Quick Quack Car Wash (Store #25-159)

Noise Impact Study

City of Santa Rosa, CA

Prepared for:

Quick Quack Development II, LLC
Mr. Vance Shannon
1380 Lead Hill Blvd #260
Roseville, CA 95661

Prepared by:

MD Acoustics, LLC
Joel Demir, INCE-USA
Claire Pincock, INCE-USA
1197 Los Angeles Avenue, Ste 256
Simi Valley, CA 93065

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1.0 Executive Summary

This report has been prepared to provide the calculated noise projections from the proposed Quick Quack Car Wash ("Project") located at 4332-4374 Sonoma Highway in the City of Santa Rosa, CA. All calculations are compared to the City of Santa Rosa's noise ordinance as well as the existing ambient condition. The Project proposes to construct a 108-foot covered car wash tunnel with 18 vacuum stalls.

1.1 Findings and Conclusions

Three (3) baseline 15-minute ambient measurements were performed at the Project site and represent the current operational noise and ambient levels within the Project vicinity. The predominant source of noise impacting the existing site is traffic noise propagating from Sonoma Hwy.

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

Project-only operational noise levels are anticipated to be up to 57 dBA Leq at residential uses north of the project site, with the Project plus ambient noise level resulting in no increase to the ambient levels, which meets the City's multifamily residential code of 55 dBA plus 5 dBA (Municipal Code Section 17-16.120).

This assessment evaluates the baseline noise condition and compares the Project's worst-case operational noise level to the measured noise level (during the Project's proposed hours of operation).

The following outlines the project design features:

1. The Project will incorporate a 140 HP IDC Predator or 120 HP Aerodry blower system or equivalent.

2.0 Introduction

2.1 Purpose of Analysis and Study Objectives

This noise impact study aims to evaluate the potential noise impacts for the Project study area and recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to potentially applicable noise standards set forth by the State and/or local agencies. Consistent with the City's Noise Guidelines, the Project must demonstrate compliance with the applicable noise zoning ordinance and sound attenuation requirements.

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 impact (e.g., blowers and vacuums) from the Project site to adjacent land uses
- An analysis of construction noise to adjacent uses

2.2 Site Location and Study Area

The Project site is located at 4332-4374 Sonoma Highway in the City of Santa Rosa, CA, as shown in Exhibit A. The land uses directly surrounding the Project are commercial uses to the east and west, church and residential uses to the north, and residentially zoned vacant/wooded use to the south. Sensitive land uses surrounding the site include existing residences to the north.

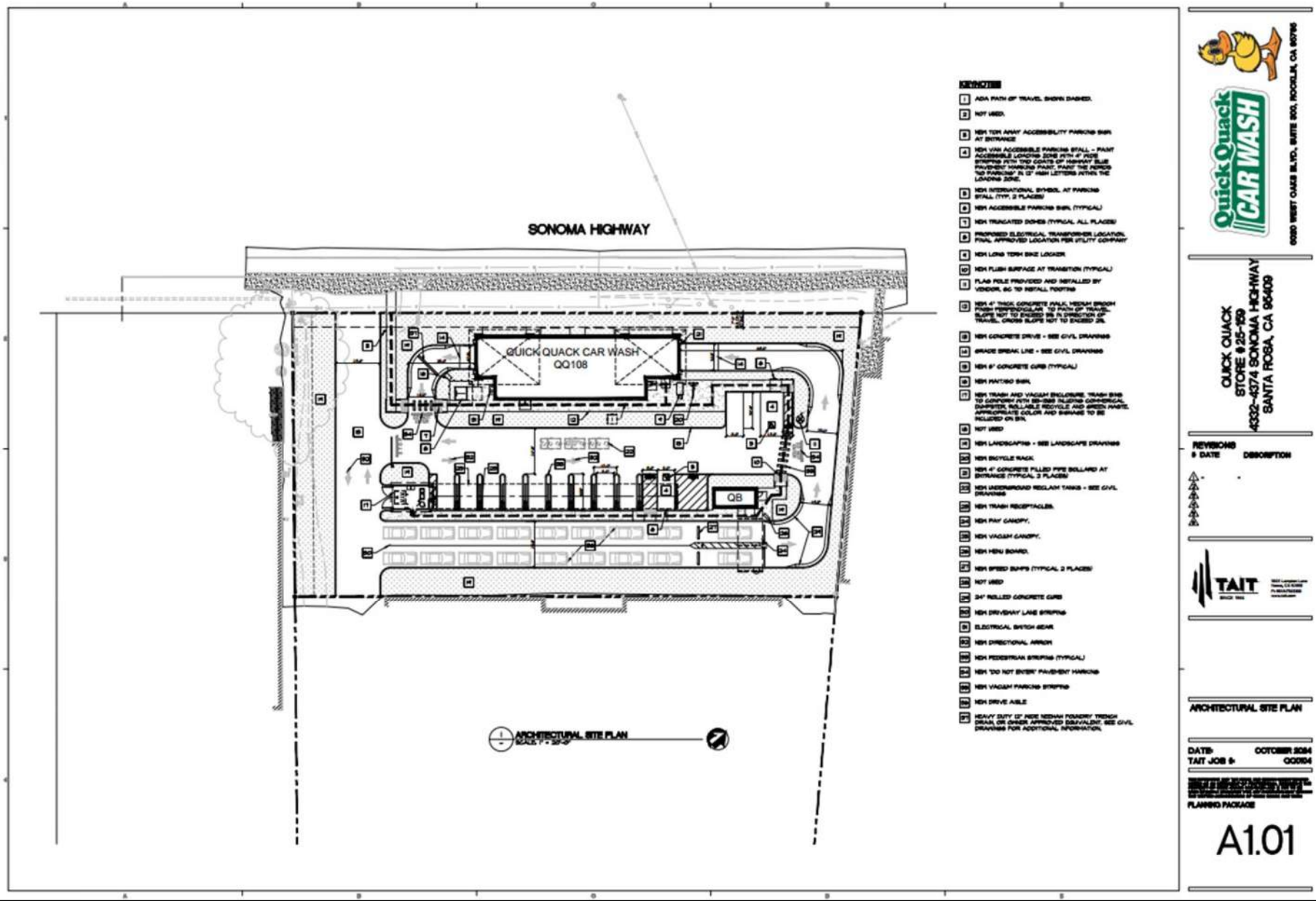
2.3 Proposed Project Description

The Project proposes to develop a 108-foot car wash tunnel and 18 covered vacuum stall systems. The site plan used for this is illustrated in Exhibit B. The Project operational hours are assumed to be between 7 AM to 9 PM, seven days per week.

Exhibit A
Location Map

Exhibit B

Site Plan



3.0 Fundamentals of Noise

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

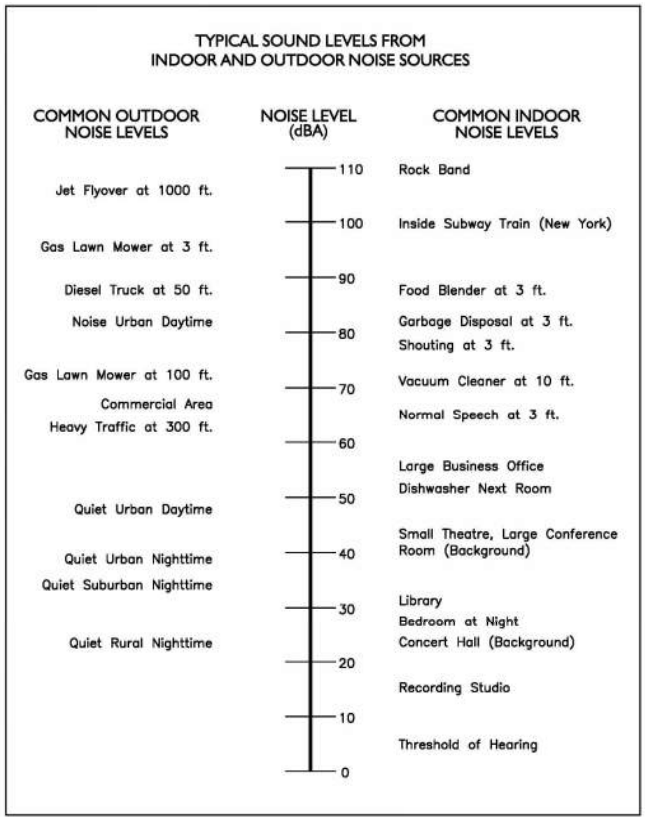
3.1 Sound, Noise, and Acoustics

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

3.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



3.3 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 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 reference sound levels for different noise sources.

3.4 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.

3.5 Human Response to Changes in Noise Levels

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

3.6 Noise Descriptors

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

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

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

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

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

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

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

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

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

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, 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.

3.7 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 at least 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

4.0 Regulatory Setting

The proposed Project is in the City of Santa Rosa, 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) was originally tasked with implementing the Noise Control Act. However, it was eventually eliminated, leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) 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 that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to clearly delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 of the California Building Code (CBC), which in some cases requires acoustical analyses to outline exterior noise levels and

to ensure interior noise levels do not exceed the interior threshold. The state mandates that the legislative body of each county and City adopt a noise element as part of its comprehensive general plan. The local noise element 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.

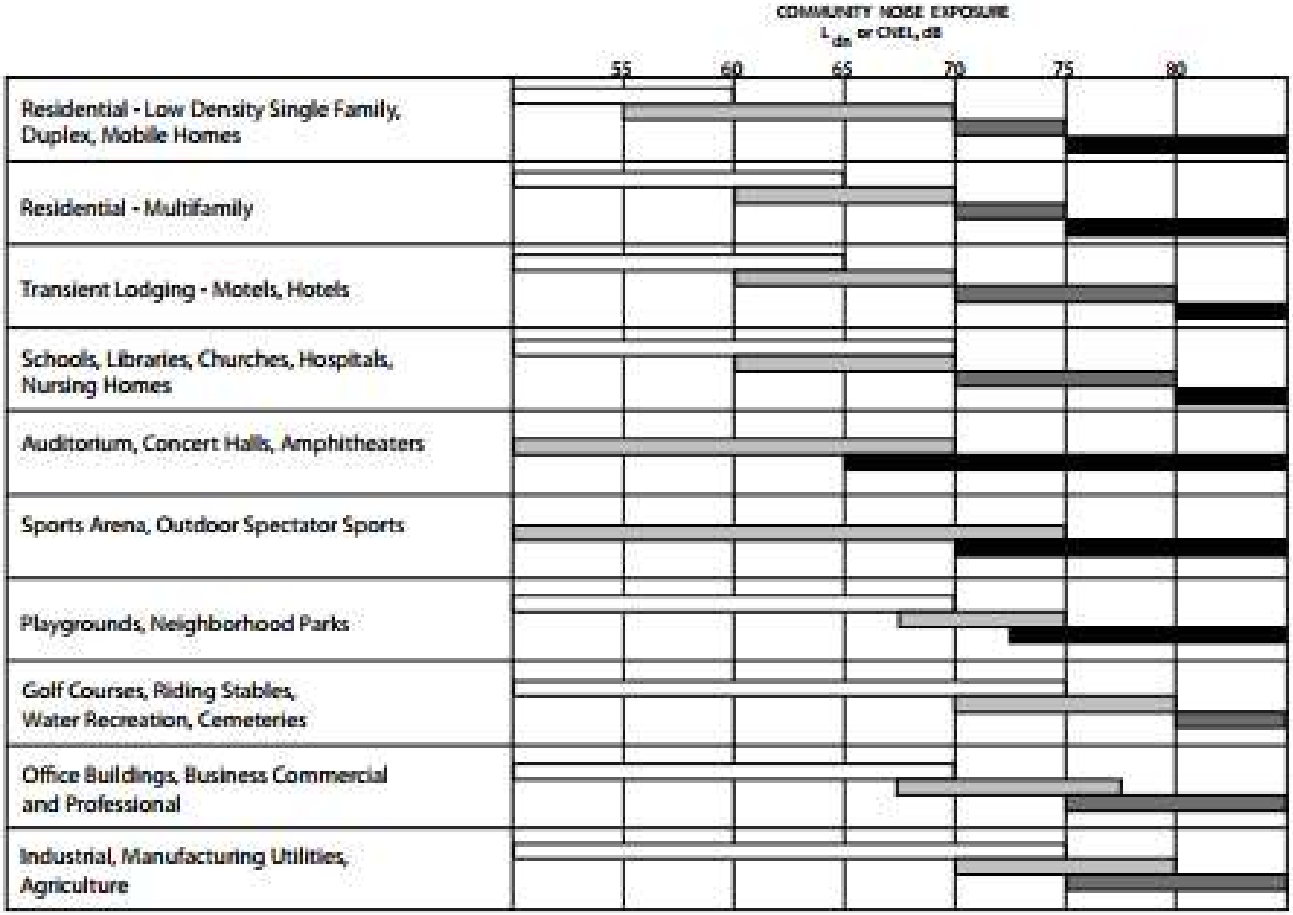
4.3 City of Santa Rosa Noise Regulations

