vista General Plan

Chapter 9. Environmental from the City's General Plan includes Section 3.5 Noise. Section 3.5.1 describes noise planning and standards, and the exterior land use/noise compatibility guidelines. The General Plan includes objectives and policies with the goal of protecting the community from noise impacts.

Objective – E 21: Protect people from excessive noise through careful land use planning and the incorporation of appropriate mitigation techniques

E 21.1 Apply the exterior land use-noise compatibility guidelines listed in Table 9-2 of this Environmental Element to new development, where applicable, and in light of project-specific considerations

E 21.1 Where applicable, the assessment and mitigation of interior noise levels shall adhere to the applicable requirements of the California Building Code with local amendments and other applicable established City standards.

E 21.3 Promote the use of available technologies in building construction to improve noise attenuation capacities.

E 21.4 Continue to implement and enforce the City's noise control ordinance.

Objective – E 22 Protect the community from the effects of transportation noise.

E 22.1 Work to stabilize traffic volumes in residential neighborhoods by limiting throughways and by facilitating the use of alternative routes around, rather than through, Neighborhoods.

E 22.2 Explore the feasibility of using new technologies to minimize traffic noise, such as use of rubberized asphalt in road surface materials.

E 22.3 Employ traffic calming measures, where appropriate, such as narrow roadways and on-street parking, in commercial and mixed use districts.

E 22.4 Encourage walking; biking; carpooling; use of public transit; and other alternative modes of transportation to minimize vehicular use and associated traffic noise.

E 22.5 Require projects to construct appropriate mitigation measures in order to attenuate existing and projected traffic noise levels, in accordance with applicable standards, including the exterior land use/noise compatibility guidelines listed in Table 9-2 of this Environmental Element.

Brown Field Airport

The project is located in Area 2 of the Brown Field Airport Land Use Compatibility. However, the project is outside the noise contours of the Brown Field Airport and will not be impacted by the airport.

Construction

Section 17.24.040 (C)(8) states that the use of any tools, power machinery, or equipment or the conduct of construction and building work in residential zones so as to cause noises disturbing to the peace, comfort, and quiet enjoyment of property of any person residing or working in the vicinity between the hours of 10:00 p.m. and 7:00 a.m., Monday through Friday, and between the hours of

10:00 p.m. and 8:00 a.m., Saturday and Sunday, except when the work is necessary for emergency repairs required for the health and safety of any member of the community;

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 City's noise ordinance, the Federal Highway Transportation (FHWA) 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, lawn mowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the project site's boundary. Three (3) short-term 10-minute noise measurements were conducted at the site's property lines and is illustrated in Exhibit E. Appendix A includes photos, field sheet, and measured noise data.

5.3 Stationary Noise Modeling

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

The future worst-case noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces and loading docks). The model assumes that the

building facility has a total of five (5) dock high truck doors and sixteen (16) grade level truck doors for loading and unloading, and approximately 309 parking spaces.

Trucks idling at the dock high door loading and unloading area were modeled as a point source with a reference noise level of 74 dBA 10 feet from the source idling continuously for an hour. This is a conservative measure as the trucks will likely only idle for a few minutes within an hour.

Truck back up beepers at the grade level door loading and unloading areas were modeled as a point source with a reference noise level of 69 dBA Leq at 5 ft active for 5 minutes in an hour.

MD added two 7.5-ton HVAC units to the corners each building to account for HVAC noise. There are no parapets in the model as a worst-case. The actual HVAC equipment will likely be much quieter and placed further from the edges of the building.

The cars idling and coming and going in the parking spots were modeled at 3 cars per hour.

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

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

Table 3: Reference Sound Level Measurements for SoundPlan Model[1]

Source	Source Type	Reference Level (dBA)	Descriptor
Idling Semi Truck	Point Source	74	10ft
Parking	Area (SP Parking Tool)	-	3 cars per hr
Back Up Beeper	Point Source	69	5ft
Carrier 7.5 ton HVAC units	Point	83	Sound Power

1. Reference noise levels in Appendix B

5.4 FHWA Traffic Noise Prediction Model

Per the Local Mobility Analysis *Local Mobility Analysis, Chula Vista, California* existing traffic counts measured 14,260 ADT. The project is anticipated to create 153 ADT. Existing plus Project ADT are anticipated to create a 0.7 dB increase in noise level. Therefore, the increase in traffic noise would be negligible when compared to the existing noise

Traffic noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model predicts a noise level increment of 3 dB per doubling the traffic volume. Roadway volumes and percentages correspond to the project's

traffic scoping agreement, The City's traffic counts, and roadway classification. The traffic data is included in Appendix D.

Table 4 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 4: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT[1]	Existing Plus Project ADT[1]	Cumulative Distribution[1]	Speed (MPH)	Site Conditions
Main Street	Nirvana Ave to Heritage Rd	14,260	14,413	16,719	50	Hard

Vehicle Distribution (Truck Mix)[2]				
Motor-Vehicle Type	**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles	77.5	12.9	9.6	97.42
Medium Trucks	84.8	4.9	10.3	1.84
Heavy Trucks	86.5	2.7	10.8	0.74

Notes:
[1] Traffic counts provided by Linscott Law & Greenspan. This model takes the total ADT and uses the vehicle distribution mix for the calculations.
[2] Vehicle mix distribution per SANDAG.

5.5 FHWA Roadway Construction Noise Model

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

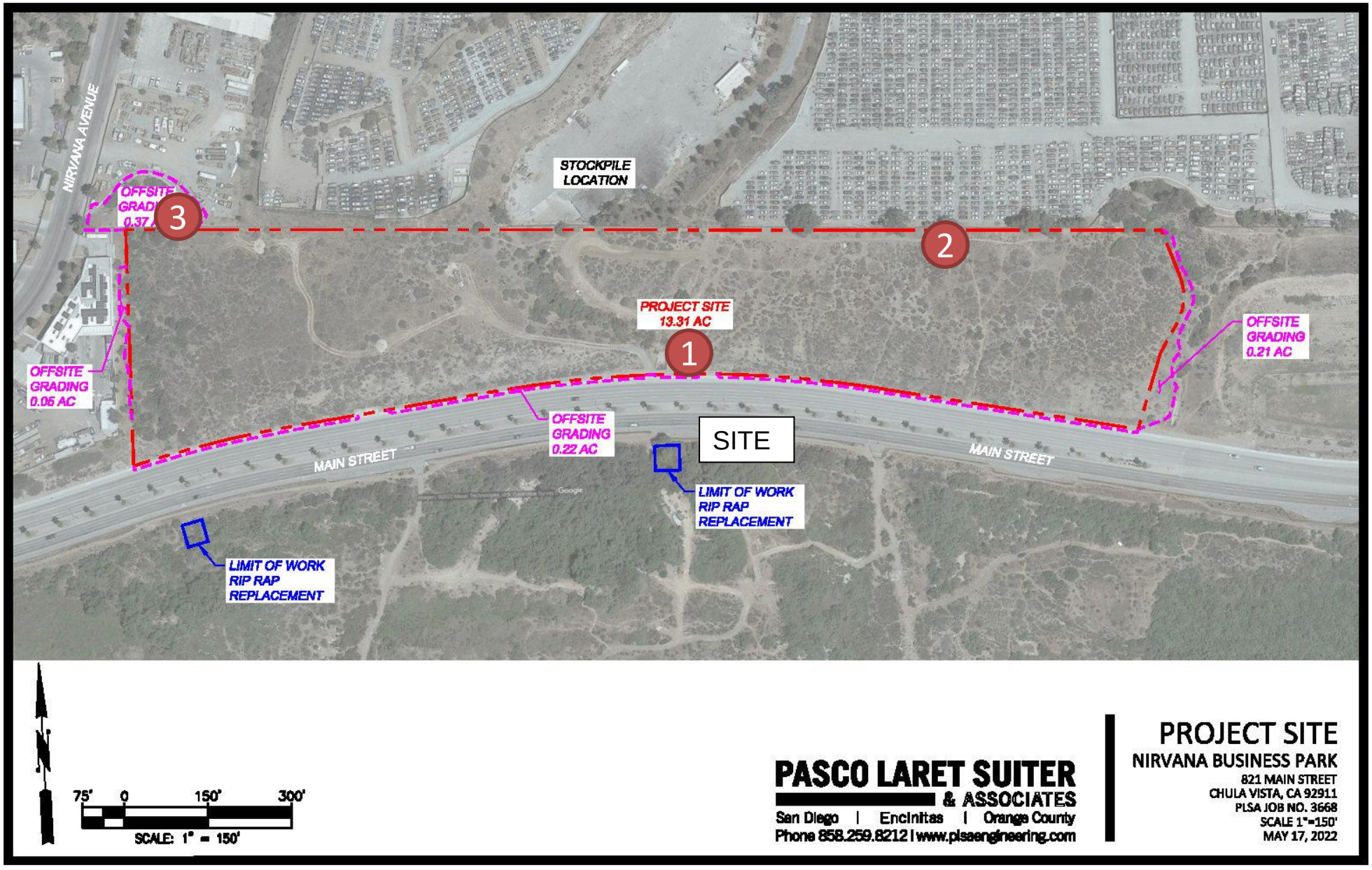
The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, paving, and building phases of construction. The construction noise calculation output worksheet is located in Appendix E. of the Noise Impact Study (Appendix M). The following assumptions relevant to short-term construction noise impacts were used:

- It is estimated that construction will be carried out over 24-months. Daily construction hours are expected to be during allowable daytime hours per the City's Municipal Code. The model includes key inputs like distance to the sensitive receiver, equipment type, and 40% usage factor. Construction noise is expected to be the loudest during the grading, paving, and building phases.

