SOUND LEVEL ASSESSMENT REPORT

Hudson Logistics Center Project
Town of Hudson, Hillsborough County, NH

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1.0 EXECUTIVE SUMMARY

The Hudson Logistics Center Project (the Project) is a new warehouse project planned for development in The Town of Hudson, Hillsborough County, New Hampshire. The Project includes a total building footprint of approximately 1.4 million square-feet consisting of one main warehouse and several accessory buildings located on an approximate 375-acre lot (the Property) located west of Lowell Road and Steele Road. Epsilon Associates, Inc. (Epsilon) has been retained by Langan Engineering (Langan) to conduct a sound level measurement and acoustic modeling study for the mechanical equipment and delivery truck activity associated with the Project.

A previously approved project on the Property consisted of three warehouse buildings totaling approximately 2.6 million square feet (the Approved Project). A sound level assessment for the Approved Project was conducted by Ostergaard Acoustical Associates in 2020, with the latest version of the report, *Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, NH* (Revision 2), dated December 1,2020.

The sound level assessment described in this report included a baseline sound level measurement program to determine existing ambient sound levels at properties in the vicinity of the Project site and sound level modeling of operational sounds from the proposed facility.

An ambient sound level measurement program for the Project was conducted by Epsilon in June of 2022. Results of the acoustic modeling demonstrate that facility operations due to sources associated with the Project will be below the Town of Hudson regulatory limits at all the closest receptors. The limits were established under the Hudson Noise Regulations (Chapter 249 of the Town of Hudson Town Code (the Hudson Town Code). Therefore, the Project meets the Hudson Town Code regulatory limits with respect to noise. For purposes of comparison, modeled continuous sound levels due to the Project are also lower at all the closest receptors when compared to the previously Approved Project.

Pursuant to the analysis performed by Epsilon as described herein, and subject to the recommendations contained in section 9.0, Hillwood's proposed new Project will comply with applicable local regulations relating to noise to include Chapter 275-6.H (the elimination of undesirable and preventable elements of pollution, such as noise, … into the environment which might prove harmful to persons, structures, or adjacent properties), and Chapter 249 of the Town of Hudson's Town Code. Further, when compared to the results of the sound level analysis performed for the Approved Project by Ostergaard Associates in December of 2020, the proposed Project has lower continuous sound levels at all modeling locations and time periods than the levels presented for the Approved Project, and otherwise will not prove harmful to persons, structures or adjacent properties.

2.0 INTRODUCTION

The proposed development includes a warehouse building and several accessory structures including a guardhouse, a transportation building and a maintenance building located west of Lowell Road in the Town of Hudson, Hillsborough County, NH. The proposed building will include HVAC equipment and a life-safety emergency generator. In total, there are expected to be 64 HVAC rooftop units (RTUs). The building includes 134 loading dock spaces along the west and east sides, which is a reduction of 210 loading spaces compared to the Approved Project.

The Project site is located on land zoned G-1 (General). The Project parcel is bordered by the Merrimack River to the west and a residential neighborhood to the south. There are residential and business parcels to the east and an industrial area to the north. The proposed site plan is shown in Figure 2-1.

There is an earthen berm proposed to be built south of the Project building. A 10-foot-tall sound fence is planned for the top of the berm, and two 15-foot-tall sound fences are proposed to be built southeast of the main building as shown in Figure 2-1.

This report presents a brief explanation of acoustic terminology, a summary of an existing conditions measurement program, a discussion of the sound level modeling, and an evaluation of the predicted future sound levels against the Hudson Town Code noise limits. The Project RTU sound sources, generators, and semi-trailer truck activities were modeled in CadnaA using tenant sound data provided by Langan, or data collected by Epsilon.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

Langan Hudson **Hudson, New Hampshire**

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Figure 2-1
Aerial Locus

3.0 SOUND TERMINOLOGY

There are several ways in which sound levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a 3-decibel increase (53 dB), which is equal to doubling in sound energy, but not equal to a doubling in decibel quantity (100 dB). Thus, every 3-dB change in sound level represents a doubling or halving of sound energy. The human ear does not perceive changes in the sound pressure level as equal changes in loudness. Scientific research demonstrates that the following general relationships hold between sound level and human perception for two sound levels with the same or very similar frequency characteristics[1]:

- 3 dB increase or decrease results in a change in sound that is just perceptible to the average person,
- 5 dB increase or decrease is described as a clearly noticeable change in sound level, and
- 10 dB increase or decrease is described as twice or half as loud.

Another mathematical property of decibels is that if one source of sound is at least 10 dB louder than another source, then the total sound level is simply the sound level of the higher-level source. For example, a sound source at 60 dB plus another sound source at 47 dB is equal to 60 dB.