The City of Santa Rosa outlines its noise regulations and standards within the Noise Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Santa Rosa General Plan

The Santa Rosa General Plan Noise Element presents an overview of the environmental and man-made hazards affecting Santa Rosa. The major noise sources described are highways, arterial streets, railroad operations, emergency medical helicopters and vehicles, landscaping equipment, and industrial and commercial facilities. Noise is addressed through the land use compatibility matrix shown in Exhibit D (Figure 12-1 from the General Plan), California insulation standards, and the city's noise ordinance. Policies from the general plan address noise attenuation along major regional/arterial streets through the location of land uses, site design, architectural standards, barriers, and street materials.

Exhibit D: Land Use Compatibility Guidelines



LEGEND:

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise insulation requirements.

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

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Goals and Policies

Goals and policies from the Noise Element that would mitigate potential impacts on noise include the following.

Goal NS-B: Maintain an acceptable community noise level to protect the health and comfort of people living, working and/or visiting in Santa Rosa, while maintaining a visually appealing community.

Policies

NS-B-1 Do not locate noise-sensitive uses in proximity to major noise sources, except residential is allowed near rail to promote future ridership.

NS-B-2 Encourage residential developers to provide buffers other than sound walls, where practical. Allow sound walls only when projected noise levels at a site exceed land use compatibility standards in Figure 12-1.

In some established neighborhoods and subdivisions, sound walls may provide the only alternative to reduce noise to acceptable community standards. The Design Review process shall evaluate sound wall aesthetics and landscaping to ensure attractiveness along with functionality.

NS-B-3 Prevent new stationary and transportation noise sources from creating a nuisance in existing developed areas. Use a comprehensive program of noise prevention through planning and mitigation, and consider noise impacts as a crucial factor in project approval.

The Land Use Compatibility Standards specify normally acceptable levels for community noise in various land use areas.

NS-B-4 Require new projects in the following categories to submit an acoustical study, prepared by a qualified acoustical consultant:

- *All new projects proposed for areas with existing noise above 60dBA DNL. Mitigation shall be sufficient to reduce noise levels below 45 dBA DNL in habitable rooms and 60 dBA DNL in private and shared recreational facilities. Additions to existing housing units are exempt.*
- *All new projects that could generate noise whose impacts on other existing uses would be greater than those normally acceptable (as specified in the Land Use Compatibility Standards).*

NS-B-5 Pursue measures to reduce noise impacts primarily through site planning. Engineering solutions for noise mitigation, such as sound walls, are the least desirable alternative.

NS-B-6 Do not permit existing uses to generate new noises exceeding normally acceptable levels unless:

- Those noises are mitigated to acceptable levels; or
- The activities are specifically exempted by the City Council on the basis of community health, safety, and welfare.

NS-B-7 Allow reasonable latitude for noise generated by uses that are essential to community health, safety, and welfare. These include emergency medical helicopter and vehicle operations, and emergency vehicle sirens.

NS-B-8 Adopt mitigations, including reduced speed limits, improved paving texture, and traffic controls, to reduce noise to normally acceptable levels in areas where noise standards may be exceeded (e.g., where homes front regional/arterial streets and in areas of mixed use development.)

NS-B-9 Encourage developers to incorporate acoustical site planning into their projects. Recommended measures include:

- Incorporating buffers and/or landscaped earth berms;
- Orienting windows and outdoor living areas away from unacceptable noise exposure;
- Using reduced-noise pavement (rubberized-asphalt);
- Incorporating traffic calming measures, alternative intersection designs, and lower speed limits; and
- Incorporating state-of-the-art structural sound attenuation and setbacks.

NS-B-10 Work with private enterprises to reduce or eliminate nuisance noise from industrial and commercial sources that impact nearby residential areas. If progress is not made within a reasonable time, the city shall issue abatement orders or take other legal measures.

NS-B-11 Work with CalTrans to assign a high priority to traffic noise mitigation programs. Support construction of attractive sound walls, as necessary along Highway 101 and Highway 12.

NS-B-12 Cooperate with Santa Rosa Memorial Hospital, Sutter Medical Center, and other hospitals proposing helipads. Minimize the noise and safety impacts of medical emergency helicopters through location and design of landing pads, regulation of flight times and frequency and, if necessary, sound attenuating alterations to nearby residences.

NS-B-13 Prohibit new helipads in developments of industrial, commercial, office, or business park uses. The city may make an exception if the helipad will provide a significant benefit for community health, safety, and welfare.

NS-B-14 Discourage new projects that have potential to create ambient noise levels more than 5 dBA DNL above existing background, within 250 feet of sensitive receptors.

City of Santa Rosa Municipal Code – Chapter 17-16: Noise

Section 17-16.030 of the City's Municipal Code presents the criteria to be used as a base (ambient noise level) from which noise levels can be compared.

Zone	Time	Sound Level A (decibels) Community Environment Classification
R1 and R2	10 p.m. to 7 a.m.	45
R1 and R2	7 p.m. to 10 p.m.	50
R1 and R2	7 a.m. to 7 p.m.	55
Multi-family	10 p.m. to 7 a.m.	50
Multi-family	7 a.m. to 10 p.m.	55
Office & Commercial	10 p.m. to 7 a.m.	55
Office & Commercial	7 a.m. to 10 p.m.	60
Intensive Commercial*	10 p.m. to 7 a.m.	55
Intensive Commercial	7 a.m. to 10 p.m.	65
Industrial	Anytime	70

"Intensive commercial" means those office and commercial zones within the City which exhibit ambient noise levels in excess of the "Office and Commercial" areas defined in Section 17-16.030.

Section 17-16.040 Standards for determining violations.

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

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

(a) The level of noise;
(b) The intensity of the noise;
(c) Whether the nature of the noise is usual or unusual;
(d) Whether the origin of the noise is natural or unnatural;
(e) The level and intensity of the background noise, if any;
(f) The proximity of the noise to residential sleeping facilities;
(g) The nature and zoning of the area within which the noise emanates;
(h) The density of the inhabitation of the area within which the noise emanates;
(i) The time of the day or night the noise occurs;

(j) The duration of the noise;
(k) Whether the noise is recurrent, intermittent or constant;
(l) Whether the noise is produced by a commercial or noncommercial activity. (Prior code Ch. 27, Art. I, Div. 5)

Section 17-16.120 Machinery and equipment.

It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to ***exceed the ambient base noise level by more than five decibels***. (Prior code § 27.20).

Threshold Applied to the Project

Per Section 17-16.120, the adjacent multi-family zoned (R-3) properties have a noise limit of 55+5 dBA Leq from the hours of 7 AM to 10 PM. The adjacent commercial zone has an ambient in excess of 60 dBA between the hours of 7 AM and 10 PM, and so the adjacent commercial properties have a noise limit of 65+5 dBA Leq from the hours of 7 AM to 10 PM.

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

MD conducted three (3) short-term noise measurements at the Project site, representing the noise level from the traffic conditions along Sonoma Highway (see Appendix A for the field sheet data).

5.2 Stationary Noise Modeling

SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP can evaluate 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 (vacuums and car wash blowers at the exit). The SP model assumes a total of 18 vacuums and the dryer systems are operating simultaneously (worst-case scenario) when the noise will, in reality, be intermittent and lower in noise level. The reference vacuum equipment and blower system sound level data are provided in Appendix C.

All other noise-producing equipment (e.g., compressors, pumps) will be housed within mechanical equipment rooms.

The following outlines the project design features:

1. The Project will incorporate a 140 HP IDC Predator or 120 HP Aerodry blower system or equivalent.

6.0 Existing Noise Environment

Three (3) 15-minute ambient noise measurements were taken at the project site to determine the existing ambient noise levels. Noise data indicates that traffic along Sonoma Highway is the primary source of noise impacting the site and the surrounding area. NM1 and NM2 represent the noise levels at the adjacent R-3 residential use to the north and commercial use to the west, and NM3 represents the noise level at the R-3 residentially zoned land to the south.

6.1 Short-Term Noise Measurement Results

The results of the 15-minute measurements are presented in Table 1.

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

Location	Start Time	Stop Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}	L_{90}
NM1	6:59 PM	7:14 PM	67.5	88.4	42.9	74.8	70.1	66.8	61.0	49.5
NM2	6:41 PM	6:56 PM	68.1	76.2	43.2	73.8	72.4	69.9	65.9	56.3
NM3	7:17 PM	7:32 PM	40.6	48.9	37.7	44.9	42.2	40.7	39.9	38.7

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

For this evaluation, MD has utilized the measured ambient noise level of 68 dBA Leq for the uses adjacent to Sonoma Hwy and 41 dBA Leq to represent the uses to the south of the site. The ambient at the adjacent commercial properties is above 60 dBA Leq, and therefore qualifies as intensive commercial per Section 17-16.010 of the Folsom Municipal Code.

Exhibit E
Measurement Locations

= Short-term Monitoring Location

7.0 Future Noise Environment Impacts

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 noise sources on-site such as dryers/blowers and vacuums.

7.1 Stationary Source Noise

The following sections outline the exterior noise levels associated with the proposed Project.

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

Sensitive receptors affected by Project operational noise include a residential property to the northwest. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes the blowers, vacuums, and equipment are always operational when in reality, the noise will be intermittent and cycle on/off depending on the customer usage.

Three (3) receptors were modeled to evaluate the proposed Project's operational impact at the nearest properties. R1 represents the multi-family uses to the north across Sonoma Hwy. R2 represents the intensive commercial properties adjacent to the project. R3 represents the multi-family zoned vacant/wooded use to the south. This study analyzes the Project only operational noise level projections and the Project plus ambient noise level projections. See Table 2 below.