Exhibit E

Measurement Locations

1 = Short term measurement



6.0 Existing Noise Environment

Three (3) ten-minute short-term ambient noise measurements were conducted at the property boundary to the south, northwest, and northeast (See Appendix A). The measurement measured the Leq, Lmin, Lmax and other statistical data (e.g., L2, L8…). The noise measurement was taken to determine the existing ambient noise levels. Noise data indicates that traffic along main street and general industrial noise is the primary source of noise impacting the site and the adjacent uses. This assessment utilizes the ambient noise data as a basis and compares project operational levels to said data.

6.1 Short-Term Noise Measurement Results

The results of the noise data are presented in Table 5.

Table 5: Short-Term Noise Measurement Data (dBA)

Location	Time	dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
1	7:29PM-7:39PM	74	89	51	82	79	75	70	56
2	7:40PM-7:50PM	56	69	49	63	60	56	54	52
3	1:23PM-1:33PM	62	74	54	66	64	63	61	90

Notes:
1. Short-term noise monitoring location is illustrated in Exhibit E.

Noise data indicates the ambient noise level ranged between 56 dBA Leq to 74 dBA Leq near project site and surrounding area. Maximum levels reach 89 dBA as a result of traffic along Main Street. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the ambient noise level and has compared the project's projected noise levels to the said ambient level.

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts as a result of the project. The analysis details the estimated exterior noise levels. Stationary noise impacts are analyzed from the on-site noise sources such as trucks loading and unloading.

7.1 Future Exterior Noise

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

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

Adjacent uses that may be affected by project operational noise include general industrial to the north, south, east, and west. The single-family residential land uses located approximately 1,425 feet northeast and 1,430 feet southwest of the project site will not be affected by the project. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes that all project activities are always operational when in reality the noise will be intermittent and cycle on/off depending on usage.

A total of three (3) receptors were modeled to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent a property line or building facade.

This study compares the Project's operational noise levels to two (2) different noise assessment scenarios: 1) Project Only operational noise level projections, 2) Project plus ambient noise level projections.

Project Operational Noise Levels

Exhibit F shows the "project only" operational noise levels at the property lines and adjacent areas. Exhibit F shows the noise contours at the project site and illustrates how the noise will propagate at the site. Project only noise levels range from 46 to 58 dBA.

Project Plus Ambient Operational Noise Levels

Table 6 demonstrates the project plus the ambient noise levels. Project plus ambient noise level projections are anticipated to measure 60 to 74 dBA Leq at receptors (R1 – R3).

<Table 6 Next Page>

Table 6: Worst-case Predicted Operational Leq Noise Level[1]

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Leq)	Total Combined Noise Level (dBA, Leq(h))	Exterior Noise Limit Nighttime 10PM to 7AM (dBA,Leq)[3]	Change in Noise Level as Result of Project
1	62	53	63	**70**	1
2	56	58	60		4
3	74	46	74		0

Notes:
[1.] Receptor 1 to Receptor 3 represent the nearest property lines
[2.] The measured existing ambient condition.
[3.] Per Chula Vista Municipal Code Sec 19.68.030 Nighttime Industrial noise limit is 70 dBA.

As shown in Table 6, the project only noise levels will not exceed the City's exterior nighttime noise limit of 70 dBA. The project plus ambient noise levels will increase the worst-case noise level by approximately 0 to 4 dBA Leq depending on location. It takes a change of 3 dBA to hear a noticeable difference. The increase in noise level is below the typical noticeable difference in change of noise levels.

Table 7 provides the characteristics associated with changes in noise levels.

Table 7: Change in Noise Level Characteristics[1]

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

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

The change in noise level would fall within the "Not Perceptible" to "Clearly Noticeable" acoustic characteristic depending on location. Based on the industrial land use of the receiving property, lack of sensitive receptors to the location, and that the City of Chula Vista noise limit is not exceeded at the property line, the change in noise level would be less than significant.

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

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 50 feet from the centerline of the analyzed roadway. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in with and without project conditions. In addition, the noise contours for 60, 65 and 70 dBA CNEL were calculated. 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.

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

Table 8 compares the existing, existing with project scenario, and cumulative project and shows the change in traffic noise levels as a result of the proposed project. It takes a change of 3 dB or more to hear a perceptible difference. As demonstrated in Table 8, the project is anticipated to change the noise by 0.7 dBA CNEL in the worst-case scenario.

Although there is an increase in traffic noise levels the impact is considered to have less than significant impact as the noise levels at or near any existing proposed sensitive receptor would be 70 dBA CNEL or less and the change in noise level is 3 dBA or less.

Table 8: Existing Scenario - Noise Levels Along Roadways (dBA CNEL)[1,2]

Existing Without Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Main Street	Nirvana Ave to Heritage Rd	69.3	45	97	208	449

Existing With Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Main Street	Nirvana Ave to Heritage Rd	69.3	45	97	210	452

Cumulative Projects Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Main Street	Nirvana Ave to Heritage Rd	70.0	50	107	232	499

Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Cumulative Project	Change in Noise Level	Potential Significant Impact
Main Street	Nirvana Ave to Heritage Rd	69.3	70.0	0.7	No

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

7.1.3 Noise Impacts to On/Off-Site Receptors Due to Project Maintenance Equipment

Project maintenance activities such as parking lot sweeper machines and/or landscaping machinery should not be used before 7 a.m. or after 10 p.m. or according to Section 17.24.040(C)(8).

Exhibit F

Future Operational Noise Levels

8.0 Construction Noise Impact

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

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 9.

Table 9: Typical Construction Equipment Noise Levels[1]

Type	Lmax (dBA) at 50 Feet
Backhoe	80
Truck	88
Concrete Mixer	85
Pneumatic Tool	85
Pump	76
Saw, Electric	76
Air Compressor	81
Generator	81
Paver	89
Roller	74

Notes:
[1] Referenced Noise Levels from FTA noise and vibration manual.

Construction is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the City's Municipal Code 17.24.040(C)(8). Construction is anticipated to occur during the permissible hours of 7AM to 10PM on weekdays and 8AM to 10PM Saturday and Sunday according to the City's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise. The impact is considered less than significant however construction noise level projections are provided.

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 will be loudest during grading phase. A likely worst-case construction noise scenario during grading assumes the use of 1-grader, 1-dozer, 2-excavators, 2-backhoes, and 2-scrapers operating at the center of the site, 250 feet from the property boundary.

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels at 250 feet have the potential to reach 73 dBA L_{eq} at the property boundary during building construction.

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 = 1.1 (the value related to the attenuation rate through 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[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, September 2018.

At a distance of 24 feet (distance of nearest structure from the site's western boundary), a large bulldozer would yield a worst-case 0.093 PPV (in/sec) which may be perceptible for short periods of time during grading along the western property line of the project site but is below any threshold of damage. The impact is less than significant, and no mitigation is required.

8.3 Construction Noise Reduction Policies

Construction operations must follow the City's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further ensure that construction activities do not disrupt the adjacent land uses, the following policies shall be taken and will be applied as conditions of approval:

1. Construction shall occur during the permissible hours (7AM to 10PM on weekdays and 8AM to 10PM Saturday and Sunday) as defined in Section 17.24.040(C)(8) of the City's Municipal Code.

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

3. The contractor shall 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.

4. Idling equipment shall be turned off when not in use.

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

9.0 References

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

City of Chula Vista: General Plan Noise Element.

City of Chula Vista: Municipal Code

Appendix A:

Photographs and Field Measurement Data

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

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

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

10-Minute Continuous Noise Measurement Datasheet

Project: Chula Vista Self Storage
Site Address/Location: Between Nirvana ave and Heritage Rd
Date: 6/23/2021
Field Tech/Engineer: Jason Schuyler

Site Observations: Clear sky, measurements were performed on the site and measured the baseline noise conditions. Winds 3-5MPH. Measurments taken at the nearest property lines

General Location:
Sound Meter: NTi Audio **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-minute interval
Meteorological Con.: Temps in the hi 70's, minimal wind, west-southwest, 5mphs
Site ID: ST-1 thru ST-3

Site Topo: Flat
Ground Type: soft site conditions,

Noise Source(s) w/ Distance:
1 - 72' from CL of Main Street
2 - 5' from Northwest property line
3- 5' from Northwest property line

Figure 1: Monitoring Locations

Figure 2: ST-1 Photo

Figure 3: ST-2 Photo

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

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

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

10-Minute Continuous Noise Measurement Datasheet - Cont.

