KPC EHS Consultants, LLC

Technical Memorandum

Kevin P. Carr, MS.

Date: February 16, 2023

Re: City of Victorville – Luna Road Retail Center Project – Noise Assessment

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1.0 Purpose

The purpose of this memorandum is to document the impacts of construction, mobile, operational noise, and vibration as it relates to the potential environmental impacts associated with the construction and operation of the proposed commercial development project on 3.57 acres.

2.0 Project Location & Description

2.1 Project Location: The proposed project site is in the City of Victorville, San Bernardino, California on the southwest corner of Luna Road and U.S. Hwy 395 and is referred to as APN: 3096-361-09.

2.2 Description: The Applicant is proposing a neighborhood retail center on 3.57 acres consisting of a 3,400 square foot (SF) convenience store with 8 pump gas station, a 1,000 SF quick service food, a 4,800 SF express carwash, a 1,500 SF restaurant with drive through, 8,700 SF of retail, and 87 parking spaces

3.0 Noise Impacts

3.1 Ambient Noise: The Project site is in partially developed area of the City and currently does not generate noise. The existing noise environment in the Project area is characterized by the area's general level of development. The Project is located in a partially developed with residential uses. Ambient noise levels are therefore increased as a result of roadway traffic, industrial activities, and other human activities. Table 3.1-1, *Population Density and Associated Ambient Noise Levels,* summarizes typical ambient noise levels based on level of development. Given the existing normal suburban residential nature of the proposed Project area, baseline ambient noise levels are assumed to be approximately 55 Ldn.

Table 3.1-1. Population Density and Associated Ambient Noise Levels

Population Density	dBA, Ldn
Rural 40-50	40-50
Small town or quite suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75-80
Area adjoining freeway or near major airport	80–90
Notes: dBA = A-weighed decibels Ldn = day-night level	

Source: Draft Initial Study / Mitigated Negative Declaration Silver Peak Solar Project, February 24, 2022

3.1.1 Ambient Noise Measurements

To assess the existing noise level environment short-term noise measurements were obtained from 4 locations on the Project site. Exhibit 3-A Noise Monitoring Map, provides the locations where the noise measurements were taken and Table 3.1-2 Ambient Noise Level Measurements, provides the noise measurements. Data sheets for measurements are included in Appendix A.

Exhibit 3-A Noise Monitoring Map

Table 3.1-2 Ambient Noise Level Measurements

Location	Description	Average Noise Level dBA (Leq)	Lmax dBA
#1	Project Site	52.1	63.7
#2	Forest Park Ln & Bella Pine St.	52.3	64.7
#3	Vista Verde Elementary School	49.6	59.6
#4	Cantina Dr. and 395	51.0	63.1

3.1.2 Victorville Ambient Noise Limits

The City of Victorville Municipal Code Chapter 13.01, Noise Control, establishes criteria and standards for the regulation of noise levels in the City. Table 3.1-3 *Base Ambient Noise Limits* outlines the maximum ambient noise levels for residential zones.

Table 3.1-3. Base Ambient Noise Limits

Zone	Time Period	Sound Level Decibels (dBA) [1]
Residential Zones	10 p.m. – 7 a.m.	55
Residential Zones	7 a.m. – 10 p.m.	65
Commercial Zones	Anytime	70

Notes: 1. If the ambient noise level exceeds the applicable limit noted, the ambient noise level shall be the standard.
Source: Victorville Municipal Code, Section 13.01.040 Base Ambient Noise Levels

3.2 Construction Noise: Construction activities that would create noise include: site preparation, grading, building construction, paving, and architectural coating. Noise levels associated with the construction will vary with the different types of construction equipment, the duration of the activity, and distance from the source. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing levels within the Project vicinity. The nearest sensitive receptors to the Project site are the single-family residential development located approximately 70 feet across Bella Pine Street from the west border of the property and approximately 220 feet to the nearest residence from the Project's center. Additionally, other receptors include the Vista Verde Elementary School, located 1,050 feet north of the property north boundary of the site and approximately 1,300 feet from the center of the site and residential uses to the west, southwest and north as shown in Table 3.2-1 *Receptor Locations.*

To estimate the potential impact of construction noise at the residences, the ambient noise measurements taken on the project site along with equipment that is expected to be used during construction was input into the Federal Highway Administration Roadway Construction Noise Model (RCNM) to generate anticipated noise levels. The RCNM generates the maximum noise levels (Lmax) and the equivalent continuous sound level (Leq). The Leq is a calculation of the anticipated steady sound pressure level which, over a given time period (day, evening, night) has the same total energy as the actual fluctuating noise. The RCNM also uses an acoustical use factor in the noise calculations. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at the full power level and is used to estimate the Leq values from the Lmax values. For example, 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 the site preparation and grading phases. Table 3.2-2, *Construction Equipment Noise Levels at the Nearest Receptor,* identifies the level of noise generated by construction equipment.

Table 3.2-1 – Receptor Locations

Receptor	Distance from Project Site Boundary (feet)	Distance from Project Site Center (feet)
Vista Verde Elementary School (North)	1,050	1,300
Residential - North	100	250
Residential - West	70	220
Residential – Southwest	800	950

Source: Google Earth Pro, February 13, 2023

Table 3.2-2 Construction Equipment Noise Levels at the Nearest Receptor (West Project Site Boundary)

Source	Approximate Distance to Nearest Receptor [1] (Structure to Construction Site) (feet)	Sound Level at Nearest Receptor		
		Lmax	Acoustical Use Factor (%)	Leq
Backhoe	70	74.6	40	70.7
Compactor (ground)	70	80.3	20	73.3
Compressor (air)	70	74.7	40	70.8
Crane	70	77.6	16	69.7
Concrete Mixer Truck	70	75.9	40	71.9
Dozer	70	78.7	40	74.8
Dump Truck	70	73.5	40	69.5
Excavator	70	77.8	40	73.8
Front End Loader	70	76.2	40	72.2
Generator	70	77.7	50	74.7
Grader	70	82.1	40	78.1
Offroad Forklift	70	80.5	40	76.5
Paver	70	74.3	50	71.3
Pickup Truck	70	72.1	40	68.1
Roller	70	77.1	20	70.1
Scraper	70	80.7	40	76.7
Welder Torch	70	71.1	40	67.1

1. Nearest Receptor – Residences west of project site.
Source: FHWA – RCNM Version 1.1
Datasheets are included in Appendix B.

Table 3.2-3 Construction Equipment Noise Levels at the Nearest Receptor (Center of Project Site)

Source	Approximate Distance to Nearest Receptor [1] (Structure to Construction Site) (feet)	Sound Level at Nearest Receptor		
		Lmax	Acoustical Use Factor (%)	Leq
Backhoe	220	64.7	40	60.7
Compactor (ground)	220	70.4	20	63.4
Compressor (air)	220	64.8	40	60.8
Crane	220	67.7	16	59.7
Concrete Mixer Truck	220	65.9	40	62.0
Dozer	220	68.8	40	64.8
Dump Truck	220	63.6	40	62.0
Excavator	220	67.8	40	63.9
Front End Loader	220	66.2	40	62.3
Generator	220	67.8	50	64.8
Grader	220	72.1	40	68.2
Offroad Forklift	220	70.5	40	66.6
Paver	220	64.4	50	61.3
Pickup Truck	220	62.1	40	58.2
Roller	220	67.1	20	60.1
Scraper	220	70.7	40	66.7
Welder Torch	220	61.1	40	57.2

1. Nearest Receptor – Residences west of project site.
Source: FHWA – RCNM Version 1.1
Datasheets are included in Appendix B.

The residential properties west across Bella Pine Street are the nearest sensitive receptors. The project site and vacant lots to the south are designated and zoned for commercial useand the Project would be compatible with surrounding land uses and would not adversely impact sensitive receptors.

The City of Victorville has set restrictions to control noise impacts and establish criteria and standards to regulate noise levels in the City in the Municipal Code Chapter 13.01. Section 13.01.06 of the Victorville Municipal Code exempts specified activities from the provisions of Chapter 13.01 including construction activities on private property that are determined by the director of building and safety to be essential to the completion of a project.

As the City does not have established construction noise thresholds to quantify the potential construction noise impacts on the nearest residential receptors to evaluate whether the Project will generate a substantial increase in the short-term noise levels at the offsite sensitive receptors (residences), the construction-related noise level threshold used for this analysis is based on the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL)

for occupation noise exposure at 85 dBA, as an 8-hour time-weighted average (85 dBA – 8-hr TWA).

The highest equipment noise level at the nearest sensitive receptor from the west project site boundary as indicated in Table 3.2 will be a grader at 82.1 dBA (Lmax) and 78.1 dBA (Leq). The same piece of equipment operating at the center of the site would generate noise levels of 72.1 dBA (Lmax) and 68.2 dBA (Leq). During the construction phase the noise levels will be the highest as heavy equipment pass along the Project site boundaries. During the site preparation and grading phases equipment will not be stationary, rather equipment will be moving throughout the site and varying speeds and power levels and as a result not operating at the maximum noise level for the entire work day. Construction noise is of short-term duration and will not present any long-term impacts on the project site or the surrounding area. Equipment noise levels at the nearest receptors as indicated in Table 3.2 are all below the NIOSH REL of 85 dBA 8-hour TWA, impacts would be less than significant.

3.3 Operational Noise

Operational noise consists of both offsite and onsite components. Offsite noise generated by the project will be the result of traffic, whereas onsite noise will be generated by roof-top heating ventilation and air conditioning units (HVAC), idling trucks, delivery truck activities, backup alarms, car wash drying assembly and vacuums, drive-thru activities, as well as loading and unloading of dry goods, and parking lot vehicle movement.

3.3.1 Offsite Traffic Noise Impacts

Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The primary source of noise generated by the Project will be from the vehicle traffic generated by the vehicle ingress and egress to the Project site. Under existing conditions, the site does not generate any traffic noise that impacts the surrounding area.

The 2030 General Plan Final Environmental Impact Report (FEIR) Table 5.11-8 indicates that Luna Road from 395 west to Mesa View Drive 2030 CNEL will be 66 dBA with a distance from roadway centerline at 58 feet.

According to the Federal Highway Administration*, Highway Traffic Noise Analysis and Abatement Policy and Guidance.* the level of roadway traffic noise depends on three things: (l) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of the traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. These factors are discussed below.

- *The Volume of the Traffic*

  Upon buildout, the proposed Project is expected to generate approximately 3,766 average daily vehicle trips (ADT) weekday, 4,065 ADT Saturday, and 3,551 ADT Sunday[1], which will increase the ambient traffic noise levels in the vicinity of the Project site in comparison to the existing site conditions.

[1] Air Quality / GHG Technical Memorandum, CalEEMod Datasheets Trip Summary Information Table 4.2. Dated: 1/30/2323

The primary transportation routes for the Project site will be Luna Road to Highway 395 which provides access to both Palmdale Road (State Route 18) and Interstate 15. Estimated traffic conditions for the area roadways are presented in Table 3.3-1**.**

Table 3.3-1 Estimated Traffic Roadway Conditions

Roadway	Number of Lanes	ADT
SR 395	4	22,700[(1)]
Luna Road	4	15,500 [(2)]

(1) Caltrans 2020 Traffic Census Program.
(2) GPFEIR 2030 Existing 2005 and GP Buildout ADT (Table A)

According to Caltrans, the human ear is able to begin to detect sound level increases of 3 decibels (dB) in typical noisy environments.[2] A doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dBA increase in sound, would generally be barely detectable. As indicated above, implementation of the Project will increase traffic volumes in the area by approximately 3,551 to 4,065 ADT, but not to the extent that traffic volumes will be doubled creating a +3dBA noise increase or result in a perceivable noise increase. Therefore, operational noise impacts would be less than significant.