A sound level meter (SLM) that is used to measure sound is a standardized instrument.[2] It contains "weighting networks" (e.g., A-, C-, Z-weightings) to adjust the frequency response of the instrument. Frequencies, reported in Hertz (Hz), are detailed characterizations of sounds, often addressed in musical terms as "pitch" or "tone". The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies. The A-weighting network is the accepted scale used for community sound level measurements; therefore, sounds are frequently reported as detected with a sound level meter using this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. These sound levels are reported in decibels designated dBA. The C-weighting network has a nearly flat response for frequencies between 63 Hz and 4,000 Hz and is noted as dBC. Z-weighted sound levels are measured sound levels without any weighting curve and are otherwise referred to as

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1 Bies, David, and Colin Hansen. 2009. *Engineering Noise Control: Theory and Practice*, 4th Edition. New York: Taylor and Francis.

2 *American National Standard Specification for Sound Level Meters*, ANSI S1.4-2014 (R2019), published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

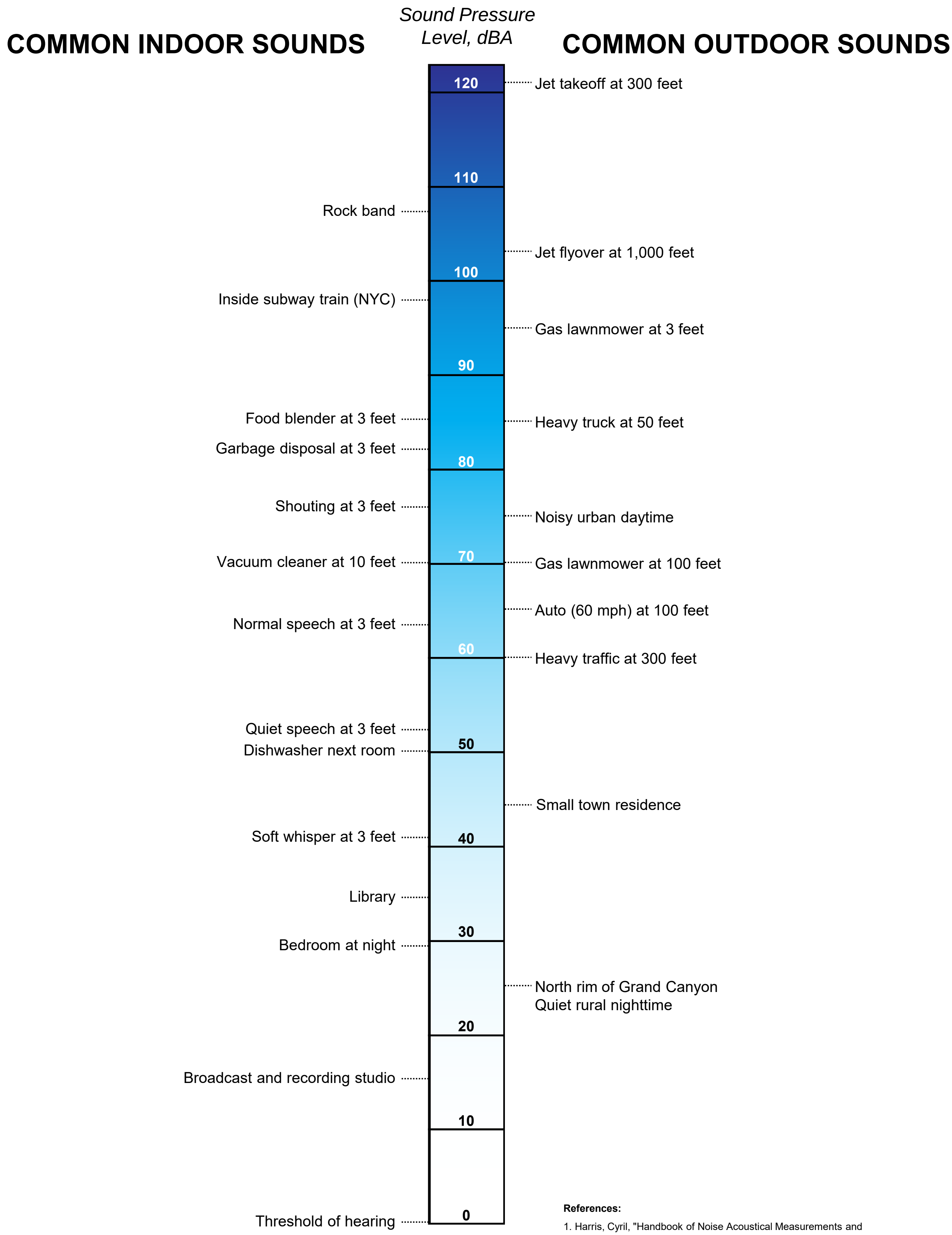
“unweighted”. Sound pressure levels for some common indoor and outdoor environments are shown in Figure 3-1.