Project: Chula Vista Self Storage
Site Address/Location: Between Nirvana ave and Heritage Rd
Site ID: ST-1 thru ST-3

Figure 4: ST-3 Photo

Table 1: Morning - Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1	12:38 PM	12:48 PM	74.3	88.8	51.2	82.3	78.9	75.2	70.1	59.5
2	12:54 PM	1:04 PM	56.2	69.1	49.0	63.1	60.1	56.3	54.0	51.7
3	1:23 PM	1:33 PM	66.8	76.2	50.4	71.9	70.5	68.6	65.7	56.4

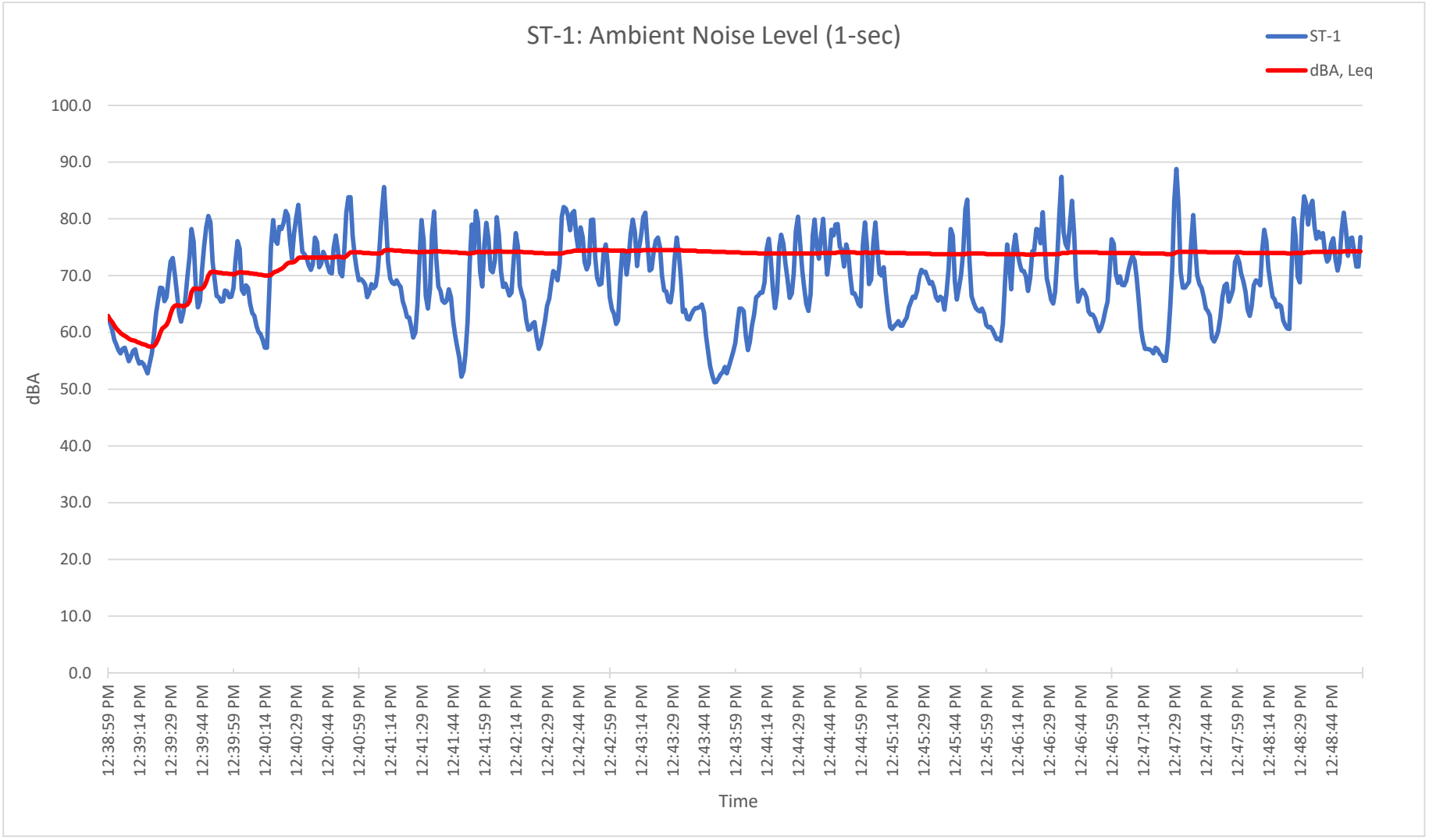
MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

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

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

10-Minute Continuous Noise Measurement Datasheet - Cont.

Project: Chula Vista Self Storage
Site Address/Location: Between Nirvana ave and Heritage Rd
Site ID: ST-1



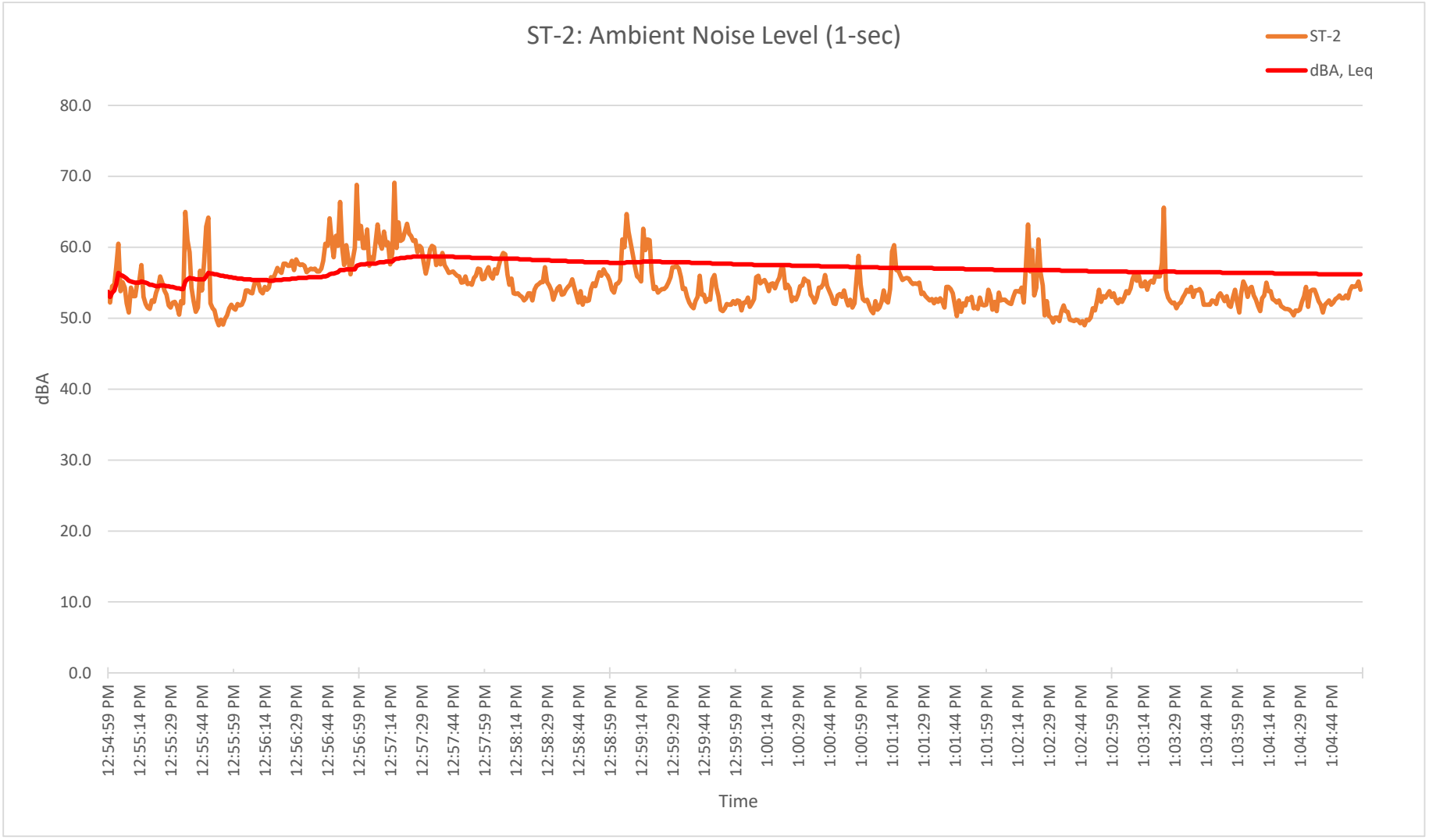
MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

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

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

10-Minute Continuous Noise Measurement Datasheet - Cont.