- *The Speed of Traffic*

The speed limit of Luna Road is posted as 40 mph, Highway 395 as 55 mph, whereas the speed limit of Bella Pines Street and the roadways around the project site are subject to a prima facie limit of 25 mph under the vehicle code. These low levels of speeds on Luna Road and Bella Pines Street do not result in vehicles generating high levels of noise.

- *The Number of Trucks in the Flow of the Traffic*

The Project is a commercial development, which will generate noise from delivery trucks. Highway 395 is a truck route and is adjacent to the west boundary of the project site with access on Luna Road.

3.3.2 Commercial / Retail Land Use Operations (Stationary Noise)

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include roof-top heating ventilation and air conditioning units (HVAC), idling trucks, delivery truck activities, backup alarms, car wash drying assembly and vacuums, drive-thru activities, as well as loading and unloading of dry goods, and parking lot vehicle movements

This noise analysis is intended to describe noise level impacts associated with the expected typical operational (stationary source) activities at the Project site.

[2] Caltrans, Traffic Noise Analysis Protocol, April 2020, p.7-1.

Table 3.3-2 Reference Noise Level Measurements

Noise Source	Reference Distance (feet)	Reference Noise Level (dBA)	Distance to Receptor (feet)	Noise Level (dBA)
Rooftop HVAC [1]	1 ‘	79.0	100	39.0
Truck Backup Alarm [2]	50 ‘	75.0	350	58.1
Parking Lot Activity [2]	25 ‘	54.4	140	39.4
Vacuum Noise [3]	15 ’	77.3	160	56.7
Drying Assembly [4]	3.3 ’	97.1	400	55.4
Drive thru Speaker[5]	1 ’	84.0	125	42.1

[1] Reference Level Carrier 50HCQA07 5-ton air handler unit (AHU) manufacturer specifications.
[2] Reference Level collected at Amazon Fulfillment Center ONT-6 (24208 San Michele Rd., Moreno Valley)
[3] Vacutech Sound Study Projections (10 units running at
[4] MacNeil Automatic Car Wash System Drying Fans Sound Pressure Levels (87 dBA for 1 unit 97.1 dBA for 10)
[5.] HME Drive Thru Sound Pressure Levels from Menu Board or Speaker Post.

Rooftop HVAC Noise:

The exact rooftop units for the Heating Ventilation and Air Conditioning equipment for the project buildings is not currently known, however the Carrier 50HCQH07 5-ton air handler unit (AHU) or an equivalent is expected for each building. The manufacturers datasheet with noise levels is included in Appendix C. As indicated in Table 3.4 the HVAC AHU reference noise level measured at 1- foot is 79.0 dBA and calculated attenuation to the closest receptor with no barriers or building shielding to be 39.0 dBA.

Parking Lot and Backup Alarm Noise:

To determine the noise level impacts of parking lot activity and truck backup alarms from the Project short-term reference noise level measurements that were collected at the Amazon Fulfillment Center located at 24208 San Michele Road in the City of Moreno Valley were used to calculate noise levels at the closest receptor(s). The noise measurements represent a typical weekday warehouse loading/unloading operation on a large single building distribution center, approximately 1.2 million square feet with 200 trailer parking spaces and 90 docks. Operations during the noise measurements included multiple trucks being loaded/unloaded, forklift and truck/trailer movement. The estimated noise levels represent an extreme worse-case scenario for the project which is significantly smaller in size and will not have the constant truck traffic or parking lot activity that was measured in the reference noise levels.

Trucks at the Project site would utilize backup alarms during the loading/unloading activities, which according to ECCO the first manufacturer of backup alarms, depending on the model typically produce a noise level of 87 to 112 dBA at 1 foot[3] at 350 feet with no sound barriers (walls or buildings) the noise level would be between 36.1 to 61.1 dBA. Reference noise level measurements taken at 50 feet during truck movement and backup alarm operation were measured at 75 dBA_{max} which would result in a 58.1 dBA noise level at 350 feet with no perimeter

[3] ECCO Backup alarm manufacturer resources: https://www.eccoesg.com/us/en/SearchResults?searchText=backup+alarm+noise+levels accessed February 11, 2023.

walls or buildings as shielding. The distance of 350 feet was chosen to represent a fuel delivery truck located at the underground storage tank location on the southeast corner of the property to the nearest residential receptor located to the north. Due to the design of the site, parking lots, and access the need for and use of backup maneuvers will be limited.

Traffic associated with parking lots is typically not at a sufficient level to exceed the community noise standards. The total parking spaces estimated for the Project is 87 stalls, the reference noise levels were taken at a parking lot that can accommodate approximately 1,000 stalls. The Project's parking lots are substantially smaller and no significant noise impacts offsite from the parking lot use would be anticipated.

Drive-Thru Speaker Noise:

The proposed drive-thru is in building #1 in the northwest corner of the project site. The intercom speaker will be located in the northeast corner of the building with the closet receptors being across Luna Road to the north. To assess the potential noise impacts the HME Intercom System was used which has a maximum noise level of 84 dBA at 1- foot in front of the speaker. As indicated in Table 3.4 the intercom reference noise level measured at 1- foot is 84 dBA would produce a calculated attenuation with no barriers or building shielding to be 42.1 dBA at the closet residential unit approximately 125 feet to the north. The HME Manufacturer's datasheet on noise levels is included in Appendix C.

Carwash Dryer and Vacuum Noise:

To assess the potential noise impacts from the operation of the express car wash dryer and vacuum equipment, the MacNeil car wash system with ten Powerlock 15 HP Tech 21 Dryers was assumed along with the vacuum system manufactured by Vacutech. Manufacturer datasheets and car was system layout is included in Appendix C.

The MacNeil dryers produce a noise level of 87 dBA individually at a distance of 1 meter (approximately 3.3 feet) and 97.1 with ten units operational. The majority of noise will be produced at the carwash tunnel exit where the dryers are located. Sound walls are proposed at the entry and exits of the carwash, although no attenuation was calculated for barriers or buildings. Additionally, the units are normally located approximately 10 feet inside the tunnel which would reduce the noise impacts outside the exit portal. The property immediately south of the project site is zoned commercial therefore the closest receptors are located to the north approximately 400 feet away and to the west approximately 425 feet away. As indicated in Table 3.4 the carwash dryer reference noise level measured at 1- foot for all ten units is 97.1 dBA and would produce a calculated attenuation with no barriers or building shielding to be 55.4 dBA at the closest residential unit approximately 400 feet to the north.

The proposed locations for the vacuums are one bank of 10 stalls to the north of the carwash structure and one bank of 12 stalls to the west of the convenience store. The vacuum noise reference level was obtained for the manufacturer (Vacutech) and included an assessment with 10 units operating simultaneously. As indicated in Table 3.4 the vacuum noise level measured at 15- feet for ten units is 77.3 dBA and would produce a calculated attenuation with no barriers or

building shielding to be 56.7 dBA at the closest residential unit approximately 160 feet to the north.

Stationary Noise Conclusion:

The USEPA identifies noise levels affecting health and welfare as exposure levels over 70 dBA over a 24-hour period. Noise levels for various levels are identified according to the use of the area. Levels of 45 dbA are associated with indoor residential areas, hospitals, and schools, whereas 55 dBA is identified for outdoor areas where typical residential human activity takes place. According to the USEPA levels of 55 dbA outdoors and 45 dbA indoors are identified as levels of noise considered to permit spoken conversation and other activities such as sleeping, working, and recreation, which are part of the daily human condition.[4] Levels exceeding 55 dbA in a residential setting are normally short in duration and not significant in affecting health and welfare of residents.

The City of Victorville Base Ambient Noise Limits as shown in Table 3.1-1 indicate that daytime maximum levels in residential zones is 65 dBA and in commercial zones 70 dBA. Ambient noise measurements taken on the project site indicate (Table 3.1-2) that noise levels of 63.7 dBA Imax were observed and levels above 60 dBA occurred approximately 5% of the time. The highest operational noise levels (Table 3.3-2) from the project are estimated to be from truck backup alarms at 58.1, vacuum noise at 56.7 dBA, and drying assembly at 55.4 dBA. As the fuel delivery and carwash will be daytime operations noise impacts are projected to be below the 65 dBA City Base Ambient Noise Limit of 65 dBA.

3.4 Vibration

During construction the operation and movement of heavy equipment create seismic waves that radiate along the ground-surface in all directions. These waves are felt as ground vibrations. Vibrations from construction can result in effects ranging from annoyance to people to structure damage. Vibration levels are impacted by geology, distance, and frequencies. According to the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018[37], while ground vibrations from construction activities do not often reach the levels that can damage structures, construction vibration may result in building damage or prolonged annoyance from activities such as blasting, piledriving, vibratory compaction, demolition, and drilling or excavation near sensitive structures. The Project does not require these types of construction activities.

Vibration amplitude and impact decreases with distance and perceptible goundborne vibration is generally limited to areas within one to two hundred feet of the construction activity.

[4] USEPA "EPA Identifies Noise Levels Affecting Health and Welfare" https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html accessed February 5, 2023.

[37] https://www.transit.dot.gov/research-innovation/transit-noise-and-vibration-impact-assessment-manual-report-0123.

Table 3.4-1 Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

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

The City of Victorville's Municipal Code does not identify specific vibration thresholds. Therefore, to analyze the potential impacts from construction vibration on the nearest sensitive receptors, the CalTrans Vibration Guidance Manual (Guidance Manual) Damage Potential Threshold Criteria will be used.[5] The Guidance Manual indicates that vibration threshold for new residential structures would be 0.5 PPV in/sec for continuous/frequent intermittent sources and for older residential structures the threshold would be 0.3 PPV in/sec. To ensure the lowest possible potential for vibration damage impact on the nearest residential homes the 0.3 PPV in/sec threshold will be used for this analysis.

The closest sensitive receptor to the Project property line is minimally 70 feet from the west property line. The estimated construction vibration level from a large bulldozer (worst case scenario) measured at 25-feet would create a vibration level of 0.089 PPV in/sec which does not exceed the 0.3 PPV in/sec threshold. The proposed Project therefore is not considered to result in exposure of people to excessive ground vibration during construction.

During operations of the Project following construction the primary source of vibration would be from vehicle traffic. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that would cause annoyance to people or damage to buildings in the vicinity.

4.0 Conclusion

Based on the assessment in Section 3.0 the Project's construction noise impacts will not result in the generation of a substantial temporary or permanent increase in ambient noise levels or vibration impacts in the vicinity of the project. In addition, the Project's operational noise would be less than significant for mobile and operational noise and as such impacts to the environment for Noise are less than significant.

[5] Caltrans Vibration Guidance Manual (April 2020) p. 38 Table 19.