Because the sounds in our environment vary with time they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from some number of moment-to-moment A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value between 0 and 100 in terms of percentage. Several sound level metrics that are reported in community sound monitoring are described below.

- L_{90} is the sound level exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent sound sources.

- L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.,* the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is typically A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by loud sounds if there are fluctuating sound levels.

The Hudson Noise Regulations (Chapter 249 of the Town Code) employs similar terminology as outlined above.



References:

1. Harris, Cyril, "Handbook of Noise Acoustical Measurements and Noise Control", p 1-10., 1998
2. "Controlling Noise", USAF, AFMC, AFDTC, Elgin AFB, Fact Sheet, August 1996
3. California Dept. of Trans., "Technical Noise Supplement", Oct, 1998

Figure 3-1

Common Indoor and Outdoor Sound Levels

4.0 NOISE REGULATIONS

4.1 Local Regulations – Hudson Town Code

The Town of Hudson has noise code regulations that apply to the Project. The Project is located on land zoned G-1 (General) and is required to comply with the Town's noise regulations as described in Chapter 249 of the Hudson Town Code. The Hudson Town Code provides various noise regulations for site sound emissions. Specifically, Section 249-4 identifies ten distinct noise limits that are described below, and states that, "No person or persons owning, leasing or controlling the operations of any source or sources of noise shall willfully, negligently or through failure to provide necessary equipment or facilities or through failure to take necessary precautions make or permit the emission of noise levels or conditions exceeding the following noise limits for the applicable land use."

Noise limits 2 and 3 differentiate between daytime and nighttime sound levels. The Hudson Town Code defines daytime as the period from 7:00 am to 6:00 pm and nighttime as the period from 6:00 pm to 7:00 am. Since the facility will generally operate 24-hours a day, 7 days a week, both daytime and nighttime periods have been evaluated.

Noise Limit 1 – Noise Pollution (§ 249-4.A)

This limit prevents anyone from causing noise pollution as defined in §249-2 of the Hudson Town Code. There are no quantitative thresholds associated with this limit.

Noise Limit 2 – Continuous Sources (§ 249-4.B)

This limit establishes absolute sound level limits of continuous sources for daytime and nighttime. These are shown in Table 4-1.

Table 4-1 Hudson Noise Limit 2

Continuous Sound Level Limits (1-Hour[3] dBA)		
Receptor Land Use Category	**Daytime**	**Nighttime**
Residential/rural/institutional[1]	55	50
Business/recreational[2]	65	55
Industrial	75	75

Notes:
1. Hospitals, schools, places of worship, libraries, public parklands, etc.
2. Public playgrounds, swimming pools, athletic fields, golf courses, etc.
3. Where the offending source of noise is nearly constant over a one-hour period, a measurement sampling period of less than one hour, but no less than five minutes, is permitted. This measurement shall be made with the sound-level meter set to slow A-weighting responses.

Noise Limit 3 – Impulsive Sources (§ 249-4.C)

This limit establishes absolute sound level limits for impulsive sources which typically last for less than 1-second. The sound level limits for impulsive sources use C-weighting and are shown in Table 4-2.

Table 4-2 Hudson Noise Limit 3

Impulsive Sound Level Limits (dBC fast)		
Receptor Land Use Category	**Daytime**	**Nighttime**
Residential/rural/institutional[1]	67	62
Business/recreational[2]	77	67
Industrial	87	87

Notes:
1. Hospitals, schools, places of worship, libraries, public parklands, etc.
2. Public playgrounds, swimming pools, athletic fields, golf courses, etc.

Noise Limit 4 – Background Referenced Sound Level (§ 249-4.D)

This limit is based on the measured background noise level which is defined as the level exceeded 90 percent of the time or the L_{90}. This limit prohibits the existing L_{90} from increasing by more than 10 dBA.

Noise Limit 5 – Pure-Tone Conditions (§ 249-4.E)

This limit prevents the emission of pure-tones which are defined as the sound pressure level in any octave band from exceeding the sound pressure level in the two adjacent octave bands by 3 dB or more.

Noise Limit 6 – High Noise Level Areas (§ 249-4.F)

This limit applies to high noise-level areas and is not applicable to the Project based on ambient measurements.

Noise Limit 7 – Snow-Traveling and Recreational Vehicles (§ 249-4.G)

This limit applies to snow-traveling and other recreational vehicles and is not applicable to the Project.

Noise Limit 8 – Water Vessels (§ 249-4.H)

This limit applies to powered water vessels and is not applicable to the Project.