Project: Chula Vista Self Storage
Site Address/Location: Between Nirvana ave and Heritage Rd
Site ID: ST-2



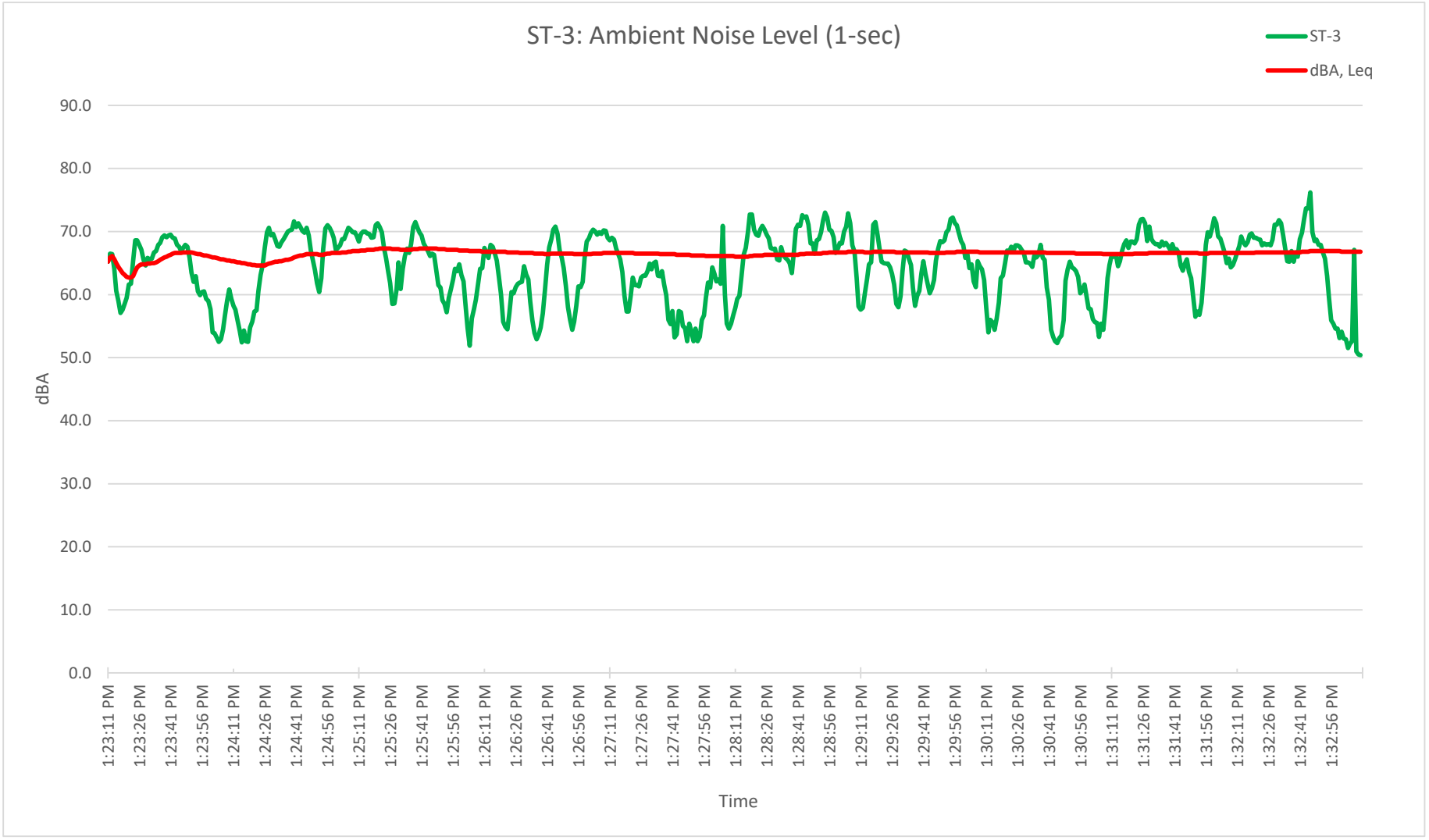
MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

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

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

10-Minute Continuous Noise Measurement Datasheet - Cont.

Project: Chula Vista Self Storage
Site Address/Location: Between Nirvana ave and Heritage Rd
Site ID: ST-3



Appendix B:

SoundPlan Input/Output

Project:	Nance and Arrow Warehouse
Job Number:	0551-2020-16
Site Address/Location:	170 S William Dillard Dr, Ste A105, Gilbert, AZ 85233
Date:	08/11/2020
Field Tech/Engineer:	Shon Baldwin
Source/System:	Idling Semi-Truck
General Location:	Loading Docks - 10ft from source
Sound Meter:	NTi XL2 **SN:** A2A-05967-E0
Settings:	A-weighted, slow, 1-sec, 30-sec duration
Meteorological Cond.:	95 degrees F, no wind

Site Observations:

SLM was placed 10-ft from idiling semi-truck

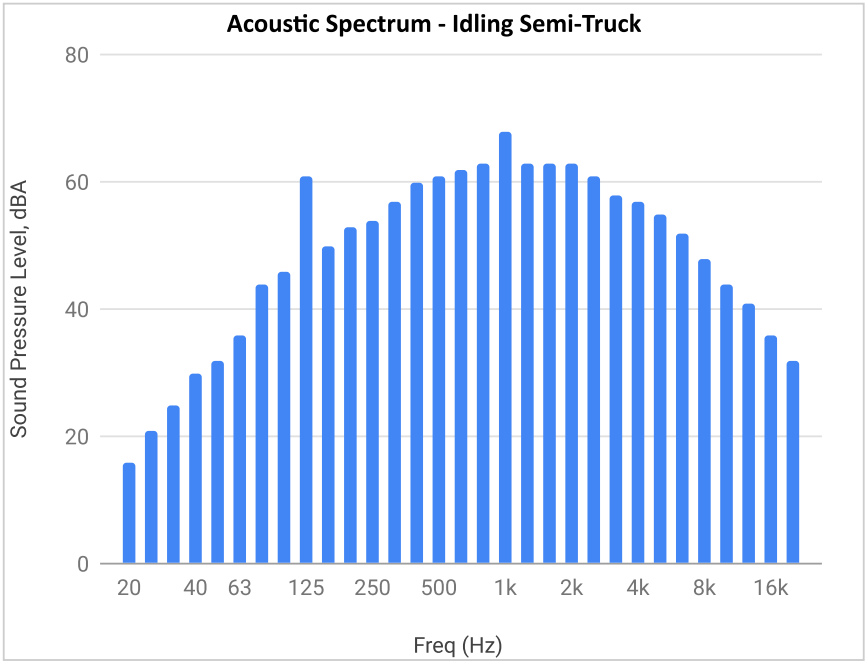
Leq	Lmin	Lmax
73.8	73.0	74.9

Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
74.2	74.1	73.9	73.8	73.5	73.4

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall dB(A)	3rd Octave Band Data (dBA)																														
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	12.5	1.6k	2k	2.5k	3.15	4k	5k	6.3k	8k	10k	12.5	16k	20k
Idling Semi-Truck	Semi-Truck	73.8	16.0	21.0	25.0	30.0	32.0	36.0	44.0	46.0	61.0	50.0	53.0	54.0	57.0	60.0	61.0	62.0	63.0	68.0	63.0	63.0	63.0	61.0	58.0	57.0	55.0	52.0	48.0	44.0	41.0	36.0	32.0

Figure 1: Idling Semi-Truck



Project: Fork Lift noise With Back up Beeper

Job Number:

Site Address/Location: MD Acoustics and Lab

Date: 10/04/2021

Field Tech/Engineer: Robert Pearson

Source/System: Fork Lift

General Location: 5 feet

Sound Meter: NTi XL2 **SN:** A2A-16164-E0

Settings: Second by Second

Meteorological Cond.: Clear Skies, 70 degrees

Site Observations:

Measurment taken 5' away as forklift is running and beeping.

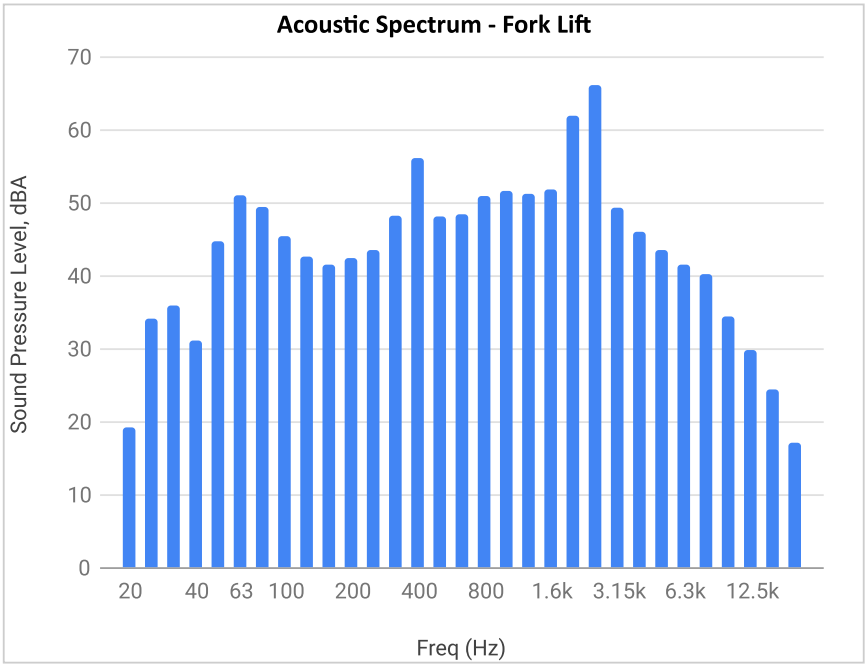
Leq	Lmin	Lmax
68.8	67.1	70.4

Ln 2	Ln 8	Ln 10	Ln 50	Ln 90	Ln 99
72.7	71.6	70.9	68.5	64.8	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall dB(A)	3rd Octave Band Data (dBA)																														
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	12.5	1.6k	2k	2.5k	3.15	4k	5k	6.3k	8k	10k	12.5	16k	20k
Fork Lift	Fork Lift	68.8	19.4	34.3	36.1	31.3	44.9	51.2	49.6	45.6	42.8	41.7	42.6	43.7	48.4	56.3	48.3	48.6	51.1	51.8	51.4	52.0	62.1	66.3	49.5	46.2	43.7	41.7	40.4	34.6	30.0	24.6	17.3