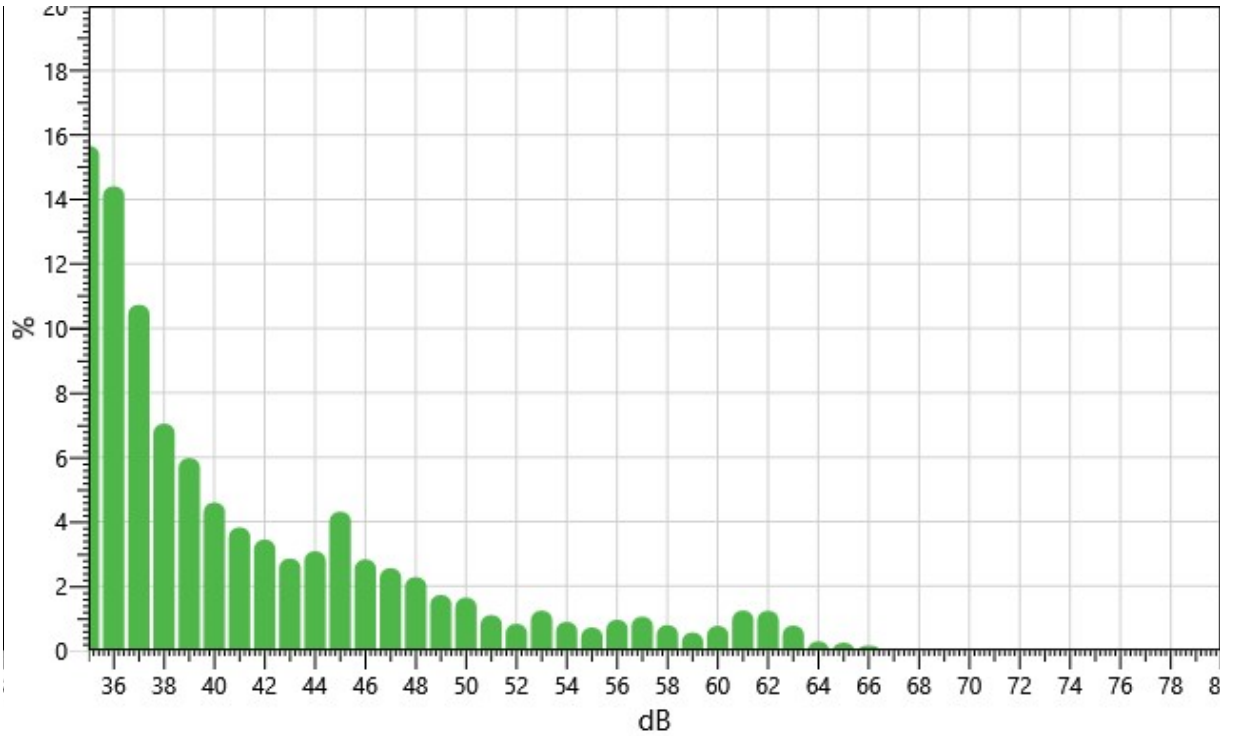
Appendix A

LUNA #1

Information Panel

Start Time	11/22/2022 9:43:52 AM
Stop Time	11/22/2022 9:58:52 AM
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Device Name	BIJ050019

Statistics Chart



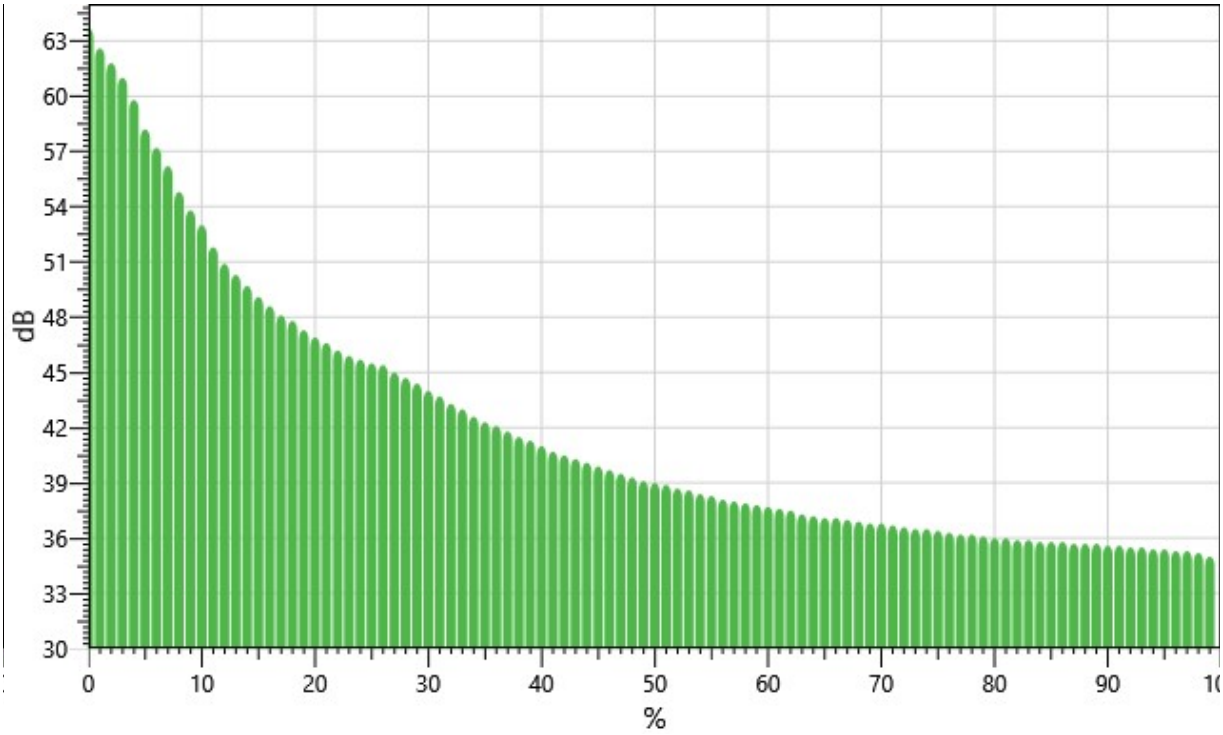
Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
35:	0.00	0.05	0.51	0.99	1.88	2.53	1.89	2.07	2.90	2.85	15.66
36:	2.31	1.28	1.40	1.38	1.33	1.45	1.19	1.25	1.23	1.59	14.40
37:	1.42	1.38	1.20	0.95	1.00	0.87	0.86	0.96	1.01	1.08	10.73
38:	0.85	0.77	0.66	0.57	0.84	0.75	0.64	0.73	0.59	0.64	7.04
39:	0.69	0.66	0.86	0.59	0.59	0.62	0.55	0.52	0.48	0.44	5.97

40:	0.49	0.49	0.41	0.34	0.47	0.54	0.46	0.51	0.49	0.40	4.59
41:	0.46	0.45	0.35	0.29	0.35	0.36	0.36	0.36	0.39	0.45	3.82
42:	0.38	0.31	0.32	0.36	0.42	0.37	0.38	0.27	0.36	0.27	3.44
43:	0.31	0.33	0.30	0.26	0.26	0.26	0.26	0.28	0.29	0.31	2.86
44:	0.24	0.28	0.31	0.25	0.32	0.27	0.34	0.42	0.32	0.33	3.08
45:	0.31	0.29	0.22	0.23	0.21	0.39	0.86	0.81	0.55	0.44	4.31
46:	0.39	0.24	0.26	0.27	0.22	0.24	0.30	0.31	0.28	0.31	2.83
47:	0.26	0.28	0.25	0.27	0.23	0.25	0.22	0.26	0.24	0.31	2.56
48:	0.34	0.32	0.15	0.20	0.20	0.19	0.22	0.23	0.21	0.21	2.28
49:	0.20	0.20	0.18	0.14	0.17	0.18	0.17	0.16	0.18	0.14	1.72
50:	0.20	0.20	0.13	0.12	0.13	0.18	0.15	0.18	0.18	0.18	1.64
51:	0.14	0.12	0.08	0.11	0.12	0.12	0.10	0.09	0.12	0.11	1.10
52:	0.09	0.08	0.10	0.10	0.10	0.08	0.07	0.07	0.08	0.07	0.83
53:	0.08	0.08	0.09	0.12	0.14	0.17	0.13	0.12	0.17	0.15	1.24
54:	0.19	0.10	0.06	0.08	0.08	0.07	0.07	0.08	0.08	0.07	0.89
55:	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.72
56:	0.07	0.06	0.08	0.08	0.14	0.10	0.11	0.10	0.11	0.10	0.96
57:	0.12	0.09	0.06	0.09	0.15	0.11	0.14	0.13	0.08	0.09	1.05
58:	0.08	0.07	0.07	0.12	0.10	0.10	0.09	0.07	0.05	0.05	0.79
59:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.09	0.56
60:	0.08	0.10	0.07	0.11	0.11	0.07	0.05	0.06	0.06	0.05	0.77
61:	0.07	0.09	0.11	0.15	0.11	0.13	0.17	0.13	0.11	0.18	1.24
62:	0.14	0.09	0.07	0.11	0.13	0.15	0.13	0.13	0.15	0.13	1.23
63:	0.15	0.16	0.05	0.11	0.09	0.04	0.03	0.02	0.03	0.10	0.78
64:	0.04	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.28
65:	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.24
66:	0.04	0.01	0.02	0.02	0.01	0.03	0.01	0.01	0.00	0.00	0.16
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
71:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
72:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
73:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
74:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Exceedance Chart

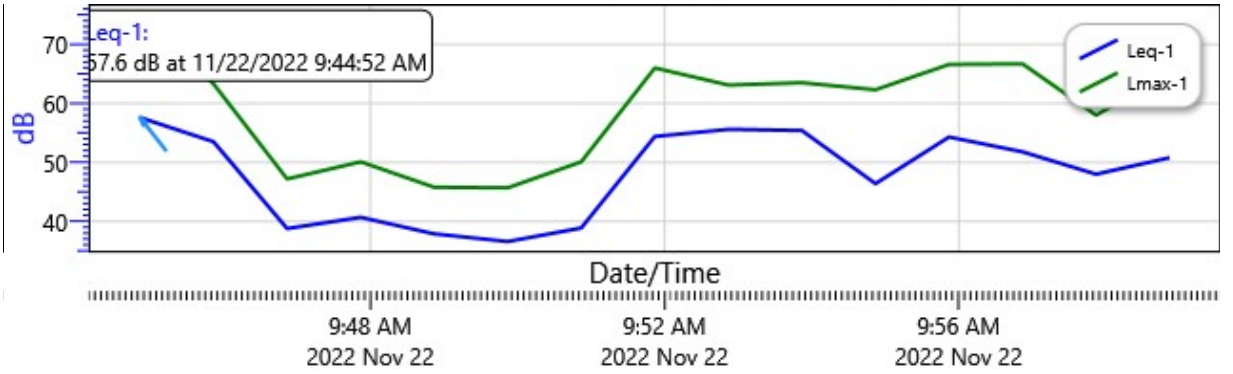
S023_BIJ050019_28112022_142019: Exceedance Chart



Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		63.7	62.6	61.8	61.0	59.8	58.2	57.2	56.2	54.8
10%:	53.8	53.0	51.8	50.9	50.3	49.7	49.1	48.6	48.1	47.8
20%:	47.3	46.9	46.6	46.2	45.9	45.7	45.5	45.4	45.0	44.7
30%:	44.4	44.0	43.7	43.3	43.0	42.6	42.3	42.1	41.8	41.5
40%:	41.3	41.0	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.3
50%:	39.1	39.0	38.9	38.7	38.6	38.4	38.3	38.1	38.0	37.9
60%:	37.8	37.7	37.6	37.5	37.3	37.2	37.1	37.1	37.0	36.9
70%:	36.8	36.8	36.7	36.6	36.5	36.5	36.4	36.3	36.2	36.2
80%:	36.1	36.0	36.0	35.9	35.9	35.8	35.8	35.8	35.7	35.7
90%:	35.7	35.6	35.6	35.5	35.5	35.4	35.4	35.3	35.3	35.2
100%:	35.0									