Noise Limit 9 – Construction (§ 249-4.I)

This limit applies to construction noise and requires construction to take place during permitted hours (Monday through Saturday between the hours of 7:00 a.m. and 7:00 p.m.) and with well-maintained equipment. In addition, the quantitative limits set forth in Noise Limit 2 and Noise Limit 3 must also be met. This is discussed further in Section 8.9.

Noise Limit 10 – Prohibited Activities (§ 249-4.J)

This limit includes prohibited activities such as excessive vehicle horn use, truck idling for longer than 10 minutes, and exhaust discharge.

4.2 Site Plan Criteria

In addition to the above, Section 275-6 of the Town of Hudson Code provides that the Project proponent must demonstrate that adequate provisions be made by the Owner or his/her/its authorized agent for, among other things, E. Elimination of undesirable and preventable elements of pollution, ***such as noise***, smoke, soot, particulates or any other discharge, into the environment which might prove harmful to persons, structures or adjacent properties (emphasis added). See § 275-6E. of the Hudson Site Plan Review Ordinance.

Other than the above, there are no other local, state, or federal regulations that apply to the Project. The State of New Hampshire does not provide any specific language that limits Project sound emissions. However, the State requires that all motor vehicles are equipped with proper working mufflers to prevent noise in Section 266:59, and also places limits on idling, all of which are addressed by Noise Limit 10 of the Hudson Town Code.

5.0 EXISTING SOUND LEVEL MEASUREMENT PROGRAM

5.1 Overview

A sound level survey was conducted, consistent with the requirements of § 249-3. "Guidelines for determining sound levels" of the Hudson Town Code and other generally accepted methodology, to characterize the existing acoustical environment near the site. Three continuous long-term sound level monitors were deployed for a 1-week period. Figure 5-1 shows the three long-term sound level measurement locations over aerial imagery of the Project area.

5.2 Sound Level Measurement Locations

Sound level measurement locations were chosen by Epsilon and are consistent with measurement locations selected for the previously Approved Project evaluated by Ostergaard Associates[3]. Two of these locations are along the southerly property line adjacent to the residential neighborhood, and one is along the east property line as shown in Figure 5-1. The three long-term monitoring locations were used to measure the existing sound levels at properties adjacent to the Project. Each sound level measurement location is described in the following subsections.

The coordinates for the sound level measurement locations are listed in Table 5-1.

Table 5-1 GPS Coordinates – Sound Level Measurement Locations

Location	Latitude	Longitude
ML1	42.71035°	-71.43246°
ML2	42.71258°	-71.42678°
ML3	42.71952°	-71.42268°

[3] Ostergaard Acoustical Associates. (December 2020). *Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, NH, Revision 2.*

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Figure 5-1
Sound Monitoring Locations

5.2.1 ML1 – Fairway Drive

One continuous unattended sound level meter was placed north of Fairway Drive in the Town of Hudson. This location is representative of existing sound levels at the residences on Fairway Drive, near the southwest corner of the Project site. Figure 5-2 shows a photo of the sound level meter at this location.

The meter continuously measured and stored broadband (A-weighted) and one-third octave band sound level statistics from 3:00 pm Tuesday, June 21, 2022, until 12:00 pm on Monday, June 29, 2022. In total, 189 1-hour measurement periods were recorded during the measurement program. In addition to sound data collection, continuous ground-level wind speed data were collected at this location.

Figure 5-2 Location ML1 - Sound Level Meter

5.2.2 ML2 – Eagle Drive

One continuous unattended sound level meter was placed north of Eagle Drive in the Town of Hudson. This location is representative of existing sound levels at the residences southeast of the Project site. Figure 5-3 shows a photo of the sound level meter at this location.

The meter continuously measured and stored broadband (A-weighted) and one-third octave band sound level statistics from 4:00 p.m. Tuesday, June 21, 2022, until 11:00 a.m. on Wednesday, June 29, 2022. In total, 188 1-hour measurement periods were recorded during the measurement program.

Figure 5-3 Location ML2 - Sound Level Meter

5.2.3 ML3 – Linda Street

One continuous unattended sound level meter was placed west of Linda Street in the Town of Hudson. This location is representative of existing sound levels at the residences east of the Project site. Figure 5-4 shows a photo of the sound level meter at this location.

The meter continuously measured and stored broadband (A-weighted) and one-third octave band sound level statistics from 5:00 p.m. Tuesday, June 21, 2022, until 11:00 a.m. on Wednesday, June 29, 2022. In total, 187 1-hour measurement periods were recorded during the measurement program.