Figure 1:



MINIMUM - MAXIMUM AIRFLOWS (CFM) COOLING AND ELECTRIC HEAT

UNIT	COOLING			ELECTRIC HEATERS		
	Minimum CFM	Minimum CFM 2-Speed Fan Motor (at High Speed)	Minimum CFM 2-Speed Fan Motor (at Low Speed)	Maximum CFM	Minimum CFM	Maximum CFM
50HCQA04	900	N/A	N/A	1500	900	1500
50HCQA05	1200	N/A	N/A	2000	1200	2000
50HCQA06	1500	N/A	N/A	2500	1500	2500
50HCQA07	1800	N/A	N/A	3000	1800	3000
50HCQD07	1800	1800	1200	3000	1800	3000
50HCQD08	2250	2250	1500	3750	2250*	3750
50HCQD09	2550	2873	1915	4250	2252*	4250
50HCQD12	3000	3380	2253	5000	3000*	5000

* Minimum electric heat CFM exceptions:

UNIT	UNIT VOLTAGE	HEATER kW	UNIT CONFIGURATION	REQUIRED MINIMUM CFM
50HCQD08 50HCQD09	575	17.0	Horizontal or Vertical	2800
		34.0		2350
50HCQD12	230	50.0	Vertical	3550
		50.0	Horizontal	3420
		43.5	Horizontal or Vertical	3040
	575	50.0	Vertical	3150
		33.5	Vertical	3520
		33.5	Horizontal	3420
		26.5	Vertical	3610

SOUND PERFORMANCE

50HCQ UNIT	OUTDOOR SOUND (dB) AT 60 Hz								
	A-Weighted	63	125	250	500	1000	2000	4000	8000
A04	76	51.8	69.0	64.6	67.8	70.7	63.8	60.9	59.0
A05	79	56.1	69.6	68.7	72.5	72.8	68.9	65.0	61.2
A06	79	57.7	66.6	68.7	72.9	74.5	71.1	67.6	62.6
A07	81	86.7	82.7	79.1	78.4	75.4	71.2	67.8	62.9
D07	81	86.7	82.7	79.1	78.4	75.4	71.2	67.8	62.9
D08	83	87.3	81.6	79.7	80.6	79.0	73.5	69.2	66.1
D09	87	61.7	74.7	77.4	82.6	84.9	81.9	78.8	75.9
D12	83	61.0	67.3	75.1	77.7	78.1	75.5	71.2	66.7

LEGEND

dB —Decibel

NOTES:

1. Outdoor sound data is measure in accordance with AHRI standard 270.
2. Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environmental factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
3. A-weighted sound ratings filter out very high and very low frequencies, to better approximate the response of “average” human ear. A-weighted measurements for Carrier units are taken in accordance with AHRI standard 270.

Nirvana Chula Vista Self Storage Noise
Contribution level - 001 - Warehouse : Outdoor SP

Source	Source group	Source ty	Tr. lane	Leq,n dB(A)	A dB	
Receiver R1 Fl G Lr,lim dB(A) Leq,n 53.5 dB(A)						
Loading 1	Default industrial noise	Point		51.2	0.0	
Loading 2	Default industrial noise	Point		48.3	0.0	
Parking 1	Default parking lot noise	PLot		42.9	0.0	
HVAC	Default industrial noise	Point		35.4	0.0	
Beeper 1	Default industrial noise	Point		26.3	0.0	
HVAC	Default industrial noise	Point		23.9	0.0	
Beeper 2	Default industrial noise	Point		22.5	0.0	
Beeper 3	Default industrial noise	Point		18.6	0.0	
HVAC	Default industrial noise	Point		18.2	0.0	
Beeper 4	Default industrial noise	Point		16.8	0.0	
Loading 4	Default industrial noise	Point		16.2	0.0	
Beeper 5	Default industrial noise	Point		15.5	0.0	
Parking 22	Default parking lot noise	PLot		14.9	0.0	
HVAC	Default industrial noise	Point		14.4	0.0	
Parking 2	Default parking lot noise	PLot		13.7	0.0	
Parking 8	Default parking lot noise	PLot		11.8	0.0	
Parking 18	Default parking lot noise	PLot		11.8	0.0	
Parking 17	Default parking lot noise	PLot		11.5	0.0	
Parking 9	Default parking lot noise	PLot		11.3	0.0	
Parking 3	Default parking lot noise	PLot		11.2	0.0	
HVAC	Default industrial noise	Point		11.0	0.0	
HVAC	Default industrial noise	Point		10.8	0.0	
Parking 7	Default parking lot noise	PLot		10.8	0.0	
Parking 4	Default parking lot noise	PLot		9.9	0.0	
Parking 10	Default parking lot noise	PLot		9.9	0.0	
Parking 6	Default parking lot noise	PLot		9.7	0.0	
Loading 3	Default industrial noise	Point		9.6	0.0	
Parking 15	Default parking lot noise	PLot		9.5	0.0	
Parking 5	Default parking lot noise	PLot		9.3	0.0	
Parking 16	Default parking lot noise	PLot		9.2	0.0	
Parking 19	Default parking lot noise	PLot		9.1	0.0	
Parking 11	Default parking lot noise	PLot		8.7	0.0	
Parking 14	Default parking lot noise	PLot		8.2	0.0	
Parking 13	Default parking lot noise	PLot		7.5	0.0	
Parking 24	Default parking lot noise	PLot		7.4	0.0	
Beeper 7	Default industrial noise	Point		7.4	0.0	
HVAC	Default industrial noise	Point		6.7	0.0	
Parking 12	Default parking lot noise	PLot		4.5	0.0	
Beeper 6	Default industrial noise	Point		4.2	0.0	
Parking 37	Default parking lot noise	PLot		4.0	0.0	
HVAC	Default industrial noise	Point		3.9	0.0	
Parking 20	Default parking lot noise	PLot		3.8	0.0	
Parking 34	Default parking lot noise	PLot		3.7	0.0	
Parking 32	Default parking lot noise	PLot		3.6	0.0	

Source	Source group	Source ty	Tr. lane	Leq,n dB(A)	A dB	
Parking 33	Default parking lot noise	PLot		3.2	0.0	
Parking 30	Default parking lot noise	PLot		2.9	0.0	
Beeper 9	Default industrial noise	Point		2.7	0.0	
Beeper 8	Default industrial noise	Point		2.7	0.0	
Parking 29	Default parking lot noise	PLot		2.5	0.0	
Beeper 10	Default industrial noise	Point		2.4	0.0	
Parking 28	Default parking lot noise	PLot		2.4	0.0	
Parking 27	Default parking lot noise	PLot		2.3	0.0	
Parking 23	Default parking lot noise	PLot		2.2	0.0	
Parking 35	Default parking lot noise	PLot		2.0	0.0	
Parking 21	Default parking lot noise	PLot		1.7	0.0	
Parking 26	Default parking lot noise	PLot		1.6	0.0	
Parking 25	Default parking lot noise	PLot		1.6	0.0	
Beeper 12	Default industrial noise	Point		0.2	0.0	
Parking 36	Default parking lot noise	PLot		-0.2	0.0	
Beeper 15	Default industrial noise	Point		-1.7	0.0	
Beeper 16	Default industrial noise	Point		-1.8	0.0	
Beeper 17	Default industrial noise	Point		-1.9	0.0	
Beeper 11	Default industrial noise	Point		-2.0	0.0	
Beeper 14	Default industrial noise	Point		-2.9	0.0	
Beeper 13	Default industrial noise	Point		-2.9	0.0	
Parking 31	Default parking lot noise	PLot		-3.5	0.0	
Beeper 18	Default industrial noise	Point		-6.6	0.0	
Beeper 19	Default industrial noise	Point		-6.8	0.0	
Beeper 20	Default industrial noise	Point		-13.1	0.0	
Beeper 21	Default industrial noise	Point		-13.5	0.0	
Receiver R2 Fl G Lr,lim dB(A) Leq,n 57.6 dB(A)						
Loading 4	Default industrial noise	Point		54.8	0.0	
Loading 3	Default industrial noise	Point		54.1	0.0	
HVAC	Default industrial noise	Point		36.9	0.0	
Beeper 19	Default industrial noise	Point		34.2	0.0	
Beeper 18	Default industrial noise	Point		33.9	0.0	
Beeper 17	Default industrial noise	Point		32.3	0.0	
Beeper 16	Default industrial noise	Point		31.7	0.0	
HVAC	Default industrial noise	Point		31.1	0.0	
Beeper 15	Default industrial noise	Point		31.0	0.0	
Parking 37	Default parking lot noise	PLot		29.1	0.0	
Parking 24	Default parking lot noise	PLot		25.0	0.0	
Loading 2	Default industrial noise	Point		23.5	0.0	
HVAC	Default industrial noise	Point		22.0	0.0	
HVAC	Default industrial noise	Point		21.7	0.0	
Loading 1	Default industrial noise	Point		21.6	0.0	
Parking 36	Default parking lot noise	PLot		20.6	0.0	
HVAC	Default industrial noise	Point		18.4	0.0	
Beeper 13	Default industrial noise	Point		17.3	0.0	