Logged Data Chart



Summary Data Panel

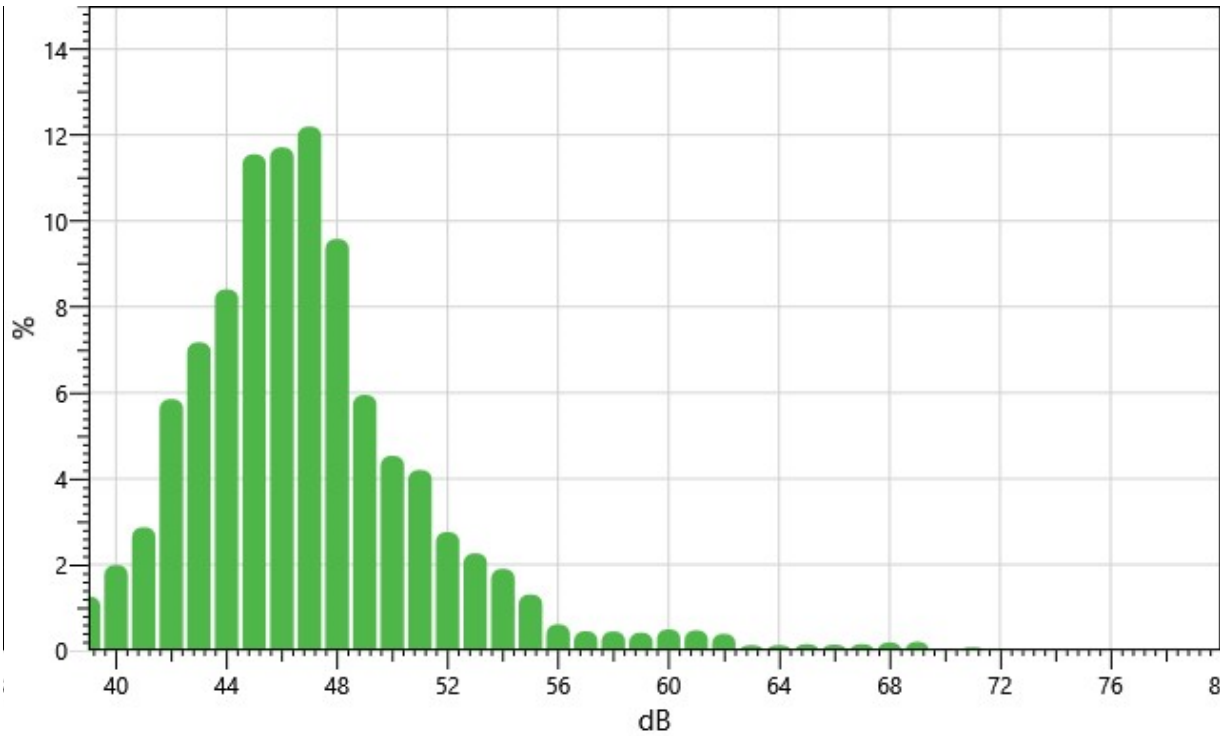
Description	Meter	Value	Description	Meter	Value
Leq	1	52.1 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	A
Response	2	FAST			

LUNA #2

Information Panel

Start Time	11/22/2022 10:06:51 AM
Stop Time	11/22/2022 10:21:51 AM
Device Name	BIJ050019
Model Type	SoundPro DL
Device Firmware Rev	R.13H

Statistics Chart

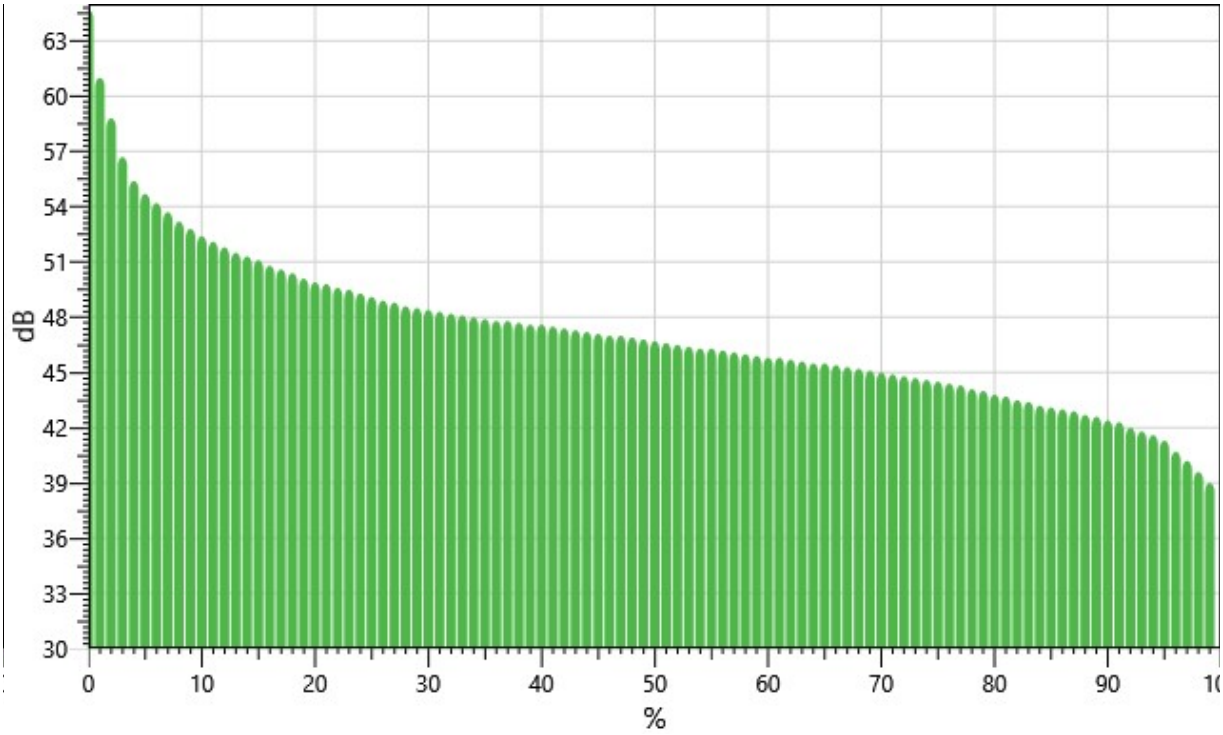


Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
39:	0.00	0.01	0.13	0.20	0.11	0.09	0.18	0.31	0.14	0.10	1.26
40:	0.21	0.26	0.17	0.13	0.17	0.23	0.23	0.22	0.19	0.18	1.99
41:	0.20	0.18	0.13	0.12	0.31	0.24	0.36	0.40	0.45	0.48	2.87
42:	0.56	0.39	0.44	0.42	0.55	0.59	0.52	0.67	0.87	0.85	5.85
43:	0.85	0.91	0.77	0.70	0.73	0.69	0.56	0.51	0.73	0.72	7.17

44:	0.72	0.64	0.72	0.60	0.71	0.81	0.83	0.98	1.17	1.23	8.41
45:	1.26	1.05	0.75	0.95	1.20	1.06	1.28	1.35	1.27	1.38	11.55
46:	1.28	1.18	1.09	1.20	1.39	1.16	1.21	1.06	1.16	0.99	11.71
47:	1.16	1.09	1.01	1.03	1.18	1.04	1.35	1.50	1.38	1.45	12.20
48:	1.39	1.21	0.71	1.02	1.05	0.92	0.99	0.84	0.72	0.74	9.58
49:	0.63	0.52	0.59	0.53	0.55	0.54	0.66	0.67	0.65	0.62	5.95
50:	0.56	0.52	0.48	0.46	0.39	0.54	0.43	0.42	0.34	0.38	4.53
51:	0.35	0.53	0.48	0.52	0.51	0.40	0.40	0.36	0.36	0.29	4.20
52:	0.26	0.36	0.32	0.31	0.29	0.28	0.24	0.26	0.15	0.27	2.76
53:	0.29	0.27	0.28	0.26	0.21	0.19	0.20	0.20	0.19	0.18	2.26
54:	0.22	0.19	0.16	0.19	0.22	0.23	0.23	0.15	0.14	0.17	1.90
55:	0.13	0.13	0.20	0.14	0.17	0.16	0.11	0.11	0.08	0.07	1.30
56:	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.08	0.06	0.61
57:	0.05	0.05	0.03	0.04	0.04	0.04	0.05	0.05	0.04	0.05	0.45
58:	0.06	0.03	0.04	0.06	0.05	0.06	0.05	0.03	0.04	0.03	0.44
59:	0.04	0.04	0.03	0.04	0.04	0.05	0.05	0.04	0.04	0.05	0.41
60:	0.05	0.05	0.03	0.07	0.06	0.04	0.06	0.04	0.05	0.04	0.49
61:	0.06	0.05	0.04	0.09	0.05	0.03	0.03	0.03	0.04	0.06	0.47
62:	0.12	0.10	0.04	0.02	0.02	0.02	0.02	0.03	0.01	0.01	0.39
63:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.13
64:	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.13
65:	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.02	0.15
66:	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.14
67:	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.02	0.02	0.15
68:	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.19
69:	0.02	0.02	0.02	0.03	0.05	0.04	0.00	0.00	0.01	0.01	0.20
70:	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.05
71:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.08
72:	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

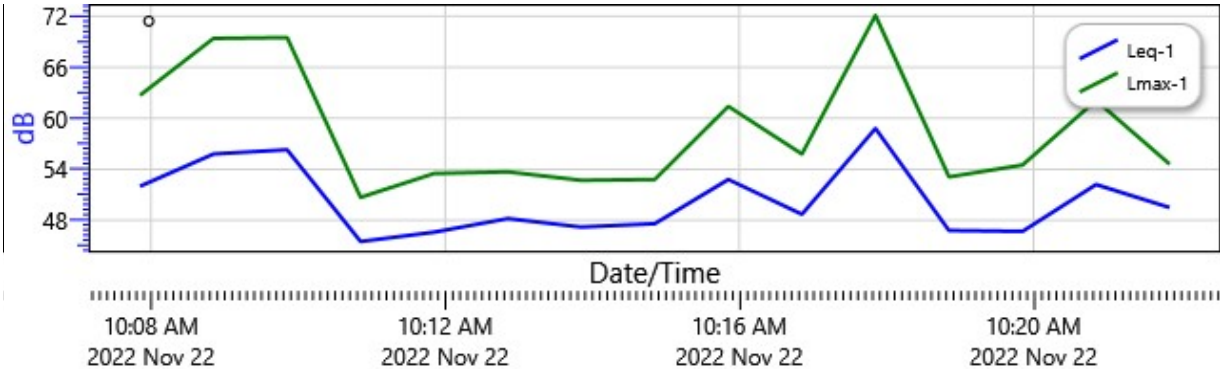
Exceedance Chart



Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		64.7	61.0	58.8	56.7	55.4	54.7	54.2	53.7	53.2
10%:	52.8	52.4	52.1	51.8	51.5	51.3	51.1	50.8	50.6	50.4
20%:	50.1	49.9	49.8	49.6	49.5	49.3	49.1	48.9	48.8	48.6
30%:	48.5	48.4	48.3	48.2	48.1	48.0	47.9	47.8	47.8	47.7
40%:	47.6	47.6	47.5	47.4	47.3	47.2	47.1	47.0	47.0	46.9
50%:	46.8	46.7	46.6	46.5	46.4	46.3	46.3	46.2	46.1	46.0
60%:	45.9	45.8	45.8	45.7	45.6	45.5	45.5	45.4	45.3	45.2
70%:	45.1	45.0	44.9	44.8	44.7	44.6	44.5	44.4	44.3	44.1
80%:	44.0	43.8	43.7	43.5	43.4	43.2	43.1	43.0	42.9	42.7
90%:	42.6	42.4	42.3	42.0	41.8	41.6	41.3	40.7	40.2	39.6
100%:	39.0									