Table 2: Worst-Case Predicted Operational Noise Levels (dBA)

Receptor[1]	Existing Ambient Noise Level (dBA, L_{eq})[2]	Project Noise Level (dBA, L_{eq})[3]	Daytime Exterior (7 a.m. – 10 p.m.) Machinery Noise Limit (dBA, L_{eq})[4]	Total Combined Noise Level (dBA, L_{eq})	Change in Noise Level as Result of Project
R1	68	57	**55+5**	68	0
R2	68	64	**65+5**	69	1
R3	41	45	**55+5**	46	5

Notes:
1. R1 and R3 are R-3 zoning. R2 is CG zoning.
2. See Appendix A for the ambient noise measurement.
3. See Exhibit F for the operational noise level projections at the said receptor.
4. The residential properties are the only sensitive land use.

The model indicates that the project-only noise level will be up to 57 dBA L_{eq} at the residential receptors and 64 dBA L_{eq} at the commercial receptor. The Project plus ambient level will be up to 68 dBA L_{eq} at the residential receptors and 69 dBA L_{eq} at the commercial receptor.

The level will not increase at the residential receptor to the north. The level will increase by 5 dB at the residentially zoned land to the south and by 1 dB at the commercial receptor. See Table 3.

Table 3: Change in Noise Level Characteristics

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

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

The change in noise level would be "Not Perceptible" at the R-3 multi-family receptor to the north as well as the intensive commercial receptor and "Clearly Noticeable" at the R-3 multi-family zoned receptor to the south. The project noise levels do not exceed either the multi-family 55+5 dBA or the intensive commercial 65+5 dBA daytime noise limits per Section 17-16.120 of the Folsom Municipal Code.

The following outlines the project design features:

1. The Project will incorporate a 140 HP IDC Predator or 120 HP Aerodry blower system or equivalent.

Exhibit F

Operational Noise Levels Contours

8.0 References

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

City of Santa Rosa: Noise Element of the General Plan

City of Santa Rosa: Municipal Code Chapter 17-16 – Noise

Appendix A:

Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet - NM1, NM2, NM3

Project Name:	QQ 25-159 Sonoma Hwy & Mission Blvd
Project: #/Name:	0362-2024-027
Site Address/Location:	4332 Sonoma Hwy
Date:	10/21/2024
Field Tech/Engineer:	Joel Demir

Site Observations:

Intermittent moderate traffic on Sonoma Hwy. Calm weather.

NM1: Loud motorcycles around 7:01pm and 7:13pm
NM2: No notable peak events
NM3: Low bass subwoofer around 7:20pm. Distant dumpster loading around 7:29pm.

Sound Meter:	831, Larson Davis	**SN:**	0003715
Settings:	A-weighted, slow, 1-sec, 15-minute interval		
Site Id:	NM1, NM2, NM3		

STICS

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1, NM2, NM3

Project Name:	QQ 25-159 Sonoma Hwy & Mission Blvd	**Calibrator:**	
Site Address/Location:	4332 Sonoma Hwy	**Cal Check: Pre-test:**	**Post Test:**
Site Id:	NM1, NM2, NM3		

Figure 1: NM1

Figure 2: NM2

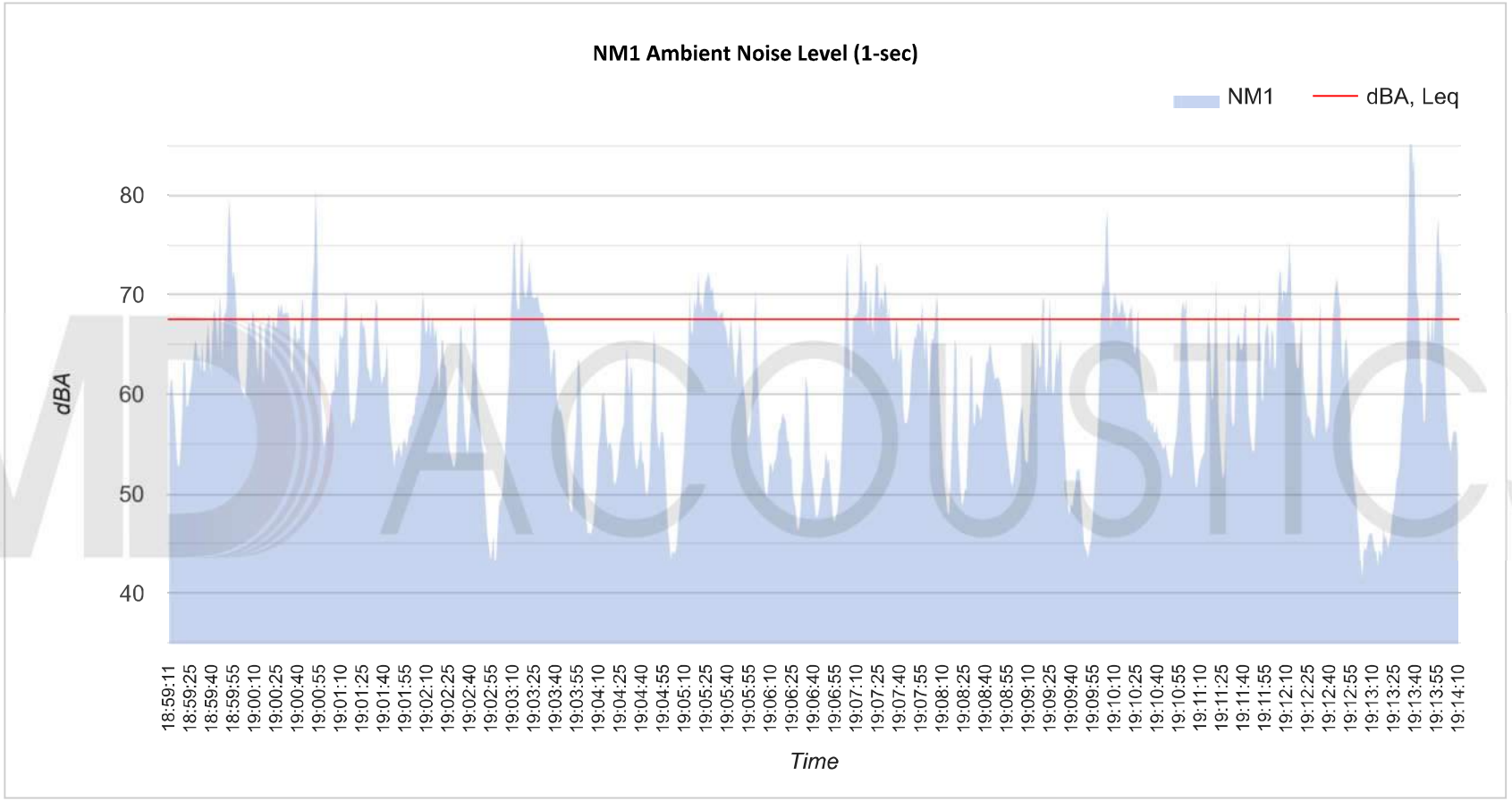
Figure 3: NM3

Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	6:59 PM	7:14 PM	67.5	88.4	42.9	74.8	70.1	66.8	61	49.5
NM2	6:41 PM	6:56 PM	68.1	76.2	43.2	73.8	72.4	69.9	65.9	56.3
NM3	7:17 PM	7:32 PM	40.6	48.9	37.7	44.9	42.2	40.7	39.9	38.7

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

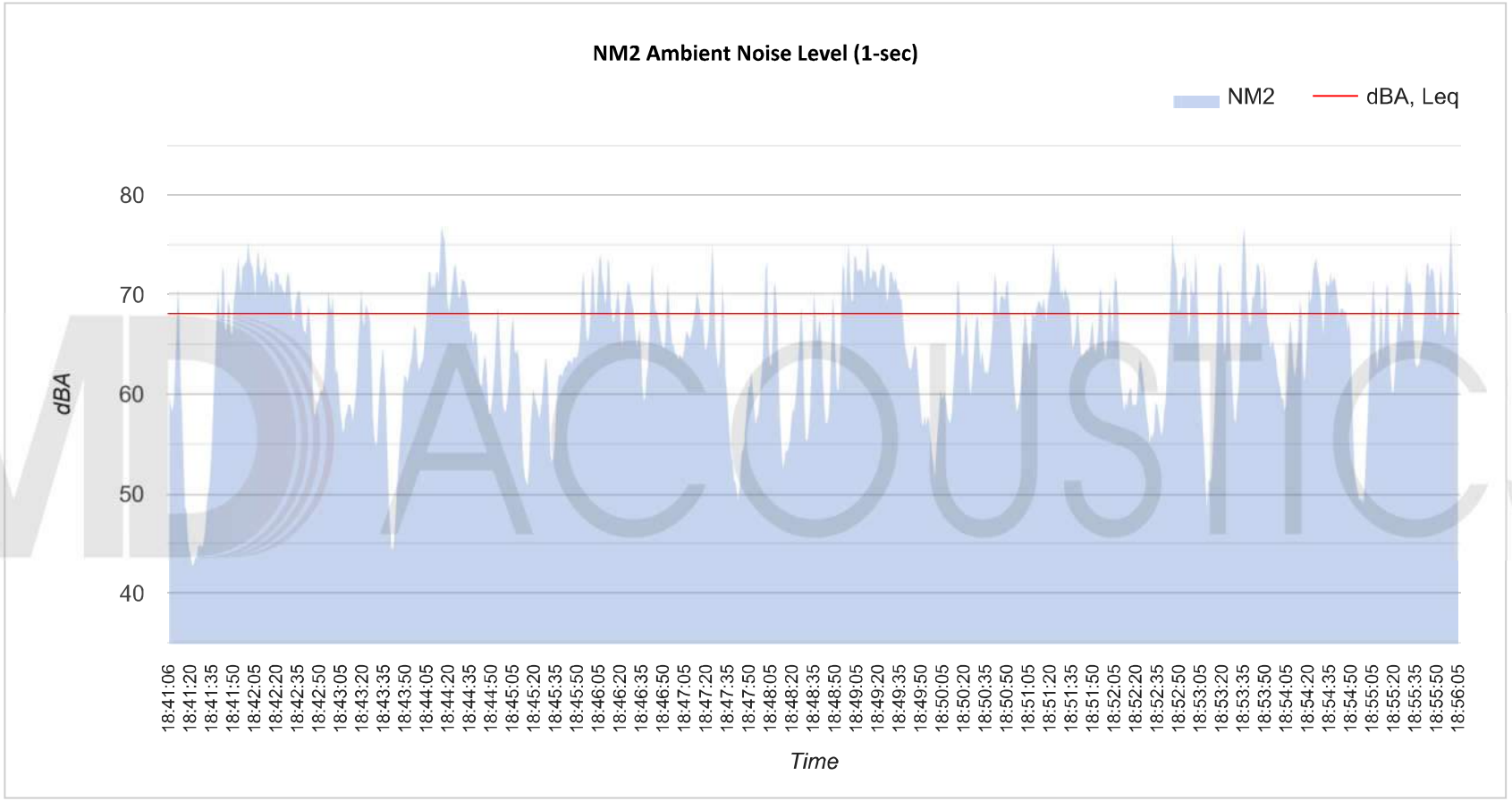
Project Name:	QQ 25-159 Sonoma Hwy & Mission Blvd	**Site Topo:**	flat	**Noise Source(s) w/ Distance:**	
Site Address/Location:	4332 Sonoma Hwy	**Meteorological Cond.:**		Sonoma Hwy @ 90 ft	
Site Id:	NM1	**Ground Type:**	soft		