Source	Source group	Source ty	Tr. lane	Leq,n dB(A)	A dB	
HVAC	Default industrial noise	Point		15.9	0.0	
HVAC	Default industrial noise	Point		14.9	0.0	
Parking 10	Default parking lot noise	PLot		14.6	0.0	
Parking 9	Default parking lot noise	PLot		14.1	0.0	
Parking 18	Default parking lot noise	PLot		13.8	0.0	
Parking 1	Default parking lot noise	PLot		13.7	0.0	
Parking 19	Default parking lot noise	PLot		13.7	0.0	
Parking 11	Default parking lot noise	PLot		13.7	0.0	
HVAC	Default industrial noise	Point		13.4	0.0	
Parking 8	Default parking lot noise	PLot		12.7	0.0	
Parking 7	Default parking lot noise	PLot		12.4	0.0	
Parking 17	Default parking lot noise	PLot		12.1	0.0	
Parking 6	Default parking lot noise	PLot		11.7	0.0	
Parking 15	Default parking lot noise	PLot		11.5	0.0	
Parking 16	Default parking lot noise	PLot		11.0	0.0	
Parking 25	Default parking lot noise	PLot		10.9	0.0	
Parking 14	Default parking lot noise	PLot		10.2	0.0	
Parking 20	Default parking lot noise	PLot		10.2	0.0	
Parking 32	Default parking lot noise	PLot		9.7	0.0	
Parking 33	Default parking lot noise	PLot		9.7	0.0	
Parking 27	Default parking lot noise	PLot		9.1	0.0	
Parking 4	Default parking lot noise	PLot		8.9	0.0	
Parking 28	Default parking lot noise	PLot		8.9	0.0	
Parking 5	Default parking lot noise	PLot		8.8	0.0	
Parking 22	Default parking lot noise	PLot		8.5	0.0	
Parking 12	Default parking lot noise	PLot		8.4	0.0	
Parking 34	Default parking lot noise	PLot		8.2	0.0	
Parking 26	Default parking lot noise	PLot		8.2	0.0	
Parking 29	Default parking lot noise	PLot		8.2	0.0	
Beeper 9	Default industrial noise	Point		7.7	0.0	
Beeper 8	Default industrial noise	Point		7.6	0.0	
Beeper 14	Default industrial noise	Point		7.5	0.0	
Parking 30	Default parking lot noise	PLot		7.4	0.0	
Beeper 20	Default industrial noise	Point		7.3	0.0	
Parking 13	Default parking lot noise	PLot		7.2	0.0	
Beeper 7	Default industrial noise	Point		6.6	0.0	
Parking 21	Default parking lot noise	PLot		6.1	0.0	
Parking 23	Default parking lot noise	PLot		5.4	0.0	
Beeper 21	Default industrial noise	Point		5.3	0.0	
Parking 35	Default parking lot noise	PLot		5.2	0.0	
Beeper 5	Default industrial noise	Point		4.7	0.0	
Beeper 12	Default industrial noise	Point		4.5	0.0	
Beeper 10	Default industrial noise	Point		4.5	0.0	
Beeper 4	Default industrial noise	Point		4.4	0.0	
Beeper 3	Default industrial noise	Point		4.1	0.0	

Source	Source group	Source ty	Tr. lane	Leq,n dB(A)	A dB	
Beeper 2	Default industrial noise	Point		3.7	0.0	
Parking 31	Default parking lot noise	PLot		3.6	0.0	
Beeper 1	Default industrial noise	Point		3.5	0.0	
Beeper 6	Default industrial noise	Point		3.0	0.0	
Beeper 11	Default industrial noise	Point		2.6	0.0	
Parking 3	Default parking lot noise	PLot		-3.2	0.0	
Parking 2	Default parking lot noise	PLot		-3.6	0.0	
Receiver R3 Fl G Lr,lim dB(A) Leq,n 46.3 dB(A)						
Parking 12	Default parking lot noise	PLot		41.3	0.0	
Parking 23	Default parking lot noise	PLot		40.8	0.0	
Parking 11	Default parking lot noise	PLot		36.7	0.0	
Parking 21	Default parking lot noise	PLot		32.9	0.0	
Parking 20	Default parking lot noise	PLot		31.3	0.0	
HVAC	Default industrial noise	Point		31.2	0.0	
Beeper 11	Default industrial noise	Point		30.6	0.0	
Beeper 12	Default industrial noise	Point		30.6	0.0	
Parking 10	Default parking lot noise	PLot		29.7	0.0	
Parking 19	Default parking lot noise	PLot		28.8	0.0	
Parking 25	Default parking lot noise	PLot		26.4	0.0	
Parking 9	Default parking lot noise	PLot		25.9	0.0	
Parking 18	Default parking lot noise	PLot		24.4	0.0	
Parking 27	Default parking lot noise	PLot		24.0	0.0	
Parking 26	Default parking lot noise	PLot		23.9	0.0	
Parking 32	Default parking lot noise	PLot		23.8	0.0	
HVAC	Default industrial noise	Point		23.4	0.0	
Parking 8	Default parking lot noise	PLot		22.4	0.0	
HVAC	Default industrial noise	Point		22.0	0.0	
Parking 28	Default parking lot noise	PLot		21.1	0.0	
HVAC	Default industrial noise	Point		21.0	0.0	
Parking 17	Default parking lot noise	PLot		21.0	0.0	
Parking 34	Default parking lot noise	PLot		20.4	0.0	
Parking 30	Default parking lot noise	PLot		20.2	0.0	
Parking 29	Default parking lot noise	PLot		20.1	0.0	
Parking 33	Default parking lot noise	PLot		20.0	0.0	
Parking 7	Default parking lot noise	PLot		19.8	0.0	
HVAC	Default industrial noise	Point		19.6	0.0	
Parking 31	Default parking lot noise	PLot		18.4	0.0	
Parking 35	Default parking lot noise	PLot		17.7	0.0	
Parking 16	Default parking lot noise	PLot		17.7	0.0	
Parking 6	Default parking lot noise	PLot		17.5	0.0	
Parking 15	Default parking lot noise	PLot		16.9	0.0	
HVAC	Default industrial noise	Point		16.3	0.0	
Beeper 13	Default industrial noise	Point		15.6	0.0	
Beeper 14	Default industrial noise	Point		14.7	0.0	
Parking 1	Default parking lot noise	PLot		14.7	0.0	

Source	Source group	Source ty	Tr. lane	Leq,n dB(A)	A dB	
Parking 14	Default parking lot noise	PLot		14.7	0.0	
Parking 5	Default parking lot noise	PLot		14.5	0.0	
Loading 1	Default industrial noise	Point		14.1	0.0	
Parking 24	Default parking lot noise	PLot		13.4	0.0	
Loading 4	Default industrial noise	Point		13.4	0.0	
Loading 2	Default industrial noise	Point		13.1	0.0	
Parking 4	Default parking lot noise	PLot		12.3	0.0	
Parking 22	Default parking lot noise	PLot		11.1	0.0	
Loading 3	Default industrial noise	Point		11.1	0.0	
Parking 13	Default parking lot noise	PLot		10.1	0.0	
HVAC	Default industrial noise	Point		9.0	0.0	
HVAC	Default industrial noise	Point		8.4	0.0	
Beeper 8	Default industrial noise	Point		6.6	0.0	
Beeper 7	Default industrial noise	Point		6.5	0.0	
Parking 37	Default parking lot noise	PLot		4.4	0.0	
Parking 36	Default parking lot noise	PLot		4.0	0.0	
Beeper 5	Default industrial noise	Point		3.9	0.0	
Beeper 4	Default industrial noise	Point		3.7	0.0	
Beeper 3	Default industrial noise	Point		3.4	0.0	
Beeper 9	Default industrial noise	Point		3.2	0.0	
Beeper 2	Default industrial noise	Point		3.0	0.0	
Beeper 10	Default industrial noise	Point		2.7	0.0	
Beeper 6	Default industrial noise	Point		2.6	0.0	
Beeper 1	Default industrial noise	Point		-0.7	0.0	
Parking 3	Default parking lot noise	PLot		-0.8	0.0	
Beeper 15	Default industrial noise	Point		-3.4	0.0	
Parking 2	Default parking lot noise	PLot		-3.4	0.0	
Beeper 16	Default industrial noise	Point		-3.7	0.0	
Beeper 17	Default industrial noise	Point		-3.9	0.0	
Beeper 18	Default industrial noise	Point		-4.3	0.0	
Beeper 19	Default industrial noise	Point		-4.4	0.0	
Beeper 20	Default industrial noise	Point		-7.7	0.0	
Beeper 21	Default industrial noise	Point		-7.9	0.0	