Logged Data Chart



Summary Data Panel

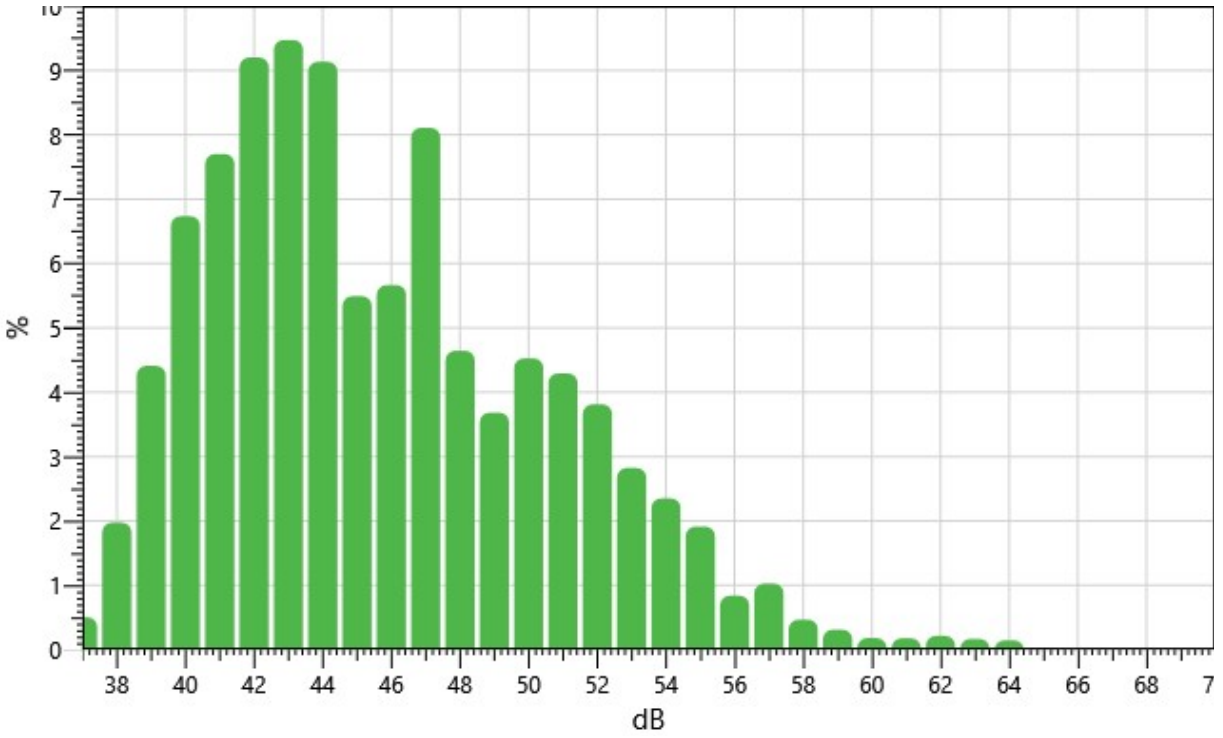
Description	Meter	Value	Description	Meter	Value
Leq	1	52.3 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	A
Response	2	FAST			

LUNA #3

Information Panel

Start Time	11/22/2022 11:01:07 AM
Stop Time	11/22/2022 11:16:07 AM
Device Name	BIJ050019
Model Type	SoundPro DL
Device Firmware Rev	R.13H

Statistics Chart

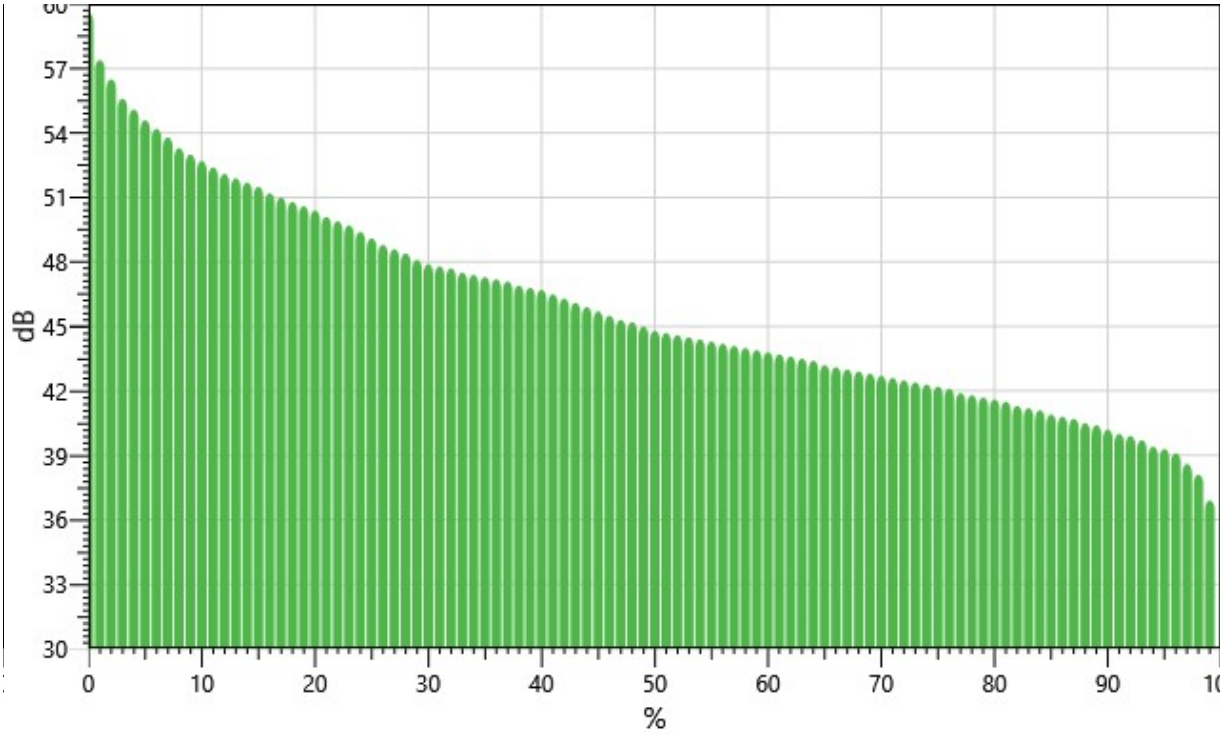


Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
37:	0.01	0.02	0.05	0.03	0.06	0.03	0.05	0.10	0.05	0.09	0.50
38:	0.14	0.15	0.28	0.19	0.11	0.18	0.23	0.26	0.20	0.21	1.97
39:	0.20	0.28	0.38	0.50	0.67	0.59	0.43	0.37	0.46	0.51	4.41
40:	0.59	0.62	0.56	0.65	0.66	0.76	0.64	0.59	0.82	0.85	6.74
41:	0.60	0.67	0.91	0.79	0.60	0.72	0.74	0.98	0.95	0.75	7.70
42:	0.81	0.67	0.97	0.86	0.87	0.85	0.95	0.97	1.22	1.02	9.20

43:	1.04	0.85	0.93	0.85	0.80	0.72	0.97	1.23	1.08	1.02	9.47
44:	0.96	0.99	0.83	0.99	0.99	1.00	0.90	0.91	0.84	0.73	9.14
45:	0.64	0.51	0.46	0.61	0.72	0.62	0.44	0.54	0.51	0.43	5.49
46:	0.42	0.44	0.61	0.58	0.49	0.48	0.45	0.64	0.84	0.72	5.66
47:	0.79	0.85	0.82	0.85	0.75	0.86	0.81	0.76	0.80	0.82	8.11
48:	0.74	0.60	0.31	0.42	0.46	0.51	0.53	0.37	0.34	0.37	4.64
49:	0.47	0.32	0.32	0.35	0.48	0.38	0.36	0.26	0.32	0.41	3.68
50:	0.49	0.42	0.48	0.40	0.42	0.43	0.42	0.57	0.47	0.42	4.53
51:	0.71	0.59	0.28	0.35	0.31	0.38	0.39	0.37	0.46	0.46	4.29
52:	0.60	0.52	0.47	0.43	0.31	0.39	0.30	0.24	0.26	0.31	3.81
53:	0.38	0.32	0.33	0.30	0.39	0.20	0.21	0.26	0.23	0.19	2.82
54:	0.22	0.30	0.18	0.30	0.23	0.22	0.30	0.19	0.17	0.25	2.35
55:	0.23	0.21	0.26	0.19	0.17	0.18	0.14	0.19	0.20	0.14	1.91
56:	0.11	0.07	0.07	0.07	0.07	0.08	0.13	0.08	0.07	0.09	0.84
57:	0.12	0.17	0.10	0.20	0.10	0.07	0.07	0.10	0.06	0.04	1.03
58:	0.04	0.05	0.03	0.04	0.05	0.06	0.05	0.06	0.05	0.02	0.47
59:	0.03	0.02	0.05	0.05	0.03	0.02	0.01	0.02	0.03	0.05	0.31
60:	0.02	0.01	0.02	0.02	0.01	0.03	0.02	0.03	0.02	0.01	0.18
61:	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.01	0.01	0.18
62:	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.06	0.05	0.21
63:	0.03	0.06	0.03	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.17
64:	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.04	0.15
65:	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02

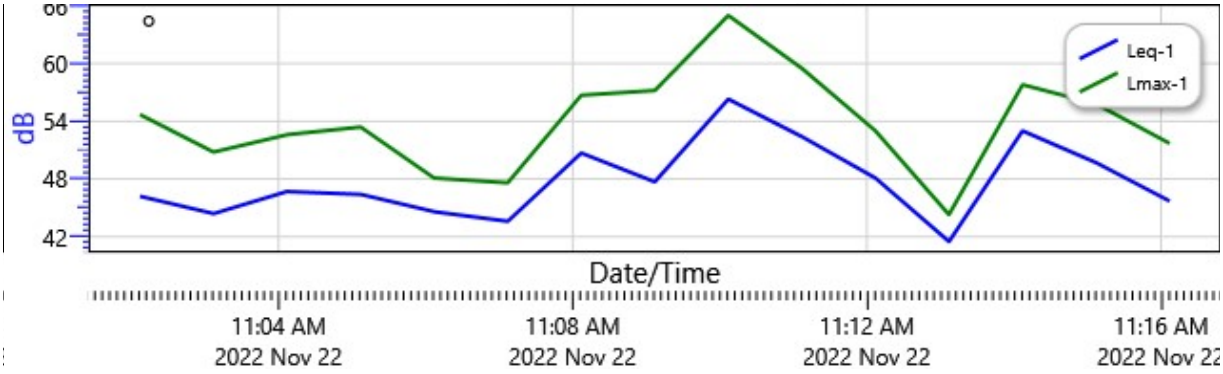
Exceedance Chart



Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		59.6	57.4	56.5	55.6	55.1	54.6	54.2	53.8	53.3
10%:	53.0	52.7	52.4	52.1	51.9	51.7	51.5	51.2	51.0	50.8
20%:	50.6	50.4	50.1	49.9	49.7	49.4	49.1	48.8	48.6	48.4
30%:	48.1	47.9	47.8	47.7	47.5	47.4	47.3	47.2	47.1	46.9
40%:	46.8	46.7	46.5	46.3	46.1	45.9	45.7	45.5	45.3	45.2
50%:	45.0	44.8	44.7	44.6	44.5	44.4	44.3	44.2	44.1	44.0
60%:	43.9	43.8	43.7	43.6	43.5	43.4	43.2	43.1	43.0	42.9
70%:	42.8	42.7	42.6	42.5	42.4	42.3	42.2	42.1	41.9	41.8
80%:	41.7	41.6	41.5	41.3	41.2	41.1	40.9	40.8	40.7	40.5
90%:	40.4	40.2	40.0	39.9	39.7	39.4	39.3	39.1	38.6	38.1
100%:	36.9									