Figure 5-4 Location ML3 - Sound Level Meter

5.3 Sound Level Measurement Instrumentation

Each of the monitoring locations used a Larson Davis (LD) model 831 sound level meter (SLM) to measure A-weighted (dBA) sound pressure levels. Each instrument was equipped with a LD PRM 831 preamplifier and a PCB 377C20 half inch microphone along with an environmental protection kit. The kit included a manufacturer open cell wind screen to reduce wind-induced noise over the microphone.

Each microphone was tripod-mounted at a height of five feet above ground level. Each meter was programmed to log statistical data every 1-hour for the following parameters: L_{10}, L_{50}, L_{90}, and L_{eq} along with a one-second time history using a “fast” response setting.

The LD831 meters meet Type 1 ANSI/ASA S1.4, ANSI S1.43-1997 (R2007), and IEC 61672 Class 1 standards for sound level meters and were calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. These calibrations were conducted by an independent laboratory within 12 months of field placement. Certificates of calibration are provided available upon request. All measurement equipment was field calibrated before and after the surveys with an acoustical calibrator which meets the standards of IEC 60942-2003 Class 1L and ANSI/ASA S1.40-2006 (R2016). This instrumentation employed is consistent with the requirements of the Hudson Town Code.

5.4 Meteorological Equipment

Wind speed can have a strong influence on ambient sound levels. To understand how the existing sound levels are influenced by wind speed, continuous measurements were made at Location ML1 using a HOBO H21-USB micro-weather station (manufactured by Onset Computer Corporation). This wind speed instrumentation has a measurement range of 0 to 76 m/s (170 mph), an accuracy of ±1.1 m/s (2.4 mph), and a starting threshold of ≤1 m/s (2.2 mph).

6.0 SOUND LEVEL MEASUREMENT RESULTS

Sound levels were continuously measured at three measurement locations for over one week. Observations at each of the three locations were made by Epsilon personnel throughout the monitoring program during the time periods described below.

- Upon deployment (daytime)
- During the night (nighttime)
- Upon pickup (daytime)

Measured ambient sound levels are and described below and summarized in Table 6-1.

Table 6-1 Summary of Measured Ambient Sound Levels

Location	Period	L_{eq}	L_{90}	ANS L_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)								
					31.5	63	125	250	500	1000	2000	4000	8000
		dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	46	38	37	48	49	45	37	36	36	29	25	22
2	Day	48	38	37	48	49	46	39	35	35	29	24	15
3	Day	46	41	40	51	50	45	39	37	37	31	25	17
1	Night	42	37	36	46	47	43	36	36	35	25	20	17
2	Night	43	36	35	45	46	42	36	34	33	26	19	13
3	Night	42	38	37	47	47	44	37	35	35	28	23	15

6.1 Location ML1 – Fairway Drive

Sound levels at location ML1 were influenced by vehicular traffic on local and distant roads, birds, wind, rustling vegetation, insects, animal movement nearby, activity from golfers and golf carts (daytime only), distant residential HVAC equipment noise (nighttime only), and occasional aircraft. The measured A-weighted 1-hour L_{eq} and L_{90} sound pressure levels during the measurement program are presented graphically in Figure A-1 in Appendix A. This figure includes ground-level wind speeds and precipitation periods measured at Location ML1. Data during certain time periods were excluded due to precipitation and ground-level winds exceeding 5 m/s. The resulting dataset includes a total of 173 1-hour periods of valid data.

The 1-hour L_{eq} during the measurement program at location ML1 ranged from 26 to 66 dBA. The 1-hour L_{90} during the measurement program at location ML1 ranged from 25 to 51 dBA.

6.2 Location ML2 – Eagle Drive

Sound levels at location ML2 were influenced by vehicular traffic on local and distant roads, birds, wind, rustling vegetation, insects, animal movement nearby, activity from golfers and golf carts (daytime only), and occasional aircraft. The measured A-weighted 1-hour L_{eq} and L_{90} sound pressure levels during the measurement program are presented graphically in Figure A-2 in

Appendix A. This figure includes ground-level wind speeds and precipitation periods measured at Location ML1. Data during certain time periods were excluded due to precipitation and ground-level winds exceeding 5 m/s. The resulting dataset includes a total of 172 1-hour periods of valid data.

The 1-hour L_{eq} during the measurement program at location ML2 ranged from 31 to 62 dBA. The 1-hour L_{90} during the measurement program at location ML2 ranged from 24 to 50 dBA.

6.3 Location ML3 – Linda Street

Sound levels at location ML3 were influenced by vehicular traffic on local and distant roads, birds, wind, rustling vegetation, insects, animal movement nearby, activity from golfers and golf carts (daytime only), and occasional aircraft. The measured A-weighted 1-hour L_{eq} and L_{90} sound pressure levels during the measurement program are presented graphically in Figure A-3 in Appendix A. This figure includes ground-level wind speeds and precipitation periods measured at ML1. Data during certain time periods were excluded due to precipitation and ground-level winds exceeding 5 m/s. The resulting dataset includes a total of 171 1-hour periods of valid data.