MD ACOUSTICS

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

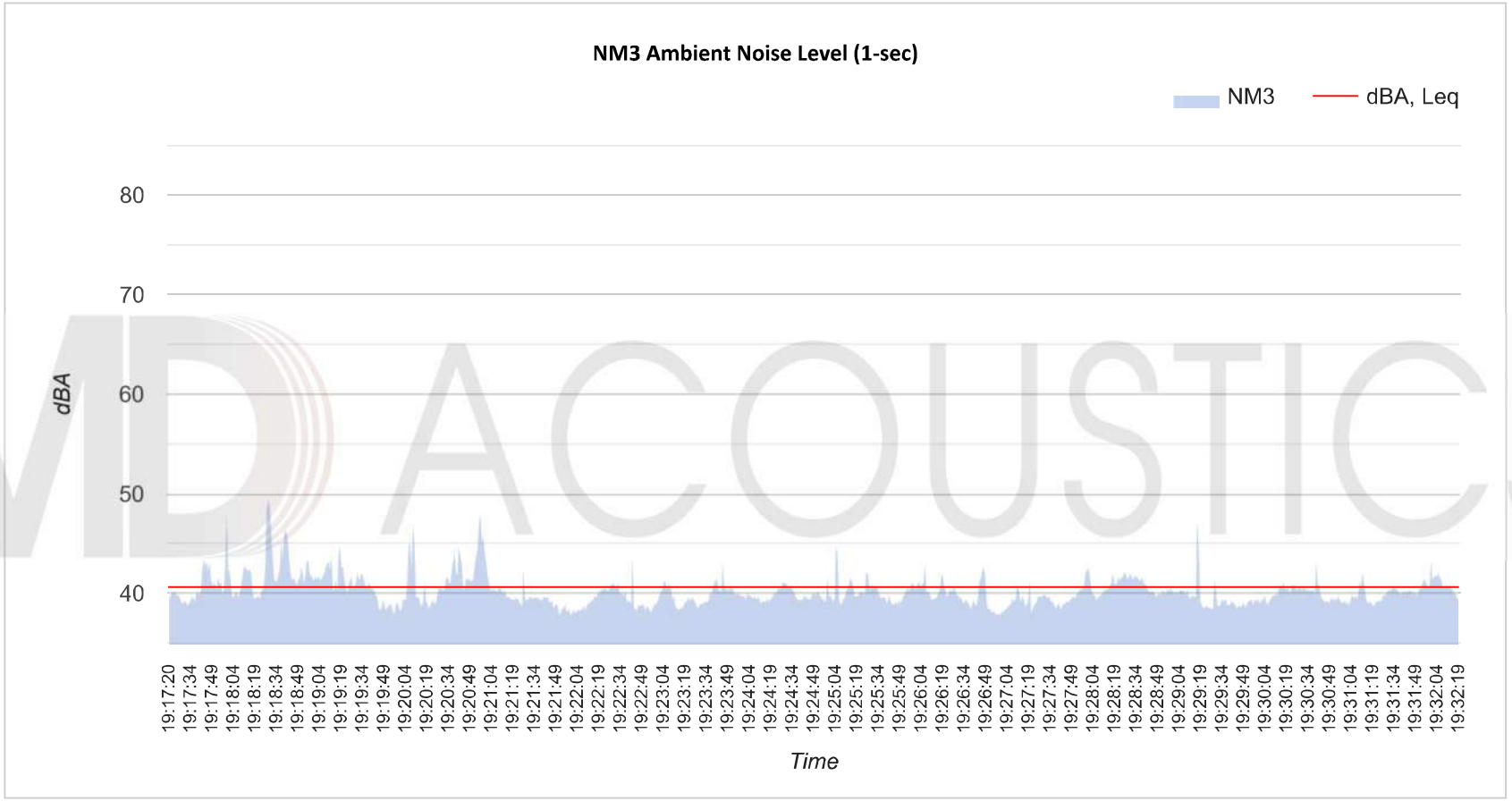
Project Name:	QQ 25-159 Sonoma Hwy & Mission Blvd	**Site Topo:**	flat	**Noise Source(s) w/ Distance:**	
Site Address/Location:	4332 Sonoma Hwy	**Meteorological Cond.:**			Sonoma Hwy @60 ft
Site Id:	NM2	**Ground Type:**	hard		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM3

Project Name:	QQ 25-159 Sonoma Hwy & Mission Blvd	**Site Topo:**	flat	**Noise Source(s) w/ Distance:**	
Site Address/Location:	4332 Sonoma Hwy	**Meteorological Cond.:**			Sonoma Hwy @ 590 ft (no line of sight)
Site Id:	NM3	**Ground Type:**	soft		



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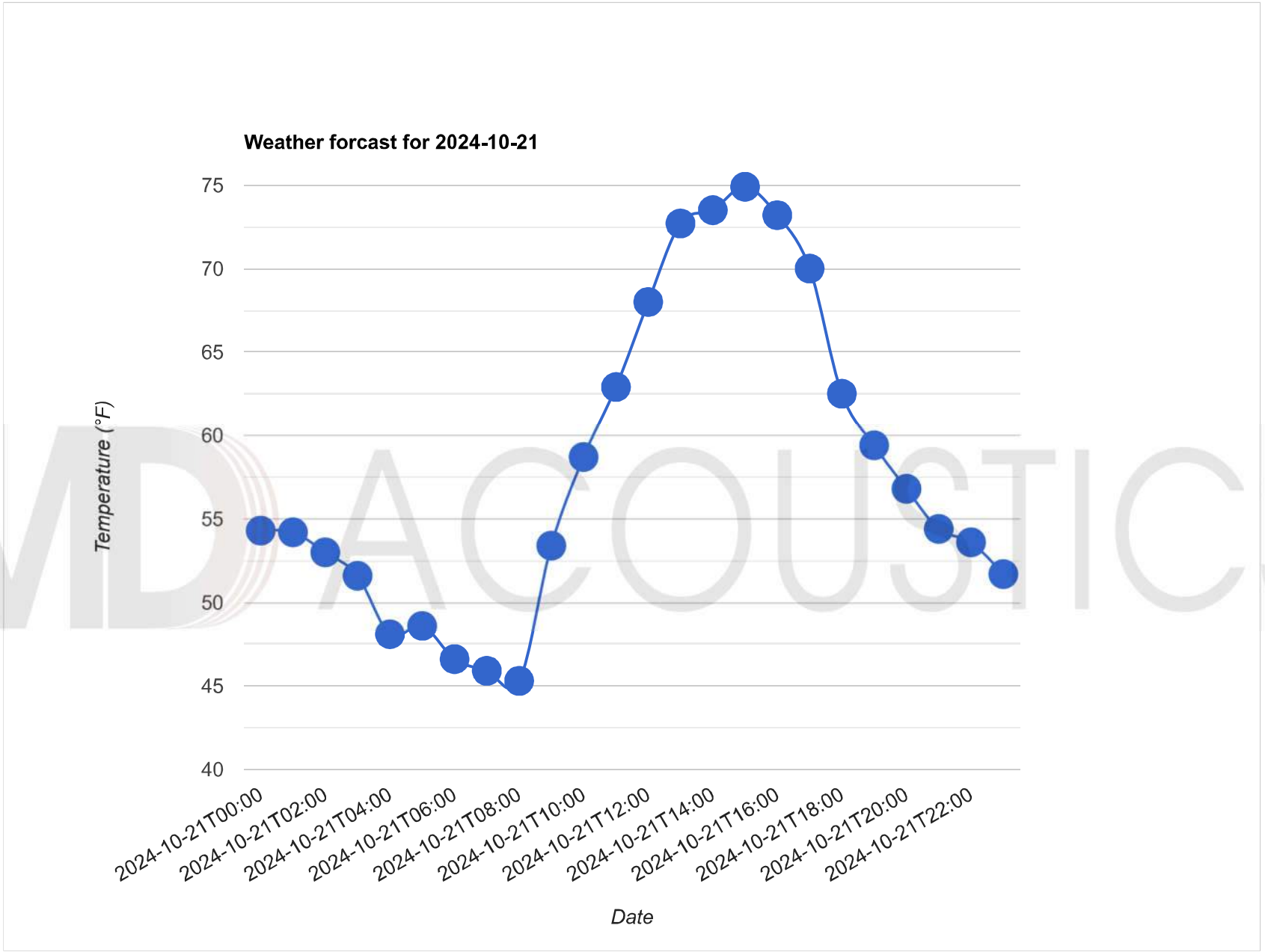
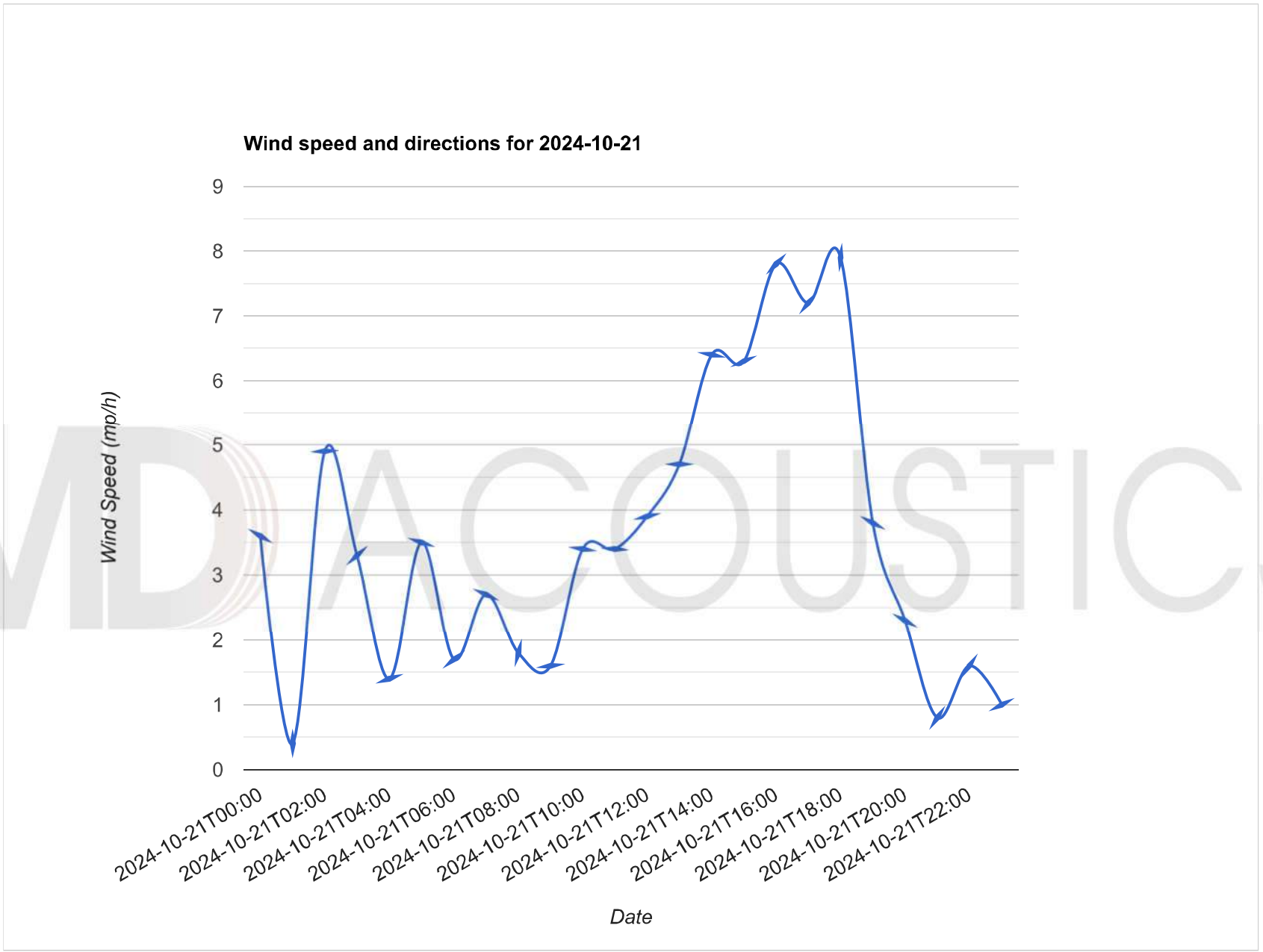