Logged Data Chart



Summary Data Panel

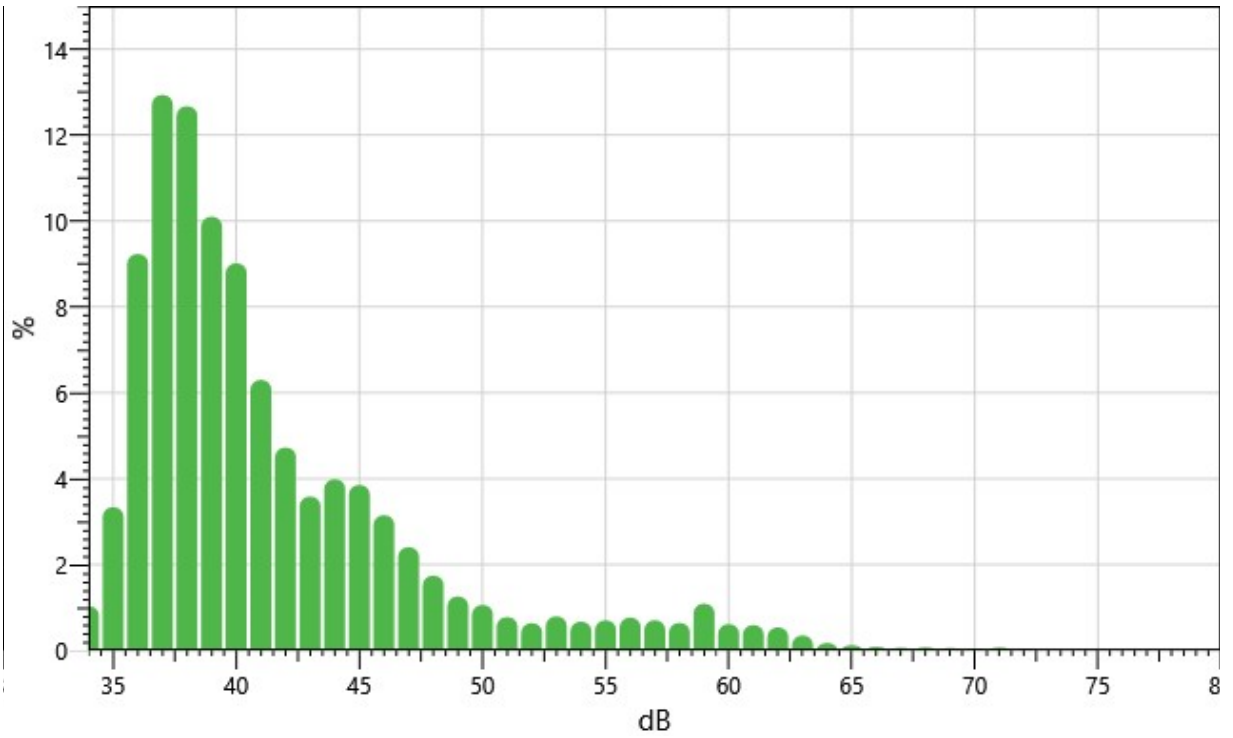
Description	Meter	Value	Description	Meter	Value
Leq	1	49.6 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	A
Response	2	FAST			

LUNA #4

Information Panel

Start Time	11/22/2022 11:19:37 AM
Stop Time	11/22/2022 11:34:37 AM
Device Name	BIJ050019
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	

Statistics Chart

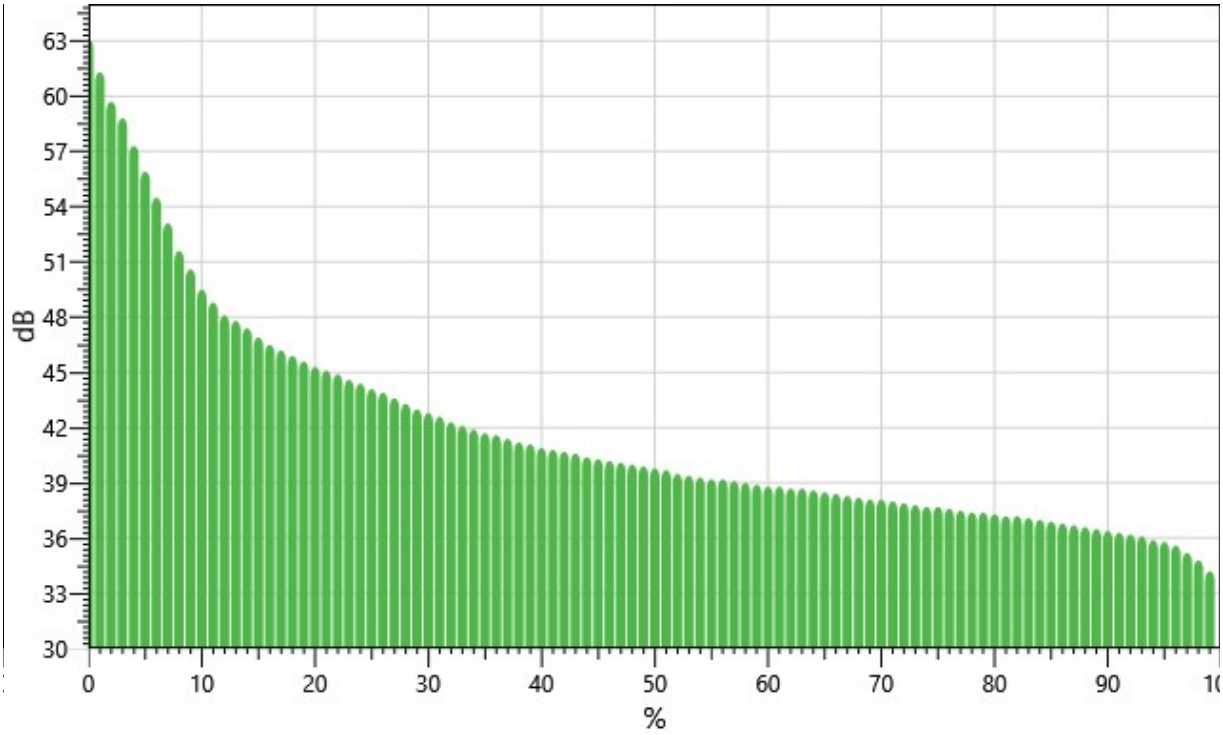


Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
34:	0.00	0.00	0.00	0.01	0.16	0.20	0.18	0.16	0.12	0.19	1.03
35:	0.31	0.31	0.35	0.30	0.16	0.15	0.36	0.48	0.38	0.55	3.34
36:	0.68	0.51	0.69	1.08	0.99	0.84	1.12	1.19	1.04	1.09	9.23
37:	0.94	0.78	1.30	1.42	1.53	1.43	1.20	1.51	1.49	1.32	12.93
38:	1.11	1.28	1.30	1.20	1.07	1.12	1.08	1.20	1.57	1.74	12.67

39:	1.40	1.07	1.30	1.19	1.04	0.87	0.97	0.78	0.76	0.73	10.10
40:	0.95	1.05	1.07	0.94	1.03	0.90	0.70	0.74	0.86	0.78	9.01
41:	0.88	0.73	0.68	0.60	0.53	0.61	0.55	0.48	0.65	0.59	6.30
42:	0.76	0.31	0.37	0.51	0.52	0.45	0.47	0.48	0.42	0.44	4.72
43:	0.39	0.34	0.38	0.41	0.35	0.31	0.31	0.34	0.34	0.41	3.58
44:	0.46	0.41	0.35	0.38	0.32	0.39	0.43	0.42	0.39	0.44	3.99
45:	0.59	0.39	0.36	0.46	0.39	0.36	0.28	0.31	0.29	0.43	3.85
46:	0.34	0.32	0.38	0.39	0.27	0.43	0.35	0.25	0.19	0.22	3.15
47:	0.22	0.24	0.22	0.18	0.22	0.25	0.24	0.22	0.27	0.36	2.40
48:	0.34	0.28	0.17	0.18	0.16	0.13	0.12	0.13	0.13	0.11	1.74
49:	0.10	0.12	0.13	0.12	0.17	0.19	0.13	0.13	0.08	0.08	1.26
50:	0.11	0.08	0.09	0.13	0.09	0.09	0.10	0.13	0.13	0.11	1.06
51:	0.15	0.08	0.05	0.07	0.07	0.10	0.06	0.07	0.06	0.05	0.78
52:	0.06	0.07	0.07	0.09	0.05	0.06	0.06	0.06	0.06	0.06	0.64
53:	0.13	0.07	0.08	0.08	0.07	0.07	0.08	0.07	0.07	0.08	0.80
54:	0.09	0.09	0.05	0.07	0.07	0.06	0.07	0.06	0.06	0.05	0.67
55:	0.06	0.09	0.08	0.07	0.07	0.07	0.06	0.07	0.07	0.06	0.70
56:	0.07	0.06	0.09	0.08	0.08	0.07	0.08	0.07	0.08	0.08	0.77
57:	0.08	0.07	0.05	0.07	0.07	0.06	0.07	0.07	0.07	0.09	0.70
58:	0.07	0.05	0.06	0.06	0.06	0.05	0.09	0.07	0.06	0.07	0.64
59:	0.08	0.08	0.10	0.09	0.11	0.11	0.14	0.13	0.10	0.15	1.09
60:	0.06	0.06	0.08	0.07	0.07	0.08	0.05	0.04	0.06	0.04	0.61
61:	0.05	0.05	0.05	0.05	0.06	0.06	0.08	0.07	0.07	0.06	0.59
62:	0.05	0.06	0.08	0.07	0.05	0.05	0.04	0.05	0.04	0.04	0.54
63:	0.03	0.04	0.04	0.05	0.03	0.03	0.04	0.02	0.03	0.02	0.35
64:	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.18
65:	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.13
66:	0.02	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.09
67:	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.07
68:	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.08
69:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.06
70:	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.05
71:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.07
72:	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04