Nirvana Chula Vista Self Storage Noise
Octave spectra of the sources in dB(A) - 001 - Warehouse 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)
Beeper 1	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 2	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 3	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 4	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 5	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 6	Point				80.2	80.2	0.0	0.0		0	Back up Alarm	Beeper	61.1	63.0	63.6	70.3	70.3	78.4	68.3	59.9	41.3
Beeper 7	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 8	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 9	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 10	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 11	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 12	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 13	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 14	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 15	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 16	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 17	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 18	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 19	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 20	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
Beeper 21	Point				83.4	83.4	0.0	0.0		0	Back up Alarm	Back up Beeper	68.6	63.0	65.0	72.1	70.8	82.4	66.4	59.1	45.8
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
HVAC	Point				82.9	82.9	0.0	0.0		0	100%/24h	Carrier 7.5 ton rooftop unit	61.1	65.5	71.1	77.4	79.0	74.7	70.2	65.0	
Loading 1	Point				93.0	93.0	0.0	0.0		0	100%/24h	Idiling Semi-Truck	46.1	57.4	80.5	76.7	83.7	89.3	87.1	83.1	76.1

Nirvana Chula Vista Self Storage Noise
Octave spectra of the sources in dB(A) - 001 - Warehouse : Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Loading 2	Point				93.0	93.0	0.0	0.0		0	100%/24h	Idiling Semi-Truck	46.1	57.4	80.5	76.7	83.7	89.3	87.1	83.1	76.1
Loading 3	Point				93.0	93.0	0.0	0.0		0	100%/24h	Idiling Semi-Truck	46.1	57.4	80.5	76.7	83.7	89.3	87.1	83.1	76.1
Loading 4	Point				93.0	93.0	0.0	0.0		0	100%/24h	Idiling Semi-Truck	46.1	57.4	80.5	76.7	83.7	89.3	87.1	83.1	76.1
Parking 1	PLot	616.30			57.7	85.6	0.0	0.0		0	Convenience Store	Typical spectrum	69.0	80.6	73.1	77.6	77.7	78.1	75.4	69.2	56.4
Parking 2	PLot	94.50			56.3	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 3	PLot	104.63			55.8	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 4	PLot	121.31			56.2	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 5	PLot	134.29			55.7	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 6	PLot	123.46			56.1	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 7	PLot	113.88			56.4	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 8	PLot	138.83			55.6	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 9	PLot	131.93			55.8	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 10	PLot	117.79			56.3	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 11	PLot	132.97			55.8	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Parking 12	PLot	89.39			55.3	74.8	0.0	0.0		0	Convenience Store	Typical spectrum	58.1	69.7	62.2	66.7	66.8	67.2	64.5	58.3	45.5
Parking 13	PLot	130.38			54.9	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 14	PLot	113.01			55.5	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 15	PLot	134.55			55.3	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 16	PLot	93.71			55.7	75.5	0.0	0.0		0	Convenience Store	Typical spectrum	58.8	70.4	62.9	67.4	67.5	67.9	65.2	59.0	46.2
Parking 17	PLot	117.58			54.7	75.5	0.0	0.0		0	Convenience Store	Typical spectrum	58.8	70.4	62.9	67.4	67.5	67.9	65.2	59.0	46.2
Parking 18	PLot	141.98			55.0	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 19	PLot	75.79			57.2	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 20	PLot	66.34			56.6	74.8	0.0	0.0		0	Convenience Store	Typical spectrum	58.1	69.7	62.2	66.7	66.8	67.2	64.5	58.3	45.5
Parking 21	PLot	80.30			54.9	74.0	0.0	0.0		0	Convenience Store	Typical spectrum	57.3	68.9	61.4	65.9	66.0	66.4	63.7	57.5	44.7
Parking 22	PLot	45.12			55.2	71.8	0.0	0.0		0	Convenience Store	Typical spectrum	55.1	66.7	59.2	63.7	63.8	64.2	61.5	55.3	42.5
Parking 23	PLot	102.97			54.7	74.8	0.0	0.0		0	Convenience Store	Typical spectrum	58.1	69.7	62.2	66.7	66.8	67.2	64.5	58.3	45.5
Parking 24	PLot	90.58			54.4	74.0	0.0	0.0		0	Convenience Store	Typical spectrum	57.3	68.9	61.4	65.9	66.0	66.4	63.7	57.5	44.7
Parking 25	PLot	136.91			55.2	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 26	PLot	153.82			54.7	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 27	PLot	130.52			55.4	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3

Nirvana Chula Vista Self Storage Noise
Octave spectra of the sources in dB(A) - 001 - Warehouse : Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Parking 28	PLot	153.91			54.7	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 29	PLot	154.25			54.7	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 30	PLot	155.90			54.6	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 31	PLot	33.49			54.8	70.0	0.0	0.0		0	Convenience Store	Typical spectrum	53.4	65.0	57.5	62.0	62.1	62.5	59.8	53.6	40.8
Parking 32	PLot	142.69			54.5	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 33	PLot	140.73			55.1	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 34	PLot	107.20			55.7	76.0	0.0	0.0		0	Convenience Store	Typical spectrum	59.4	71.0	63.5	68.0	68.1	68.5	65.8	59.6	46.8
Parking 35	PLot	79.71			55.0	74.0	0.0	0.0		0	Convenience Store	Typical spectrum	57.3	68.9	61.4	65.9	66.0	66.4	63.7	57.5	44.7
Parking 36	PLot	142.66			55.0	76.5	0.0	0.0		0	Convenience Store	Typical spectrum	59.9	71.5	64.0	68.5	68.6	69.0	66.3	60.1	47.3
Parking 37	PLot	133.33			55.8	77.0	0.0	0.0		0	Convenience Store	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7

Appendix C:

Construction Input

Activity	L_{eq} at 250 feet dBA	L_{Max} at 250 feet dBA
Grading	73	71
Building Construction	70	72
Paving	69	73

Equipment Summary	Reference (dBA) 50 ft Lmax
Rock Drills	96
Jack Hammers	82
Pneumatic Tools	85
Pavers	80
Dozers	85
Scrapers	87
Haul Trucks	88
Cranes	82
Portable Generators	80
Rollers	80
Tractors	80
Front-End Loaders	86
Hydraulic Excavators	86
Graders	86
Air Compressors	86
Trucks	86

Grading

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements										
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Grader	86	1	40	250	0.5	0	68.5	64.5	2848623.03
2	Dozer	85	1	40	250	0.5	0	67.5	63.5	2262741.7
3	Excavator	86	2	40	250	0.5	0	71.5	67.6	5697246.05
4	Tractor/Backhoe	80	2	40	250	0.5	0	65.5	61.6	1431083.51
5	Scrapers	87	2	40	250	0.5	0	72.5	68.6	7172407.83
							Lmax*	**71**	**Leq**	**73**
							Lw	**107**	**Lw**	**105**

Source: MD Acoustics, August 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**
60	18.3	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
70	21.3	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
80	24.4	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
90	27.4	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
100	30.5	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
110	33.5	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
120	36.6	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
130	39.6	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
140	42.7	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
150	45.7	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
160	48.8	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
170	51.8	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
180	54.9	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
190	57.9	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
200	61.0	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
210	64.0	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
220	67.1	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
230	70.1	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
240	73.1	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
250	76.2	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
260	79.2	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
270	82.3	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
280	85.3	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
290	88.4	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
300	91.4	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
310	94.5	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
320	97.5	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
330	100.6	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
340	103.6	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
350	106.7	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
360	109.7	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
370	112.8	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36

Building Construction

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Cranes	82	2	40	250	0.5	0	67.5	63.6	2268114.51
2	Forklift/Tractor	80	5	40	250	0.5	0	69.5	65.5	3577708.76
3	Generator	80	2	40	250	0.5	0	65.5	61.6	1431083.51
4	Tractor/Backhoe	80	5	40	250	0.5	0	69.5	65.5	3577708.76
							Lmax*	**72**	**Leq**	**70**
							Lw	**103**	**Lw**	**102**