The 1-hour L_{eq} during the measurement program at location ML3 ranged from 31 to 68 dBA. The 1-hour L_{90} during the measurement program at location ML3 ranged from 29 to 47 dBA.

7.0 SOUND MODELING

7.1 Modeling Receptors

Project sound pressure levels were modeled at 13 receptors representing nearby residential, business, and industrial locations. The receptor locations and naming convention were selected to be consistent with the receptors shown in the Ostergaard Associates sound study[4] for the previously Approved Project. Receptors are labeled B through J and were placed at a height of five feet which is the approximate ear height of a standing person. Residential receptors designated with a prime symbol (B', C', D', and F') were placed at a height of 15-feet to quantify sound levels at a second story building façade.

7.2 Modeled Sound Sources

The primary sources of sound from the Project include rooftop RTUs and truck activity. There will also be a life-safety generator for emergency use.

In this report, trucks refer to semi-trailer trucks used for freight transport. There will also be passenger vehicles present onsite. Passenger vehicles traveling at low speeds (below 35 mph) are well below 10 dB quieter than trucks and will therefore have an insignificant contribution to the overall sound level as discussed in Section 3.0 of this report. There will also be minimal passenger vehicle activity other than during shift changes. Accordingly, passenger vehicles were not included in the sound model.

The Hudson Town Code distinguishes between continuous and impulsive noise sources. There are different limits for each type of source, and they are evaluated using different metrics. RTU equipment and noise from trucks driving onsite have been evaluated as continuous, since they may be fairly constant despite fluctuations in the overall sound level. Impulse noises are defined in the Hudson Town Code as being of short duration. Appropriately, for this evaluation, sounds due to truck back-up alarms, truck hitching, and truck airbrakes have been evaluated as impulsive, since they have a very short duration. To be conservative, back-up alarms were assumed to be tonal, although broadband back-up alarms that are designed to blend in better with ambient sounds exist and may be used by some on-site vehicles.

Table 7-1 summarizes the sound power level data for each sound source used in the model. Figure 7-1 shows the locations of the modeled sound sources, modeling receptors, proposed project building, and project boundary over aerial imagery of the site. The sound levels of the RTUs and generator were provided by Langan, and the sound levels of the trucking activities were based on measurements performed by Epsilon at a similar facility.

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[4] Ostergaard Acoustical Associates. (December 2020). *Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, NH, Revision 2.*

Table 7-1 Modeled Sound Power Levels per Noise Source

Sound Source	Broadband (dBA)	L_{eq} Sound Pressure Level (dB) by Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
RTU[2]	86	97[1]	97	88	84	83	81	77	73	67
Truck Driving[3]	99	85	91	94	92	95	95	92	88	80
Truck Backup Alarm	109	-	-	-	-	-	109	-	-	-
Truck Hitching (L_{max})[3]	118	113	109	107	107	108	113	112	107	103
Truck Airbrake (L_{max})[3]	109	95	95	92	94	91	103	104	102	96
Generator[4]	104	124	111	110	102	99	98	97	93	88

1. 31.5 Hz data assumed.
2. Data provided by Langan from tenant.
3. Data from measurements taken by Epsilon personnel at a similar facility.
4. Sound power level data for Cummins 300DQDAC 300 kW diesel generator with Quiet Site II Second Stage mounted muffler. Tenant specification.

7.3 Modeling Methodology

The sound impacts associated with the proposed Project were predicted using the CadnaA sound level calculation software developed by Datakustic GmbH. This software uses the ISO 9613-2 international standard for sound propagation.[5] The benefits of this software are a more refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections (if applicable), drop off with distance, and atmospheric absorption. The CadnaA software allows for frequency-based octave band calculation of sound from multiple sources as well as computation of diffraction.

Inputs and significant parameters employed in the model are described below.

- *Project Layout:* The locations of the proposed warehouse building, truck loading bays, internal access roads, project boundaries, sound fences, and final grading were provided to Epsilon by Langan.

- *Modeling Grid:* A modeling grid with a 10-meter spacing was calculated for the entire Project Area and surrounding region. The grid was modeled at a height of 1.5 meters (five feet) above ground level for consistency with the discrete modeling points. This modeling grid allowed for the creation of sound level isolines.

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5 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation, International Standard ISO 9613-2:1996 (International Organization for Standardization, Geneva, Switzerland, 1996).