Exceedance Chart

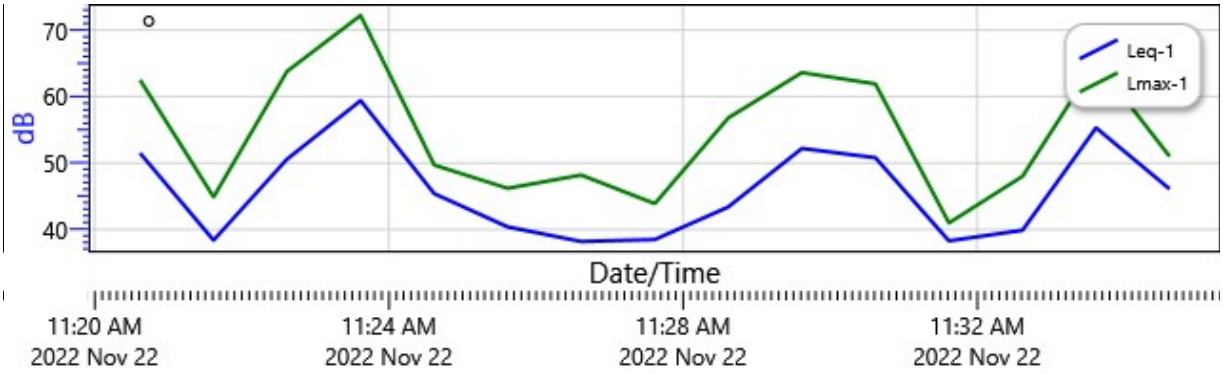


Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		63.1	61.3	59.7	58.8	57.3	55.9	54.5	53.1	51.6
10%:	50.6	49.5	48.8	48.1	47.8	47.4	46.9	46.5	46.2	45.9
20%:	45.6	45.3	45.1	44.9	44.6	44.4	44.1	43.9	43.6	43.3
30%:	43.0	42.8	42.6	42.3	42.1	41.9	41.7	41.6	41.4	41.2
40%:	41.1	40.9	40.8	40.7	40.6	40.4	40.3	40.2	40.1	40.0
50%:	39.9	39.8	39.7	39.5	39.4	39.3	39.2	39.2	39.1	39.0
60%:	38.9	38.8	38.8	38.7	38.7	38.6	38.5	38.4	38.3	38.2
70%:	38.1	38.1	38.0	37.9	37.8	37.7	37.7	37.6	37.5	37.4
80%:	37.4	37.3	37.2	37.2	37.1	37.0	36.9	36.8	36.7	36.6
90%:	36.5	36.4	36.3	36.2	36.1	35.9	35.8	35.6	35.2	34.8
100%:	34.2									

Logged Data Chart

S022_BIJ050019_28112022_142016: Logged Data Chart



Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	51 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	A
Response	2	FAST			

APPENDIX B

RCNM Datasheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2023
Case Description: Rancho 38 Warehouse Project

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential West	Residential	52.1	52.1	52.1

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	70.0	0.0
Dozer	No	40		81.7	70.0	0.0
Scraper	No	40		83.6	70.0	0.0
Excavator	No	40		80.7	70.0	0.0
Grader	No	40	85.0		70.0	0.0
Crane	No	16		80.6	70.0	0.0
Gradall	No	40		83.4	70.0	0.0
Generator	No	50		80.6	70.0	0.0
Welder / Torch	No	40		74.0	70.0	0.0
Compressor (air)	No	40		77.7	70.0	0.0
Paver	No	50		77.2	70.0	0.0
Roller	No	20		80.0	70.0	0.0
Pickup Truck	No	40		75.0	70.0	0.0
Compactor (ground)	No	20		83.2	70.0	0.0
Concrete Mixer Truck	No	40		78.8	70.0	0.0
Dump Truck	No	40		76.5	70.0	0.0
Front End Loader	No	40		79.1	70.0	0.0

Results

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	78.7	74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	77.8	73.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	82.1	78.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	77.6	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	77.7	74.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	71.1	67.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	74.7	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	74.3	71.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roller	77.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	72.1	68.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	80.3	73.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	75.9	71.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	73.5	69.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	76.2	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.1	85.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential North	Residential	52.1	52.1	52.1

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	100.0	0.0
Dozer	No	40		81.7	100.0	0.0
Scraper	No	40		83.6	100.0	0.0
Excavator	No	40		80.7	100.0	0.0
Grader	No	40	85.0		100.0	0.0
Crane	No	16		80.6	100.0	0.0
Gradall	No	40		83.4	100.0	0.0
Generator	No	50		80.6	100.0	0.0
Welder / Torch	No	40		74.0	100.0	0.0
Compressor (air)	No	40		77.7	100.0	0.0
Paver	No	50		77.2	100.0	0.0
Roller	No	20		80.0	100.0	0.0
Pickup Truck	No	40		75.0	100.0	0.0
Compactor (ground)	No	20		83.2	100.0	0.0
Concrete Mixer Truck	No	40		78.8	100.0	0.0
Dump Truck	No	40		76.5	100.0	0.0
Front End Loader	No	40		79.1	100.0	0.0

Results

					Noise Limits (dBA)									
Noise Limit Exceedance (dBA)														
			Calculated (dBA)		Day		Evening		Night					
Day	Evening	Night												
Equipment			Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe			71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer			75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper			77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator			74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader			79.0	75.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane			74.5	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Gradall	77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Generator	74.6	71.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Welder / Torch	68.0	64.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Compressor (air)	71.6	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Paver	71.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Roller	74.0	67.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Pickup Truck	69.0	65.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Compactor (ground)	77.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Concrete Mixer Truck	72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Dump Truck	70.4	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A						
Total	79.0	82.6	0.0	0.0	0.0					
0.0	0.0	0.0								

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Vista Verde ES	Residential	49.6	49.6	49.6

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	1050.0	0.0
Dozer	No	40		81.7	1050.0	0.0
Scraper	No	40		83.6	1050.0	0.0
Excavator	No	40		80.7	1050.0	0.0
Grader	No	40	85.0		1050.0	0.0
Crane	No	16		80.6	1050.0	0.0
Gradall	No	40		83.4	1050.0	0.0
Generator	No	50		80.6	1050.0	0.0
Welder / Torch	No	40		74.0	1050.0	0.0
Compressor (air)	No	40		77.7	1050.0	0.0
Paver	No	50		77.2	1050.0	0.0
Roller	No	20		80.0	1050.0	0.0
Pickup Truck	No	40		75.0	1050.0	0.0
Compactor (ground)	No	20		83.2	1050.0	0.0
Concrete Mixer Truck	No	40		78.8	1050.0	0.0
Dump Truck	No	40		76.5	1050.0	0.0
Front End Loader	No	40		79.1	1050.0	0.0

Results

Noise Limit Exceedance (dBA)					Noise Limits (dBA)							
	Calculated (dBA)				Day		Evening		Night			
Day	Evening	Night										
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	51.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Dozer	55.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	57.1	53.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	54.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	54.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	57.0	53.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	54.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	47.6	43.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	51.2	47.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	50.8	47.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	53.6	46.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	48.6	44.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	56.8	49.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	52.4	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.0	46.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	58.6	62.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residental West - Center	Residential	52.1	52.1	52.1

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	220.0	0.0
Dozer	No	40		81.7	220.0	0.0
Scraper	No	40		83.6	220.0	0.0
Excavator	No	40		80.7	220.0	0.0
Grader	No	40	85.0		220.0	0.0
Crane	No	16		80.6	220.0	0.0
Gradall	No	40		83.4	220.0	0.0
Generator	No	50		80.6	220.0	0.0
Welder / Torch	No	40		74.0	220.0	0.0
Compressor (air)	No	40		77.7	220.0	0.0
Paver	No	50		77.2	220.0	0.0
Roller	No	20		80.0	220.0	0.0
Pickup Truck	No	40		75.0	220.0	0.0
Compactor (ground)	No	20		83.2	220.0	0.0
Concrete Mixer Truck	No	40		78.8	220.0	0.0
Dump Truck	No	40		76.5	220.0	0.0
Front End Loader	No	40		79.1	220.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq	Lmax
Backhoe	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	70.7	66.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	67.8	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	72.1	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	67.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	70.5	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	67.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	61.1	57.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	64.4	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	67.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	62.1	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	70.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	65.9	62.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	66.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	72.1	75.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX C

Manufacturer Datasheets

Drive-Thru Sound Levels

Some municipalities have adopted regulations aimed at controlling the acoustic noise levels in residential and (or) commercial areas. These regulations are of particular importance to drive-thru operators because the drive-thru is viewed as a source of noise. The noise originates both from the vehicles themselves and from the drive-thru communications system. This white paper addresses common questions related to sound from the communications system.

Note: Because every site is different and each municipality has its own regulations, HME is unable to make specific recommendations for compliance or give any assurance that any particular system configuration will comply with any given regulations. Statements made in this paper should be taken as general guidelines, but to ensure compliance, the site planner should retain the services of a qualified acoustic consultant equipped to make the necessary measurements.

In the drive-thru, the primary source of sound other than the vehicles is often the drive-thru communications system. Outbound audio includes the order taker's voice and any sound provided by the message repeater. The outbound audio is delivered by the speaker and must be loud enough to be clearly heard by the customer over the noise of the customer's vehicle, any local traffic and other ambient background noises in the area. However, if it is too loud, the sound can be objectionable to neighbors or even violate specific regulations.

HME base stations are equipped with a feature known as Automatic Volume Control or "AVC" which can be used to reduce the outbound sound pressure level based on ambient noise. When AVC is active, the outbound level is reduced to a level that is 15 dB above the ambient noise level at the speaker post microphone, but it **never** increases the level above what would be heard with AVC turned off. This feature can considerably reduce the SPL during quiet periods and may help in satisfying local requirements.

Sound levels are measured in units of dB SPL and usually include a frequency variable weight referred to as "A Weighting". For this reason, the units are frequently written as "dBA SPL" and that notation will be used throughout this paper. The sound pressure level from a speaker decreases as the distance away increases. However, it can be difficult to predict how much reduction will actually occur. For a single point sound source like an alarm bell hanging in air, the SPL drops approximately 6 dB every time the distance from the source doubles. Thus if one starts one foot away, the level will be 36 dB lower when one is 64 feet away. Unfortunately, speakers are neither single point sources nor are they hanging in air. Rather, speakers are mounted in a variety of different type enclosures. Further, the building, the ground and even other cars in proximity all effect the sound's direction and decay rate. All of this tends to make the sound more directional and the decay rate less predictable.

This paper provides some "typical" measurements taken outdoors under specific circumstances. These measurements can be used as a guide for what levels might occur in a drive-through installation. These measurements were taken using "pink noise", a type of noise frequently used for acoustic testing, at levels simulating the loudest speech expected from an order taker.

All typical measurements provided here were taken using the following equipment:

- Base station: HME ION IQ set to factory default levels
- Communicator: HME COM6000
- Speaker: HME SP10
- Speaker post: Texas Digital model 107150

The measurement environment was as follows:

- Asphalt parking lot 50 ft from any building
- Ambient background noise level: ~47 dBA SPL
- Nearest vehicle not part of measurement: 15 ft

Initial measurements were taken with AVC off, no vehicle in front of the speaker post, and no other obstructions within at least 100 ft of the speaker. These are not "normal" conditions for a drive-thru, but they do yield one worst-case measurement. Under these conditions, the sound pressure level 1 foot in front of the speaker is 90 dBA SPL. At 17 feet, it drops down to a normal conversational level of 66 dBA SPL, but does not drop to 60 dBA until a distance of 55 feet. Figure 1 shows the loudness contours for both 60 dBA and 66 dBA levels. Since the primary concern is noise abatement at a distance, higher level contours are not shown.