Source: MD Acoustics, August 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**
60	18.3	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
70	21.3	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
80	24.4	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
90	27.4	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
100	30.5	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
110	33.5	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
120	36.6	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
130	39.6	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
140	42.7	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
150	45.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
160	48.8	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
170	51.8	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
180	54.9	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
190	57.9	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
200	61.0	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
210	64.0	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
220	67.1	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
230	70.1	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
240	73.1	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
250	76.2	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
260	79.2	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
270	82.3	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
280	85.3	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
290	88.4	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
300	91.4	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
310	94.5	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
320	97.5	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
330	100.6	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
340	103.6	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
350	106.7	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
360	109.7	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
370	112.8	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34

Paving

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Pavers	86	2	40	250	0.5	0	71.5	67.6	5697246.05
2	Rollers	80	2	40	250	0.5	0	65.5	61.6	1431083.51
3	Paving Equipment	80	2	40	250	0.5	0	65.5	61.6	1431083.51
							Lmax*	**73**	**Leq**	**69**
							Lw	**104**	**Lw**	**101**

Source: MD Acoustics, August 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**
60	18.3	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
70	21.3	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
80	24.4	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
90	27.4	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
100	30.5	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
110	33.5	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
120	36.6	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
130	39.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
140	42.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
150	45.7	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
160	48.8	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
170	51.8	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
180	54.9	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
190	57.9	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
200	61.0	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
210	64.0	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
220	67.1	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
230	70.1	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
240	73.1	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
250	76.2	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
260	79.2	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
270	82.3	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
280	85.3	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
290	88.4	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
300	91.4	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
310	94.5	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
320	97.5	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
330	100.6	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
340	103.6	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
350	106.7	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
360	109.7	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
370	112.8	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33

VIBRATION LEVEL IMPACT

Project:	Chula Vista Self Storage	Date: 8/10/21
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Project Site	
Address:		

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 =	24.00	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 =	**0.093**	IN/SEC	OUTPUT IN RED

Appendix D**:**

Traffic Noise Calculations

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Nirvana Self Storage
ROADWAY: Nirvana to Heritage Rd
LOCATION: Existing

JOB #: 0623-2021-04
DATE: 24-Jan-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	14,260
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIST	0
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	1,426

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		50
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	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	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	50.12	- -
MEDIUM TRUCKS	4.0	50.02	- -
HEAVY TRUCKS	8.0	50.06	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	68.9	67.0	65.3	59.2	67.8	68.4
MEDIUM TRUCKS	59.4	57.9	51.5	50.0	58.4	58.7
HEAVY TRUCKS	59.6	58.2	49.2	50.4	58.8	58.9
NOISE LEVELS (dBA)	69.8	68.0	65.5	60.2	68.8	69.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	68.9	67.0	65.3	59.2	67.8	68.4
MEDIUM TRUCKS	59.4	57.9	51.5	50.0	58.4	58.7
HEAVY TRUCKS	59.6	58.2	49.2	50.4	58.8	58.9
NOISE LEVELS (dBA)	69.8	68.0	65.5	60.2	68.8	69.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	45	97	208	449
LDN	41	89	192	414

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Nirvana Self Storage
ROADWAY: Nirvana to Heritage Rd
LOCATION: E+P

JOB #: 0623-2021-04
DATE: 24-Jan-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	14,413
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIST	0
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	1,441

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		50
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	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	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	50.12	- -
MEDIUM TRUCKS	4.0	50.02	- -
HEAVY TRUCKS	8.0	50.06	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	69.0	67.1	65.3	59.3	67.9	68.5
MEDIUM TRUCKS	59.4	57.9	51.6	50.0	58.5	58.7
HEAVY TRUCKS	59.7	58.3	49.2	50.5	58.8	59.0
NOISE LEVELS (dBA)	69.9	68.1	65.6	60.2	68.8	69.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.0	67.1	65.3	59.3	67.9	68.5
MEDIUM TRUCKS	59.4	57.9	51.6	50.0	58.5	58.7
HEAVY TRUCKS	59.7	58.3	49.2	50.5	58.8	59.0
NOISE LEVELS (dBA)	69.9	68.1	65.6	60.2	68.8	69.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	45	97	210	452
LDN	42	90	193	417

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Nirvana Self Storage
ROADWAY: Nirvana to Heritage Rd
LOCATION: E+P+Cumulative

JOB #: 0623-2021-04
DATE: 24-Jan-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	16,719
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIST	0
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	1,672

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		50
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	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	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	50.12	- -
MEDIUM TRUCKS	4.0	50.02	- -
HEAVY TRUCKS	8.0	50.06	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	69.6	67.7	66.0	59.9	68.5	69.1
MEDIUM TRUCKS	60.1	58.6	52.2	50.7	59.1	59.4
HEAVY TRUCKS	60.3	58.9	49.9	51.1	59.5	59.6
NOISE LEVELS (dBA)	70.5	68.7	66.2	60.9	69.5	70.0

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.6	67.7	66.0	59.9	68.5	69.1
MEDIUM TRUCKS	60.1	58.6	52.2	50.7	59.1	59.4
HEAVY TRUCKS	60.3	58.9	49.9	51.1	59.5	59.6
NOISE LEVELS (dBA)	70.5	68.7	66.2	60.9	69.5	70.0

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	50	107	232	499
LDN	46	99	214	460

Appendix E**:**

Cumulative Project Analysis

Nirvana Cumulative Project List

1. **Project Site** – 821 Main Street – Nirvana Business Park – located 5,000 feet to the east – Design Review – DR21-0024 for the review of the site plan and the three proposed warehouse buildings, and the self-storage building. Building 1 is proposed as 59,044 square feet, Building 2 is proposed as 44,592 square feet, Building 3 is proposed as three-stories 140,802 square feet for self-storage, and building 4 is proposed as 50,030 square feet. A Tentative Parcel Map – TPM21-0003 is also proposed to subdivide the 13.31-acre property into four (4) parcels, one for each of the buildings. The four parcels' public right-of-way is provided via a private access easement to Nirvana Avenue.

2. 1810 Main Court – In-N-Out Restaurant.

3. 1891 Nirvana Avenue – Cannabis Dispensary – Conditional Use Permit to allow the operation of a storefront retail cannabis business within an existing 3,221 sq. ft. industrial building on a 1.05-acre site located within the General Industrial (I) zone.

4. NWC Heritage/Santa Maya – Escaya Industrial – Design Review Permit to allow the construction of three industrial shell buildings. The site is in the Otay Ranch Village 3 Sectional Planning Area (SPA) and has a zoning designation of Industrial (I) and a General Plan designation of Limited Industrial (IL).

5. 1855 Maxwell Road – CV School District Vehicle Repair Shop – Design Review to construct a proposed one-story, 15,500 sq. ft. building for vehicle repair of school buses and office space for the Chula Vista Elementary School District.

6. 517 Shinohara – Shinohara Business Center – DR21-0032 – To develop a 178,156 square-foot single-story industrial building for warehousing and office uses on a vacant 9.72-acre parcel. Hours of operation are proposed as a 24-hour operation, seven days a week, with 3 varying shifts. The subject site is zoned ILP (Limited Industrial Precise Plan) and a General Plan designation of IL (Limited Industrial). The project will include one entitlement for a Design Review DR21-0032 and a Mitigated Negative Declaration with Mitigation Measures and Reporting Program IS21-0006, subject to review and approval by the Planning Commission of the City of Chula Vista.

7. 750 Main Street – Maxwell @ Main – Development of 8.21 gross-acre site within the Auto Park East Specific Plan. The project includes a Design Review, a Tentative Tract Map (seven lots), and a Notice of Exemption (under the Auto Park East Specific Plan Mitigated Negative Declaration. The site is General Plan designated IL – Limited Industrial and Zoned (ILP) Limited Industrial and is located within the Auto Park East Specific Plan. The seven commercial buildings proposed are as follows:

- Building A – a 2,551-square-foot drive-through restaurant
- Building B – a 2,164-square-foot drive-through restaurant
- Building C – a 4,446-square-foot retail car wash
- Building D – a 2,400-square-foot drive-through restaurant
- Building E – a gasoline station with a 4,620-square-foot convenience store (with a type 20 off-site beer and wine license) and a 4,596-square-foot canopy covering eight dispensers,
- Building F– a 2,221-square-foot drive-through restaurant
- Building G – a 16,89- square-foot collision (auto-repair) facility

8. 1875 Auto Park Avenue – Mossy Chrysler Dodge Ram & Jeep Chula Vista Showroom & Sales Office – DR20-0025 – Design Review for a two-story, 54,400 square foot building and a detached 1,200 square foot carwash for a Mossy automobile dealership with automotive repair services and associated carwash on approximately 6.51 acres within the Auto Park North Specific Plan.

9. 670 Main Street – BMW – DR17-0031 – Design Review consideration of a two-story, 37,600 sq. ft. building for a BMW auto dealership with auto repair/service and associated carwash on approximately 4.2 acres.

10. 1880 Auto Park Place – Automotive Repair – DR19- 0025 – Design Review consideration of a 27, 821 square-foot building with a 4, 185 square-foot covered entryway for supportive uses to include a vehicle collision and automotive repair facility.