- *Terrain Elevation:* Elevation contours for the modeling domain were imported into CadnaA which allowed for consideration of terrain shielding where appropriate. The terrain height contour elevations for the modeling domain were generated from elevation information derived from the National Elevation Dataset (NED) developed by the U.S. Geological Survey. In addition, elevation data from the future site grading plan was integrated into the model near the proposed building and roadways.

- *Ground Attenuation:* Spectral ground absorption was calculated using a G-factor of 0 for the Project site which corresponds to "hard ground" (pavement). Ground absorption for the off-site areas were calculated using a G-factor of 0.5 which corresponds to "mixed ground" consisting of both hard and porous ground cover.

Sound power levels for each sound source type were input into CadnaA to model the source generated L_{eq} sound pressure levels. The resulting sound pressure levels were predicted at the modeling receptors.

Several modeling assumptions inherent to the ISO 9613-2 calculation methodology, or selected as conditional inputs by Epsilon, were implemented in the CadnaA model to ensure conservative results (i.e., higher sound levels), and are described below:

- All modeled sources were assumed to be operating simultaneously at their highest sound level to yield the greatest sound level impacts.

- As per ISO 9613-2, the model assumed favorable conditions for sound propagation, corresponding to a moderate, well-developed ground-based temperature inversion, as might occur on a calm, clear night, or equivalently downwind propagation.

- Meteorological conditions assumed in the model (T=10°C/RH=70%) were selected to minimize atmospheric attenuation in the 500 Hz and 1 kHz octave bands where the human ear is most sensitive.

- No additional attenuation due to tree shielding, air turbulence, or wind shadow effects was considered in the model.

The sound modeling and assumptions employed above are generally accepted methodology for a project of this nature.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