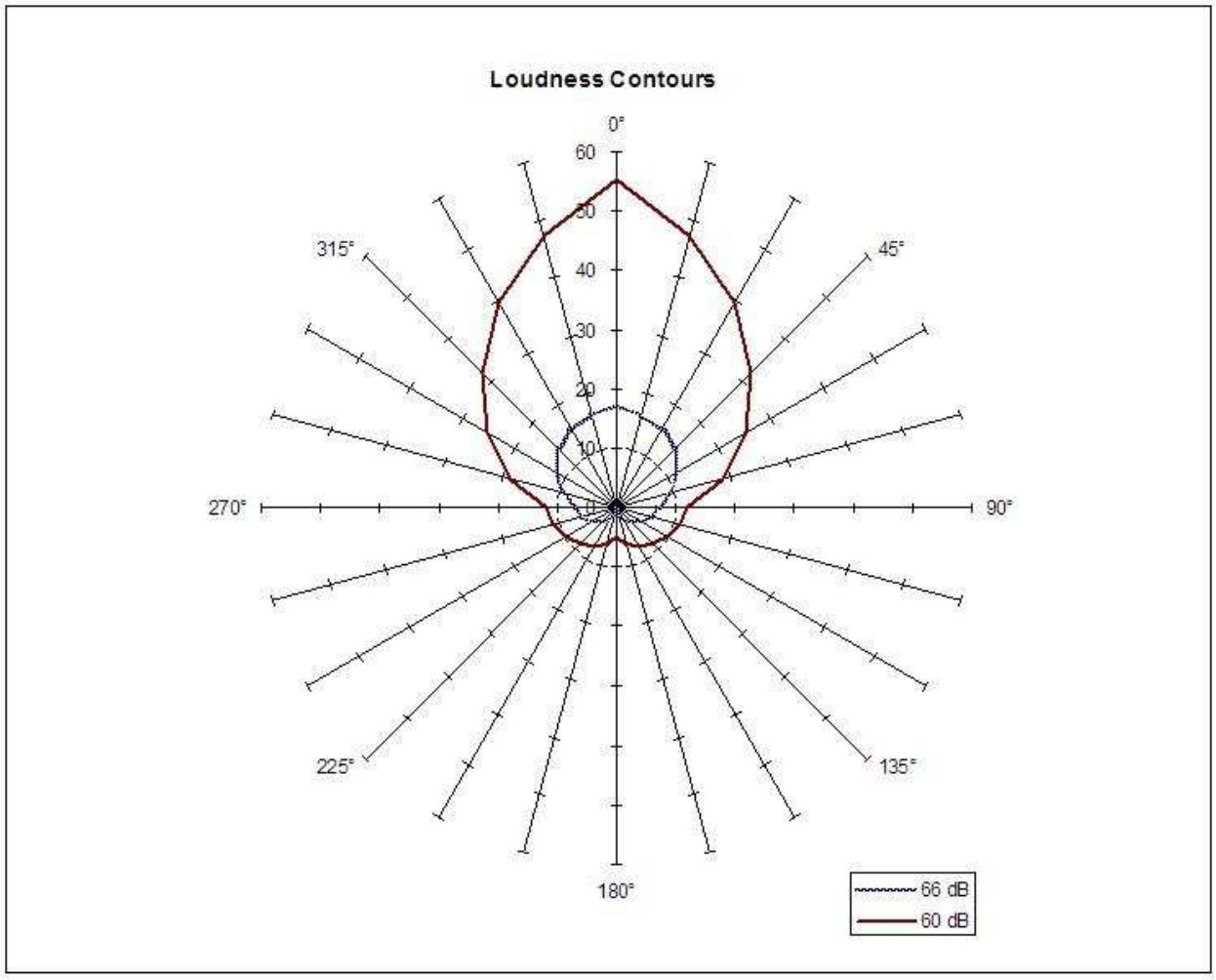


Figure 1 – SP10 SPL Contours

With a vehicle parked in front of the speaker, the shape of the contour changes dramatically and depends on many factors including the height, size, shape, and angle of the vehicle. Because of the tremendous differences in vehicles, positioning, and lane construction, HME cannot predict with any certainty the shape of the resulting SPL contours. However, generally, the shape flattens and the loudest sounds are found at angles to the front and rear of the vehicle with the front being louder.

AVC Operation

AVC measures the ambient noise level in the drive-thru and adjusts the outbound level down so that it is **never more than 15 dB above the ambient noise level**. This is particularly useful at night when there is less traffic on surrounding streets and fewer cars in the drive-thru. It may also be useful in situations where the regulations do not specify specific sound pressure levels, but use terms like "reasonable" or "sufficient". Because AVC adjusts continuously, it ensures that the outbound level is high enough to be heard by the customer whatever the conditions may be.

As an example, if the ambient noise level is 47 dBA, AVC will adjust the outbound level to approximately 62 dBA at a position about 1 ft from the speaker. Given this condition, the SPL will be below the ambient noise level less than 20 ft away from the post.

Since AVC adjusts based on the noise level measured at the speaker post, a noisy vehicle will drive the outbound level up. Thus, the use of AVC will not guarantee that the SPL is below any particular level for all vehicles or conditions. However, it will keep the outbound level from becoming excessively loud.

Guidelines

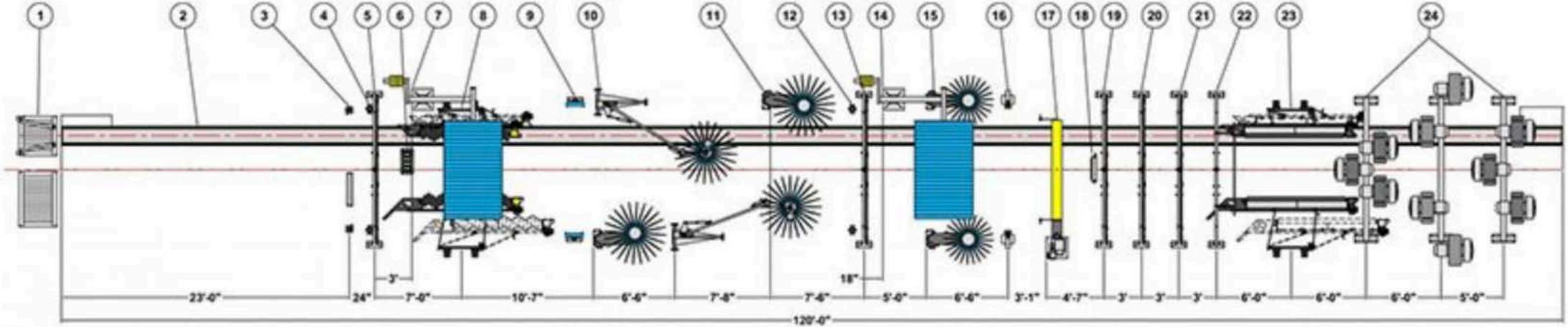
HME cannot make specific recommendations, but here are some general things that can be done to minimize issues:

Do

- Place the speaker post where vehicles can get close to it. This allows the outbound level to be kept to a minimum.
- Use brick or concrete walls to isolate the installation from adjacent residences. These walls make good barriers, but must be high enough that sounds do not easily go over them.
- Adjust the outbound level to the minimum necessary to be clearly heard by customers
- Use AVC in situations where noise abatement is an issue to further reduce outbound levels during quiet periods.

Don't

- Face the speaker post toward busy streets. This increases the ambient noise level and makes it necessary to use higher outbound levels.
- Place the speaker post on a curve in the lane. Curves force vehicles to be further away from the post, which results in higher outbound level requirements and makes it difficult for order takers to hear customers.
- Face the speaker post or the drive-thru lane at adjacent residences. Remember that the highest sound levels are likely to be directly opposite the post and off the front of vehicles.
- Turn the outbound level up higher than necessary.
- Rely on vegetation to reduce sounds. Plants have rather limited impact on sound levels.



120'FT LAYOUT EQUIPMENT		
ITEM No.	EQUIPMENT TAG	EQUIPMENT
1	RC120	CORRELATOR
2	RG440	CONVEYOR
3	IR110-2	PHOTO EYES
4	CTA (w. Mat Switch)	TIRE CHEMICAL APPLICATOR #1
5	RW111W	PRESOAK
6		BUMPER PRESOAK (front and rear)
7	RS1000 LH	TOP BRUSH #1 (94" Brush)
8	MW2000	WHEEL BOSS
9		TRIPLE STREAMER
10	RS701	WRAP AROUND (long arm)
11	RS301	HIGH SIDE WASHER

12	CTA	TIRE CHEMICAL APPLICATOR #2
13	RW111W-1	BUG PREP MANIFOLD
14	RS1000 LH	TOP BRUSH #2 (82" Brush)
15	RS400	LOW SIDE WASHER (30" Brush)
16	SB900	9-NOZZLE SIDE BLASTER
17		BLUWAVE RH
18	RW100	UNDERCHASSIS
19	RW111W-1	RINSE
20	RW111W-1	CLEARCOAT
21	RW111W-1	DRYING AGENT
22	WIDE ARCH & RW112	SPOT FREE RINSE
23	MT2500	GLOSS BOSS
24	TECH 21	DRYER 100HP w. POWER LOCK

OCT / 07

POWERLOCK SOUND PRESSURE LEVELS

Individual Fan Study

10HP Tech 21 Dryer

10HP at 1 meter **without** PowerLock	=	92DB
10HP at 1 meter with PowerLock **open**	=	88DB
10HP at 1 meter with PowerLock **closed**	=	85DB

15HP Tech 21 Dryer

15HP at 1 meter **without** PowerLock	=	96DB
15HP at 1 meter with PowerLock **open**	=	92DB
15HP at 1 meter with PowerLock **closed**	=	87DB

On average, a site will appreciate a 30-50% sound reduction, depending on its dryer package, valve cycling, and wash area.

Bob MacNeil
R&D

July 8th, 2013

Re: Vacutech Sound Study Projections for South Coast Speedwash, Santa Ana, CA.

To: City of Santa Ana / Planning Commission/ Plan Review

Project: South Coast Speedwash, Santa Ana, CA

Vacutech has no formal data available that covers vacuum sound projections beyond fifteen feet. I am sending this sound study that was performed at Lakewood Car Wash on Lakewood Blvd. in Lakewood, CA. It provides decibel readings at a maximum of 15'.

The chart below shows a cumulative average of the data collected and is presented in an incremental form based on the worst case scenario of the vacuum hoses being off their nozzle hanger. The table below is an average of the 5 foot through the 15 foot readings.

Vacutech Noise Study Projections	
Average of all ten hoses off	77.24 db
Average @ 25'	74.53 db
Average @ 35'	71.82 db
Average @ 45'	69.11 db
Average @ 55'	66.40 db
Average @ 65'	63.69 db

Refer to attached Vacutech Sound Study for All readings
The data from the Vacutech Sound Study also shows an ambient noise level of 74.4 – 82.3 db which is conclusive with the sound study that was performed by ACS on the existing parcel of the Bristol Speedwash. These numbers are all based on averages but do not appear to be out of line.

Below you will find the Vacutech sound study performed at the Lakewood Carwash. After reviewing the data provided by Vacutech there is no apparent reason that noise from the vacuum system would reach above ambient sound levels at the property line of the proposed project. Any questions or comments please feel free to call.

Tom Tucker Jr.
President

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Carrier

Turn to the experts

Product Data

WeatherMaster® Single Packaged Rooftop Heat Pump Units

3 to 10 Nominal Tons

WeatherMaster®

50HCQ 04, 05, 06, 07, 08, 09, 12
with Puron® (R-410) Refrigerant

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.