MD ACOUSTICS



Source: Global Forecast System (GFS) weather forcast model

Appendix B:

SoundPLAN Input/Outputs

QQ 25-159 Sonoma Hwy & Mission Blvd Santa Rosa
Contribution spectra - 003 - 140 HP IDC Predator - Standard: Outdoor SP

Source	Time slice	Sum	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver R1 Fl G Lr,lim dB(A) Leq,d 57.2 dB(A) Sigma(Leq,d) 0.0 dB(A)																											
Car Lane	Leq,d	30.1	9.3	9.5	11.1	7.4	10.9	7.3	11.9	7.2	8.8	13.1	13.5	18.1	18.8	18.8	20.0	18.8	21.7	22.8	19.6	16.7	12.5	7.0	0.8	-8.0	-17.5
Car Lane	Leq,d	33.7	11.1	12.7	14.5	11.5	15.4	12.7	16.5	11.4	13.4	17.5	17.7	22.0	22.3	22.4	23.5	22.2	25.2	26.2	23.1	20.7	17.1	11.9	6.3	-1.8	-10.4
Industrial building, room 1-Facade 01	Leq,d	7.1		4.9			-4.9			1.4			-4.3			-16.0			-22.7			-35.7			-56.3		
Industrial building, room 1-Facade 02	Leq,d	-1.8		-5.9			-15.5			-4.8			-14.0			-33.5			-51.3			-72.8			-97.6		
Industrial building, room 1-Facade 03	Leq,d	18.9		11.7			5.6			16.1			12.1			0.9			-5.3			-16.6			-33.2		
Industrial building, room 1-Facade 04	Leq,d	12.9		5.4			-0.5			9.9			6.7			-3.8			-9.7			-20.9			-37.2		
Industrial building, room 1-Roof 01	Leq,d	12.9		7.6			-0.1			9.7			5.0			-6.9			-13.9			-26.2			-44.5		
Industrial building, room 1-Transmissive area 01	Leq,d	57.0		30.2			37.3			48.2			52.0			51.6			50.3			42.6			24.9		
Industrial building, room 1-Transmissive area 01	Leq,d	38.5		20.6			24.9			36.6			33.0			22.7			8.8			-9.5			-32.8		
Turbine	Leq,d	14.1	-19.0	-12.0	-5.1	-3.1	-0.5	0.3	-6.0	-7.2	-3.4	-5.9	-8.0	-4.7	-2.5	-1.4	2.9	3.8	3.6	1.1	5.1	5.2	3.8	2.5	-0.4	-7.7	-15.2
Vac	Leq,d	27.2	3.7	6.2	9.5	9.6	9.8	11.8	13.3	14.8	9.6	6.6	9.4	6.4	13.7	16.4	14.3	18.1	18.0	17.7	17.4	16.2	12.1	7.7	-0.9	-12.3	-25.2
Vac	Leq,d	29.6	4.7	7.4	11.0	11.3	11.7	14.1	15.7	18.7	14.4	12.1	15.8	10.7	15.8	17.8	15.8	19.6	19.5	19.5	19.9	18.8	14.7	10.7	2.9	-6.8	-17.7
Vac	Leq,d	32.3	3.5	6.5	10.5	11.4	12.4	15.4	18.6	21.1	17.1	15.2	19.3	13.4	17.7	19.6	17.7	22.0	22.3	22.7	23.1	22.2	18.6	15.3	9.0	1.3	-6.9
Vac	Leq,d	32.0	3.6	6.6	10.6	11.4	12.4	15.4	18.7	21.1	17.2	15.2	19.3	13.4	17.7	19.3	17.5	21.5	21.8	22.2	22.7	21.8	18.6	15.4	9.1	1.5	-6.7
Vac	Leq,d	32.2	3.6	6.6	10.6	11.4	12.4	15.5	18.7	21.1	17.2	15.2	19.3	13.4	17.9	19.4	17.7	21.7	21.9	22.3	22.7	21.8	19.7	16.4	10.0	2.3	-6.1
Vac	Leq,d	26.2	1.7	4.0	7.2	7.0	7.0	8.8	10.2	9.9	6.8	3.4	14.6	10.5	14.6	15.6	13.5	17.2	16.9	16.5	15.9	14.8	11.1	7.6	0.2	-10.3	-22.9
Vac	Leq,d	25.9	1.8	4.2	7.4	7.2	7.2	9.1	10.5	10.2	7.1	3.8	6.5	10.3	14.4	15.4	13.3	17.0	16.8	16.5	15.9	15.0	11.5	7.9	-0.5	-11.4	-24.2
Vac	Leq,d	25.0	2.1	4.4	7.6	7.5	7.5	9.4	10.9	10.6	7.4	4.1	6.8	9.0	13.2	14.2	12.1	15.7	15.6	15.3	14.8	14.0	10.7	6.2	-2.5	-13.6	-26.4
Vac	Leq,d	25.7	2.4	4.7	8.0	7.9	7.9	9.8	11.3	10.9	7.6	4.3	7.0	8.8	13.0	15.1	13.0	16.7	16.5	16.1	15.6	14.7	11.3	7.0	-1.7	-13.1	-26.1
Vac	Leq,d	25.1	2.9	5.3	8.6	8.5	8.6	10.6	12.1	11.9	8.3	5.1	8.0	1.7	12.0	14.4	12.2	15.9	15.6	15.3	14.8	13.6	9.6	5.1	-3.8	-15.4	-28.3
Receiver R2 Fl G Lr,lim dB(A) Leq,d 63.8 dB(A) Sigma(Leq,d) 0.0 dB(A)																											
Car Lane	Leq,d	37.6	15.3	16.2	18.1	15.0	18.8	16.2	20.2	15.5	17.5	21.7	21.8	26.0	26.3	26.4	27.6	26.4	29.3	30.1	26.5	23.7	19.5	14.7	10.3	4.2	-1.8
Car Lane	Leq,d	38.2	15.5	16.4	18.2	15.3	19.7	17.1	20.8	15.8	17.7	21.8	22.0	26.5	26.9	27.0	28.2	27.1	30.0	30.8	27.2	24.3	19.9	15.0	10.3	3.9	-2.3
Industrial building, room 1-Facade 01	Leq,d	12.5		8.7			-0.1			8.2			4.3			-6.5			-11.8			-23.8			-41.4		
Industrial building, room 1-Facade 02	Leq,d	-6.6		-9.2			-20.6			-11.3			-18.9			-29.8			-45.8			-67.6			-97.2		
Industrial building, room 1-Facade 03	Leq,d	17.8		13.2			5.4			14.2			9.2			-2.0			-8.7			-20.9			-38.2		
Industrial building, room 1-Facade 04	Leq,d	19.1		13.7			6.6			15.7			11.7			1.0			-4.9			-15.7			-30.3		
Industrial building, room 1-Roof 01	Leq,d	14.6		10.0			1.8			11.1			6.2			-5.5			-12.8			-26.0			-44.9		
Industrial building, room 1-Transmissive area 01	Leq,d	63.6		39.2			46.3			56.9			58.8			57.5			55.7			48.1			32.0		
Industrial building, room 1-Transmissive area 01	Leq,d	33.9		16.6			18.9			29.4			28.3			28.5			16.9			-1.0			-29.0		
Turbine	Leq,d	22.9	-11.6	-4.6	2.4	4.5	7.2	8.1	4.2	3.1	2.1	3.6	1.7	5.0	6.1	7.2	10.1	10.9	10.9	8.6	13.1	13.9	13.3	13.3	12.2	7.5	3.4
Vac	Leq,d	37.5	12.1	15.1	19.1	20.0	21.0	24.0	26.5	27.5	24.0	22.0	26.0	20.0	23.9	24.9	22.9	26.8	26.6	26.3	25.9	25.3	22.3	20.0	15.0	9.2	3.4
Vac	Leq,d	38.2	12.8	15.8	19.8	20.6	21.6	24.6	27.2	28.7	24.7	22.7	26.7	20.7	24.6	25.5	23.5	27.3	27.1	26.9	26.5	25.9	23.0	20.8	16.0	10.4	4.9
Vac	Leq,d	39.6	13.4	16.4	20.4	21.3	22.3	25.3	28.0	30.0	26.0	24.1	28.1	22.1	26.0	27.0	25.0	28.8	28.6	28.4	28.0	27.5	24.6	22.4	17.6	12.0	6.6
Vac	Leq,d	40.2	14.0	17.0	21.0	21.9	22.9	25.9	28.8	30.7	26.7	24.8	28.7	22.7	26.6	27.6	25.6	29.3	29.2	29.0	28.6	28.1	25.3	23.2	18.5	13.1	7.9

QQ 25-159 Sonoma Hwy & Mission Blvd Santa Rosa
Contribution spectra - 003 - 140 HP IDC Predator - Standard: Outdoor SP

Source	Time slice	Sum	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Vac	Leq,d	40.7	14.7	17.7	21.7	22.6	23.6	26.6	29.5	31.4	27.4	25.4	29.4	23.4	27.2	28.2	26.2	29.6	29.5	29.3	29.0	28.5	25.9	23.9	19.4	14.2	9.2
Vac	Leq,d	34.4	4.6	7.6	11.6	12.5	13.6	16.7	19.9	21.1	19.0	17.2	22.1	16.7	20.8	22.8	21.7	25.2	25.0	24.7	24.2	23.3	20.0	17.0	11.2	4.1	-3.4
Vac	Leq,d	34.9	5.5	8.6	12.7	13.7	14.9	18.1	21.6	23.1	20.7	19.5	24.0	17.9	22.1	23.2	21.2	25.2	24.9	24.5	23.9	23.1	19.8	17.0	11.4	4.9	-2.0
Vac	Leq,d	36.5	10.5	13.5	17.5	18.3	19.3	22.3	24.5	25.5	22.2	20.2	24.8	18.8	23.1	24.1	22.1	26.0	25.7	26.4	25.9	25.0	21.8	19.0	13.4	6.8	-0.1
Vac	Leq,d	36.6	11.0	14.0	18.0	18.9	19.9	22.8	25.2	26.1	22.7	20.8	25.3	19.3	23.5	24.5	22.5	26.0	25.7	25.5	25.0	24.2	21.2	18.6	13.3	7.1	0.7
Vac	Leq,d	37.3	11.6	14.6	18.6	19.4	20.4	23.4	25.8	26.8	23.3	21.4	25.9	19.8	24.0	25.0	23.0	26.9	26.6	26.3	25.8	25.1	22.0	19.5	14.3	8.2	2.1
Receiver R3 Fl G Lr,lim dB(A) Leq,d 44.7 dB(A) Sigma(Leq,d) 0.0 dB(A)																											
Car Lane	Leq,d	21.4	3.5	3.5	4.6	0.3	3.4	-0.5	2.2	-3.3	-1.5	4.7	6.5	10.4	10.2	10.2	11.2	9.7	12.5	13.7	10.2	7.4	3.3	-1.3	-6.0	-14.3	-23.6
Car Lane	Leq,d	21.2	4.6	4.6	5.6	1.2	4.3	0.3	3.3	-2.4	-0.6	4.2	5.2	9.3	9.0	9.9	10.9	9.4	12.6	13.3	9.8	7.2	3.2	-1.3	-6.5	-14.5	-23.6
Industrial building, room 1-Facade 01	Leq,d	-0.1		-2.2			-12.8			-6.6			-10.5			-21.1			-29.0			-42.8			-66.1		
Industrial building, room 1-Facade 02	Leq,d	-17.5		-20.4			-31.7			-21.9			-29.3			-48.1			-65.0			-86.5					
Industrial building, room 1-Facade 03	Leq,d	-2.9		-4.6			-15.8			-9.9			-15.1			-20.1			-26.9			-40.8			-68.3		
Industrial building, room 1-Facade 04	Leq,d	-0.3		-3.8			-13.9			-8.1			-5.8			-13.5			-19.7			-32.5			-54.7		
Industrial building, room 1-Roof 01	Leq,d	-0.4		-3.2			-13.7			-6.8			-8.2			-17.4			-25.3			-39.6			-65.1		
Industrial building, room 1-Transmissive area 01	Leq,d	44.5		20.9			24.6			31.4			39.8			40.3			37.7			28.6			4.1		
Industrial building, room 1-Transmissive area 01	Leq,d	22.0		5.1			7.7			18.9			17.9			10.5			-1.5			-19.7			-47.3		
Turbine	Leq,d	9.1	-24.4	-18.2	-12.1	-11.0	-9.0	-5.9	-12.8	-14.5	-15.9	-9.1	-10.2	-8.5	-5.4	-4.5	-1.7	-0.9	-1.1	-3.7	0.3	0.5	-1.1	-2.7	-6.2	-14.6	-23.6
Vac	Leq,d	14.6	-2.2	-0.3	2.6	2.1	2.0	3.9	5.3	5.3	3.9	0.8	3.8	-3.2	-0.2	-0.3	-3.1	-0.2	-1.2	-1.8	-2.4	-3.7	-7.6	-11.5	-18.6	-27.4	-37.5
Vac	Leq,d	14.4	-1.9	0.0	3.0	2.4	2.4	4.3	5.7	5.6	3.0	0.0	3.0	-4.1	-1.1	-1.1	-4.2	-1.2	-2.0	-2.7	-3.5	-4.7	-8.4	-12.1	-18.9	-27.5	-37.3
Vac	Leq,d	17.0	-1.5	0.5	3.5	3.0	2.9	4.9	6.2	6.2	3.5	0.5	3.4	-3.7	1.1	1.0	-2.1	1.4	0.3	-0.8	9.2	8.0	4.1	0.1	-7.3	-16.7	-27.5
Vac	Leq,d	21.8	-0.8	1.3	4.3	3.8	3.8	5.8	7.0	7.0	2.0	1.2	11.3	5.1	9.2	10.1	8.0	11.5	11.4	10.9	12.7	11.6	7.8	4.2	-2.7	-11.3	-22.4
Vac	Leq,d	21.8	0.5	2.6	5.7	5.4	5.5	7.5	8.6	8.7	3.7	2.8	11.8	5.5	9.4	10.2	8.0	11.6	11.5	11.1	10.4	9.4	5.8	2.4	-4.2	-12.3	-23.2
Vac	Leq,d	14.9	-3.1	-1.2	1.7	1.1	1.0	2.9	4.3	4.3	3.1	0.1	3.1	-4.0	0.9	2.9	1.0	4.7	3.3	1.7	-0.4	-2.9	-8.0	-12.9	-20.9	-30.5	-41.3
Vac	Leq,d	15.2	-2.9	-1.0	1.9	1.3	1.2	3.2	4.6	4.6	3.2	1.6	4.5	-2.0	2.0	2.1	0.5	4.4	3.1	1.6	-0.1	-2.3	-7.1	-11.6	-19.3	-28.7	-39.4
Vac	Leq,d	15.1	-2.7	-0.7	2.2	1.6	1.5	3.4	4.9	4.9	3.5	1.9	4.8	-1.8	1.3	1.5	0.3	3.3	2.0	0.7	-0.9	-2.3	-7.0	-11.4	-19.0	-28.3	-38.8
Vac	Leq,d	14.9	-2.7	-0.7	2.2	1.6	1.5	3.5	4.9	4.9	3.6	2.0	5.0	-1.6	1.4	1.4	-1.6	1.7	0.6	-0.2	-1.5	-3.0	-7.3	-11.3	-18.7	-27.9	-38.3
Vac	Leq,d	15.0	-2.5	-0.6	2.3	1.8	1.7	3.7	5.1	5.1	3.7	2.2	5.2	-1.5	1.6	1.5	-1.4	1.3	0.2	-0.4	-1.6	-3.1	-7.2	-11.2	-18.5	-27.5	-37.8

Source	Source type	Leq,d dB(A)	
Receiver R1 Fl G Lr,lim dB(A) Leq,d 57.2 dB(A) Sigma(Leq,d) 0.0 dB(A)			
Industrial building, room 1-Transmissive area 01	Area	57.0	
Industrial building, room 1-Transmissive area 01	Area	38.5	
Car Lane	Line	33.7	
Vac	Point	32.3	
Vac	Point	32.2	
Vac	Point	32.0	
Car Lane	Line	30.1	
Vac	Point	29.6	
Vac	Point	27.2	
Vac	Point	26.2	
Vac	Point	25.9	
Vac	Point	25.7	
Vac	Point	25.1	
Vac	Point	25.0	
Industrial building, room 1-Facade 03	Area	18.9	
Turbine	Point	14.1	
Industrial building, room 1-Roof 01	Area	12.9	
Industrial building, room 1-Facade 04	Area	12.9	
Industrial building, room 1-Facade 01	Area	7.1	
Industrial building, room 1-Facade 02	Area	-1.8	
Receiver R2 Fl G Lr,lim dB(A) Leq,d 63.8 dB(A) Sigma(Leq,d) 0.0 dB(A)			
Industrial building, room 1-Transmissive area 01	Area	63.6	
Vac	Point	40.7	
Vac	Point	40.2	
Vac	Point	39.6	
Vac	Point	38.2	
Car Lane	Line	38.2	
Car Lane	Line	37.6	
Vac	Point	37.5	
Vac	Point	37.3	
Vac	Point	36.6	
Vac	Point	36.5	
Vac	Point	34.9	
Vac	Point	34.4	
Industrial building, room 1-Transmissive area 01	Area	33.9	
Turbine	Point	22.9	
Industrial building, room 1-Facade 04	Area	19.1	
Industrial building, room 1-Facade 03	Area	17.8	
Industrial building, room 1-Roof 01	Area	14.6	
Industrial building, room 1-Facade 01	Area	12.5	
Industrial building, room 1-Facade 02	Area	-6.6	
Receiver R3 Fl G Lr,lim dB(A) Leq,d 44.7 dB(A) Sigma(Leq,d) 0.0 dB(A)			
Industrial building, room 1-Transmissive area 01	Area	44.5	

QQ 25-159 Sonoma Hwy & Mission Blvd Santa Rosa
Assessed contribution level - 003 - 140 HP IDC Predator -

Source	Source type	Leq,d dB(A)	
Industrial building, room 1-Transmissive area 01	Area	22.0	
Vac	Point	21.8	
Vac	Point	21.8	
Car Lane	Line	21.4	
Car Lane	Line	21.2	
Vac	Point	17.0	
Vac	Point	15.2	
Vac	Point	15.1	
Vac	Point	15.0	
Vac	Point	14.9	
Vac	Point	14.9	
Vac	Point	14.6	
Vac	Point	14.4	
Turbine	Point	9.1	
Industrial building, room 1-Facade 01	Area	-0.1	
Industrial building, room 1-Facade 04	Area	-0.3	
Industrial building, room 1-Roof 01	Area	-0.4	
Industrial building, room 1-Facade 03	Area	-2.9	
Industrial building, room 1-Facade 02	Area	-17.5	

QQ 25-159 Sonoma Hwy & Mission Blvd Santa Rosa
Octave spectra of the sources in dB(A) - 003 - 140 HP IDC Predator - Standard: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	Rw dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	DO-Wall dB	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)
Car Lane	Line	73.06			62.8	81.4	0.0	0.0	0	Drive-Thru - Idiling Car @ 6ft	65.1	66.6	69.4	74.4	74.9	76.2	72.7	64.7	58.1
Car Lane	Line	120.31			62.8	83.6	0.0	0.0	0	Drive-Thru - Idiling Car @ 6ft	67.3	68.8	71.6	76.5	77.1	78.4	74.9	66.9	60.3
Industrial building, room 1-Facade 01	Area	194.25	87.5	57.0	38.8	61.7	0.0	0.0	3	1263_Facade 01_	54.6	48.6	59.3	54.1	41.7	35.4	25.2	12.9	
Industrial building, room 1-Facade 02	Area	22.40	82.0	57.0	34.8	48.3	0.0	0.0	3	1265_Facade 02	39.3	32.9	46.9	39.3	21.1	5.6	-12.6		
Industrial building, room 1-Facade 03	Area	194.25	87.5	57.0	38.8	61.7	0.0	0.0	3	1267_Facade 03_	54.6	48.6	59.3	54.1	41.7	35.4	25.3	12.9	
Industrial building, room 1-Facade 04	Area	28.72	89.8	57.0	40.6	55.2	0.0	0.0	3	1269_Facade 04_	48.2	42.4	52.5	48.1	36.3	30.3	20.3	8.4	
Industrial building, room 1-Roof 01	Area	205.11	87.4	57.0	38.7	61.9	0.0	0.0	0	1255_Roof 01_	54.7	48.7	59.4	54.3	41.9	35.6	25.5	13.1	
Industrial building, room 1-Transmissive area 01	Area	9.29	90.3	0.0	90.3	100.0	0.0	0.0	3	1270_Transmissive area 01	73.7	81.9	94.2	95.7	93.0	91.0	84.2	70.8	
Industrial building, room 1-Transmissive area 01	Area	15.61	82.0	0.0	82.0	93.9	0.0	0.0	3	1266_Transmissive area 01	67.2	74.9	91.3	89.9	80.6	68.8	53.7	37.2	
Turbine	Point				72.6	72.6	0.0	0.0	0	Vacutech Turbine	47.3	57.5	54.5	51.9	55.8	59.5	66.1	69.3	65.0
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2
Vac	Point				81.0	81.0	0.0	0.0	0	Vacutech - in car	62.4	69.2	75.8	72.6	71.3	73.2	72.6	67.8	59.2

Appendix C:

Equipment Reference Data

D. L. ADAMS ASSOCIATES
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1536 Ogden Street
Denver, CO 80218
www.dlaa.com
303.455.1900

August 11, 2016

Ms. Cheryl Dobie
Aerodry Systems, LLC
P.O. Box 907
Broomfield, Colorado 80038

Re: Aerodry – Spectral Sound Measurements (DLAA #16-131) Summary Report

Dear Cheryl,

The following is a summary of the blower sound level measurements taken at the site on August 4, 2016. Attached is Table 1 which is a summary of the 1/3 octave band sound measurements taken at the site.

We measured a variety of configurations with various model numbers that correspond to different groupings of dryers. The system sizes ranging from 45 HP to 120 HP consisted of configurations utilizing 1 and 2 overhead towers and 1 set of 6-outlet side columns..

Measurements were taken in ANSI-standard 1/3-octave bands between 25 Hertz (Hz) and 20,000 Hz. The blowers were located as shown in Figure 1. Sound measurements were taken outside the building at four distances: 1m, 20', 50', and 90' from the exterior edge of the building at centerline of the opening as shown in Figure 1.

Table 1 (enclosed) summarizes the measurements taken at the four measurement locations under six different operating conditions as described below Table 1.

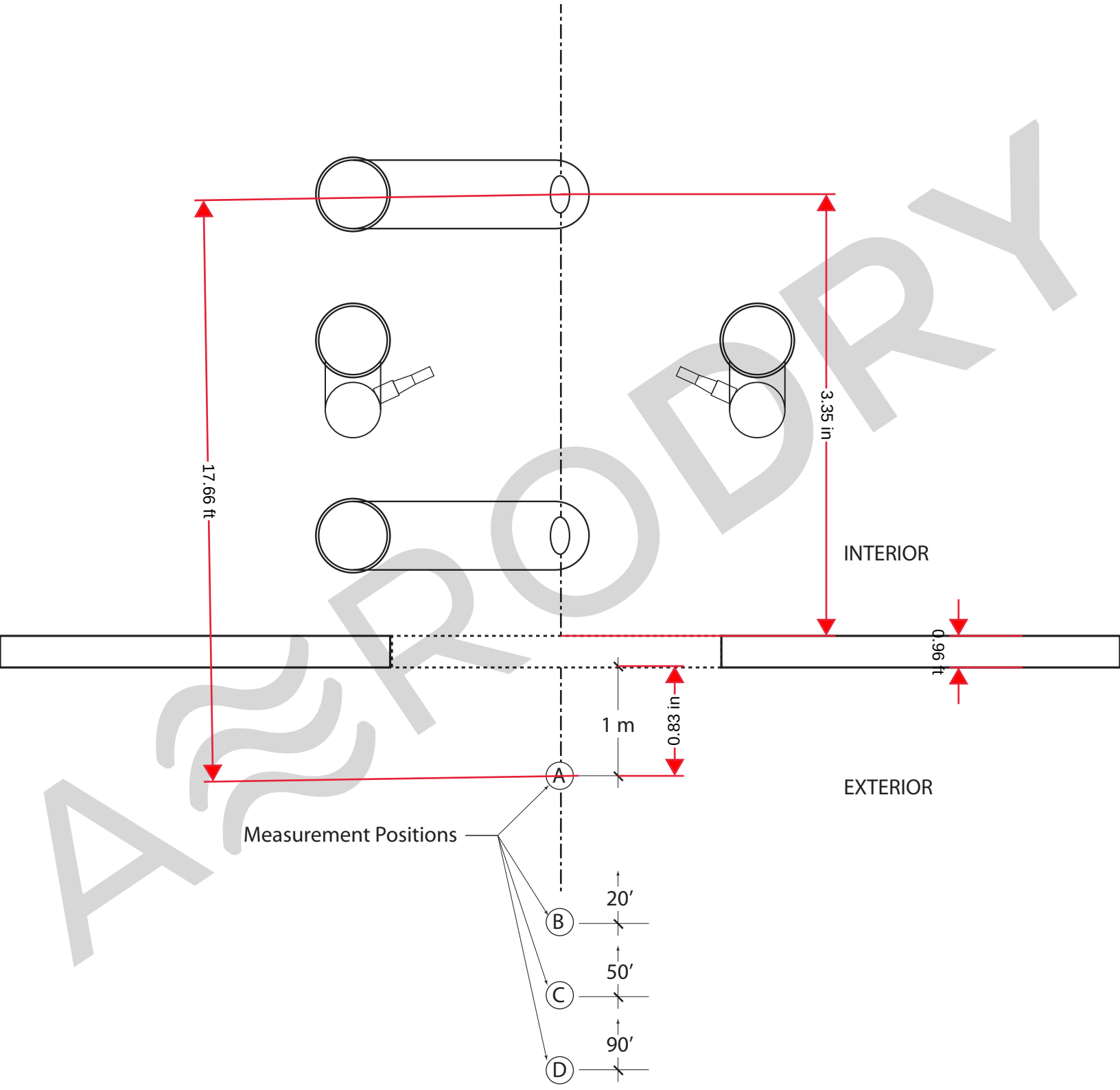
Measurements were taken with a Larson Davis Model 831 Type 1 sound level meter and a PCB Piezotronics Model 377B02 condensing microphone. Immediately prior to measuring, the sound level meter's calibration was checked and recorded. Calibration was again verified at the conclusion of the measurements. All of our equipment has been calibrated within the recommended time period set by the manufacturer. Documentation verifying measurement calibration compliance is available upon request,

If you have any questions, please call me.

Sincerely,

Mick Barnhardt
Senior Consultant

Encl: Figure 1; Table 1



AERODRY

Dryer Configuration

D. L. ADAMS ASSOCIATES
acoustics | performing arts | technology
1536 Ogden Street Denver, Colorado 80218
303/455-1900 FAX 303/455-9187

Aerodry

scale: 1/4" = 1' - 0"

Figure 1

8-11-16 | Project No. 16-161 | Drawn by MBB

TABLE 1: Sound Measurement Summary (in dB)

		1/3 Octave Band Frequency																													
Location	**Condition**	**25.0**	**31.5**	**40.0**	**50.0**	**63.0**	**80.0**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**	**12500**	**16000**	**20000**	**dBA**
A	Condition 1	75	75	76	79	79	78	73	72	76	73	67	75	83	81	66	65	66	65	66	65	65	62	60	59	57	56	55	52	47	39	**82**
B	Condition 1	63	67	69	70	74	67	66	61	64	62	60	64	76	71	55	57	55	56	54	56	54	51	51	50	48	46	45	42	36	29	**74**
C	Condition 1	60	61	60	64	68	65	62	61	59	57	54	59	68	64	50	50	48	50	49	49	48	45	44	43	40	37	34	30	24	16	**67**
D	Condition 1	57	55	57	61	62	63	64	56	53	52	49	55	64	58	45	46	45	45	45	44	43	40	39	37	34	30	27	22	16	10	**62**
A	Condition 2	69	73	74	76	79	80	80	74	74	77	73	68	73	81	81	74	66	69	67	67	66	66	63	62	61	59	58	56	53	49	**81**
B	Condition 2	65	65	68	70	74	70	66	64	65	63	58	66	73	71	60	57	57	57	57	56	57	53	52	51	49	47	46	43	38	30	**73**
C	Condition 2	60	60	62	64	69	66	61	61	59	58	53	60	67	65	59	52	51	52	51	50	50	47	45	44	41	39	36	32	26	17	**67**
D	Condition 2	61	57	59	64	64	62	59	58	54	54	49	55	62	59	46	48	47	47	47	46	46	41	41	39	36	32	29	23	16	9	**62**
A	Condition 3	76	76	77	78	80	82	74	76	78	73	71	75	84	80	68	67	69	68	69	67	68	64	63	63	60	59	57	54	51	44	**83**
B	Condition 3	65	67	68	70	74	73	66	64	66	63	59	67	77	72	59	58	57	56	57	56	56	54	53	52	49	47	46	42	37	29	**75**
C	Condition 3	61	62	63	64	69	68	61	60	61	59	55	62	70	65	51	52	51	52	51	50	50	47	46	45	42	39	36	32	26	17	**68**
D	Condition 3	59	58	58	60	63	65	58	58	55	53	51	56	65	60	45	47	46	46	47	45	45	43	41	39	35	32	28	23	16	9	**63**
A	Condition 4	74	75	76	80	81	80	75	76	78	75	69	72	80	84	73	67	71	69	69	68	68	65	64	62	61	59	57	55	50	42	**84**
B	Condition 4	65	65	68	72	75	73	68	66	66	65	59	63	72	74	63	59	58	59	59	59	58	56	54	53	51	49	48	45	39	31	**74**
C	Condition 4	61	62	62	66	70	67	63	61	61	60	55	59	65	67	58	52	51	53	53	52	51	49	47	46	43	41	38	34	28	19	**68**
D	Condition 4	58	57	59	63	64	64	60	58	56	55	52	54	60	62	58	49	47	48	49	48	46	44	42	41	37	34	30	25	18	11	**63**
A	Condition 5	77	77	79	80	84	84	77	79	81	76	73	74	81	83	73	69	73	71	72	71	71	67	66	66	63	62	60	58	54	46	**85**
B	Condition 5	68	69	71	72	77	75	69	67	68	65	61	67	75	75	64	61	60	60	61	61	60	57	56	56	53	51	50	47	42	34	**76**
C	Condition 5	63	63	63	66	72	70	63	62	63	61	57	61	67	68	60	54	54	55	54	54	53	50	49	48	45	42	40	36	30	21	**69**
D	Condition 5	59	59	60	62	64	66	61	61	58	56	51	56	62	63	54	49	49	49	50	49	48	45	44	42	38	35	32	26	19	11	**64**
A	Condition 6	76	76	78	79	82	82	75	77	79	74	72	76	83	81	75	68	70	69	69	68	69	65	64	63	61	59	58	55	51	43	**84**
B	Condition 6	66	68	69	71	76	74	67	65	67	64	60	68	76	72	63	59	57	58	59	58	58	55	54	53	50	49	47	44	39	31	**75**
C	Condition 6	62	62	62	64	71	69	62	60	61	59	56	61	68	64	55	53	52	52	52	51	51	48	47	46	42	39	37	33	27	18	**68**
D	Condition 6	58	58	58	62	63	65	60	59	58	55	51	55	63	60	50	48	46	47	48	47	46	44	41	40	36	32	29	24	17	10	**63**

AERODRY

Location A: 1 meter from exterior door opening
Location B: 20 feet from exterior door opening
Location C: 50 feet from exterior door opening
Location D: 90 feet from exterior door opening

Condition 1: Model A45
Condition 2: Model A60
Condition 3: Model A60+
Condition 4: Model A90
Condition 5: Model A120
Condition 6: Model A75

Results are exclusive to the Advantage Drying System manufactured by Aerodry Systems, LLC. Use and interpretation for other equipment models or brands is expressly prohibited. Aerodry Systems, LLC is an independent, certified WBE.

INTERNATIONAL DRYING
CORPORATION

STEALTH PREDATOR DRYING SYSTEM

THE FIRST "ULTRA QUIET" DRYING SYSTEM

- ✔Patent pending Reverse flow technology
- ✔Producers construced from 304 surgical stainless steel
- ✔Over 11,000 cubic feet per minute (CFM) per 10HP motor
- ✔Meets or exceeds most U.S. and International sound regulations
- ✔Sound & Performance studies done in reverberant sound room ISO 3741:2010, 3747:2010

SCAN ME

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International Drying Corporation
160 Chicago St
Cary, IL 60013

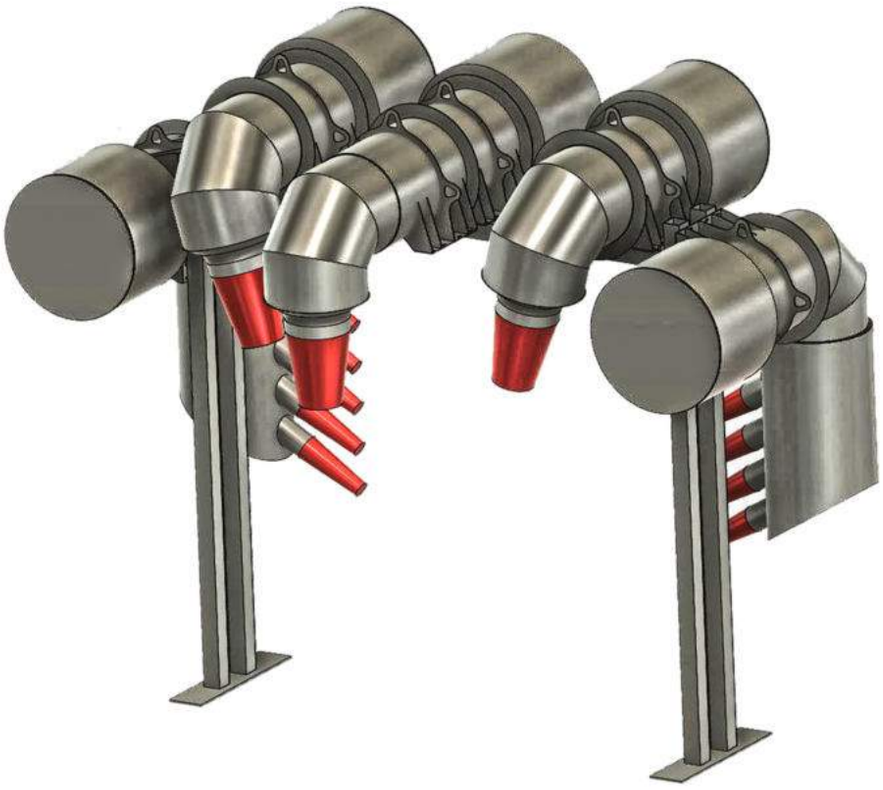
Stealth Predator Ultra-Quiet Drying System Specifications

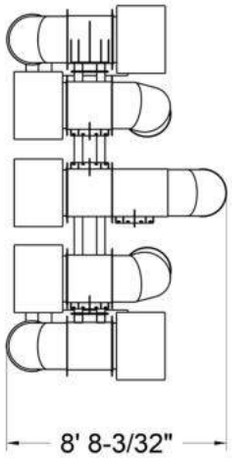
30HP System - Total Sound 60Hz		80HP System - Total Sound 60Hz	
Q = sound source			
65	dBA at Q=1, 30 feet	69.4	dBA at Q=1, 30 feet
61.8	dBA at Q=1, 45 feet	66.5	dBA at Q=1, 45 feet
60.2	dBA at Q=1, 55 feet	64.9	dBA at Q=1, 55 feet

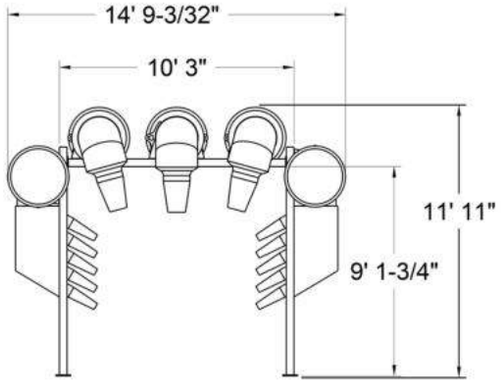
Meets OSHA Sound Exposure Requirements

✓ The Stealth Predator features patent pending "Reverse flow air technology" which creates the first "Ultra-Quiet Dryer" and is the most powerful Ultra Quiet Dryer ever designed.

Model uses 140 HP System







INTERNATIONAL DRYING CORPORATION

SPECIFICATIONS

15' 2" Bay Width
12' 0" Ceiling Height
96" Standard Clearance

Closed cell foam nozzles available in red, blue, black

Ducts-Stainless Steel
Molded Aluminum Impellors
Stainless Steel Motor Housings

Slotted flanges for adjustability of air outlet and air intake direction

Project: Sound Library

Job Number: 0000-2020-02

Site Address/Location: Parking lot

Date: 09/18/2018

Field Tech/Engineer: Robert Pearson

Source/System: 2009 Hyundai Sonata

General Location: Measured @ 3'

Sound Meter: NTi XL2 **SN:** A2A-05967-E0

Settings: A-weighted, slow, 1-sec, 10-sec duration

Meteorological Cond.: 90 degrees F, 0 mph wind

Site Observations:

Clear sky, measurements were performed at 3ft of source.

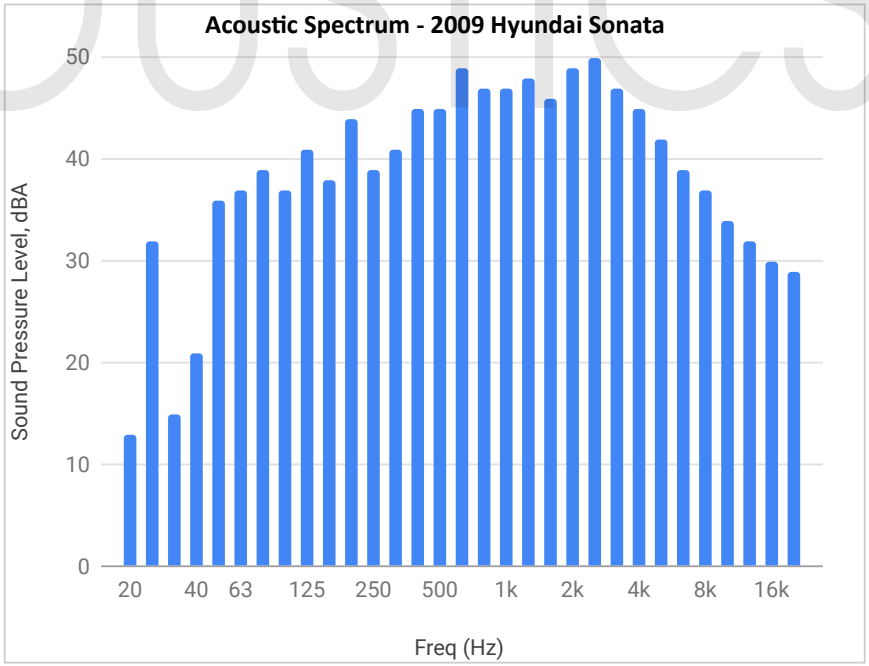
Leq	Lmin	Lmax
58.7	0.0	0.0

Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
0.0	0.0	0.0	0.0	0.0	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall	3rd Octave Band Data (dBA)																														
		dB(A)	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
2009 Hyundai Sonata	Car Idle	58.7	13.0	32.0	15.0	21.0	36.0	37.0	39.0	37.0	41.0	38.0	44.0	39.0	41.0	45.0	45.0	49.0	47.0	47.0	48.0	46.0	49.0	50.0	47.0	45.0	42.0	39.0	37.0	34.0	32.0	30.0	29.0

Figure 1: Car Idle - Hyundai Sonata



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Chandler, AZ 85249
p. (602) 774-1950

CA Office
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065
p. (805) 426-4477

Project: SuperStar Car Wash Chula Vista
Site Location: 1555 W Warner Rd, Gilbert, AZ 85233
Date: 4/5/2018
Field Tech/Engineer: Robert Pearson
Source/System: Vacutec System

Location: Vac Bay 1
Sound Meter: NTi XL2 **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-sec duration
Meteorological Cond.: 80 degrees F, 2 mph wind

Site Observations:
Clear sky, measurements were performed within 1.5ft of source. Measurements were performed while the vacuum was positiioned at three (3) different positions. Holstered, unholstered and inside a car. This data is utilized for acoustic modeling purposes and represents an average sound level at a vacuum station.

Table 1: Summary Measurement Data

Source	System	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	1.25K	1.6K	2K	2.5K	3.15K	4K	5K	6.3K	8K	10K	12.5K	16K	20K
Vacutech (Holstered)	Vacuum	63.3	9	17	22	29	31	35	40	41	44	43	46	48	47	49	51	51	51	52	53	52	52	50	52	53	50	47	47	48	45	39	30
Vacutech (Unholstered)	Vacuum	80.7	6	19	22	28	34	37	40	43	47	46	48	48	48	49	54	55	58	58	62	65	68	70	74	75	73	69	67	65	63	60	55
Vacutech (Inside Car)	Vacuum	69.6	16	28	31	38	42	45	49	51	52	55	60	61	57	55	59	53	55	56	54	57	57	57	57	57	55	54	51	48	46	42	36
Average Level*	Vacuum	76.3	13	24	28	34	38	41	45	47	49	51	56	57	53	52	56	54	56	56	59	61	64	66	69	70	68	64	62	60	58	55	50

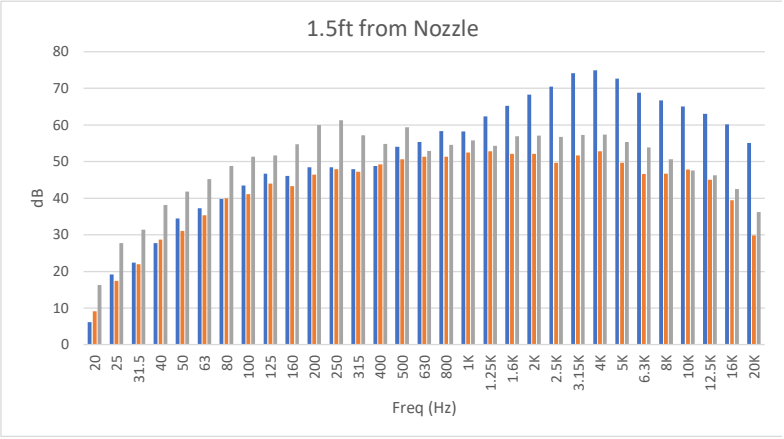
* Refers to the logarithmic average of all measurements. This measurement represents an average of the multiple vacuum positions.

Figure 1: Example Measurement Position

Figure 1: Holstered

Figure 2: Unholstered

Figure 3: Inside Car



SOUND LEVEL METER READINGS

MODEL: FT-DD-T340HP4 (40hp VACSTAR TURBINE VACUUM PRODUCER)

READING ONE: 43 DB-A, 3 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING TWO: 36 DB-A, 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING THREE: 24 DB-A, 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING FOUR: 12 DB-A, 30 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

NOTE: THESE READINGS WERE TAKEN OUTSIDE OF 8'x10'x8' CINDER BLOCK ENCLOSURE WITH CONCRETE SLAB AND WOOD JOIST ROOF.

SOUND LEVEL METER USED:

SIMPSON MODEL #40003 – MSHA APPROVED.
MEETS OSHA & WALSH-HEALY REQUIREMENTS FOR NOISE CONTROL.
CONFORMS TO ANSI S1.4-1983, IEC 651 SPECS FOR METER TYPE.

Vacutech
1350 Hi-Tech Drive, Sheridan WY, 82801
PHONE: (800) 917-9444 FAX: (303) 675-1988
EMAIL: info@vacutechllc
WEB SITE: vacutechllc.com