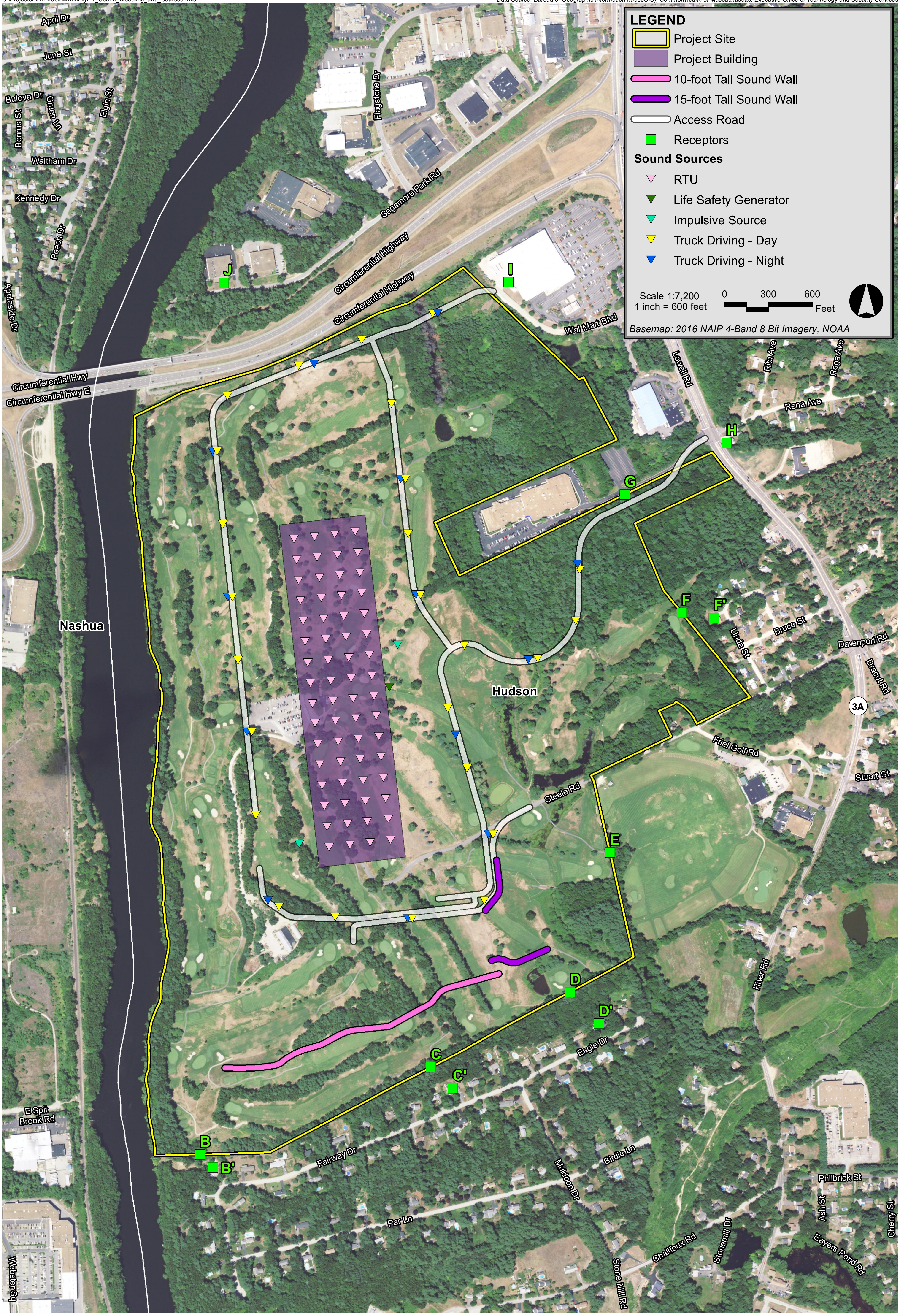

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Figure 7-1

Sound Modeling and Sound Source Locations

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

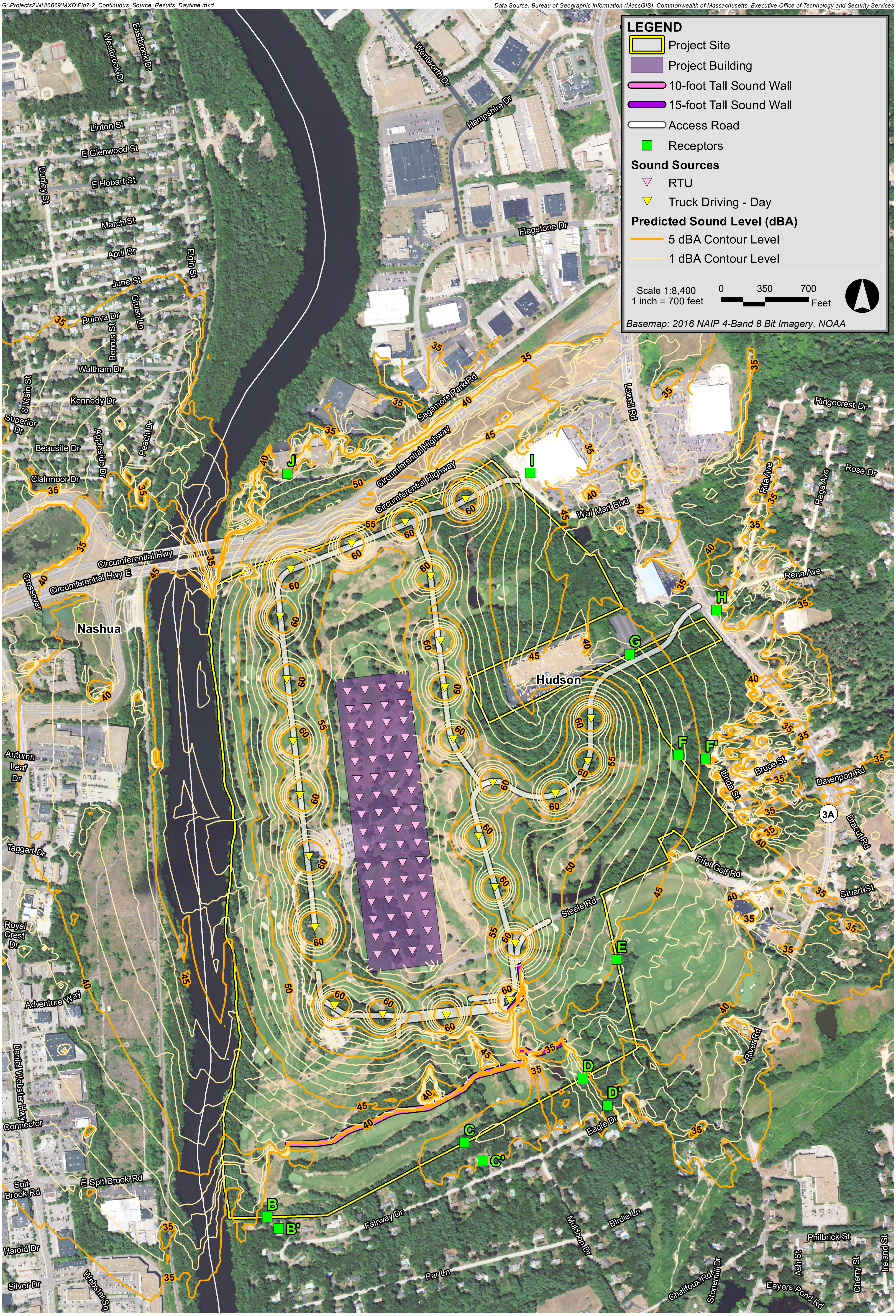
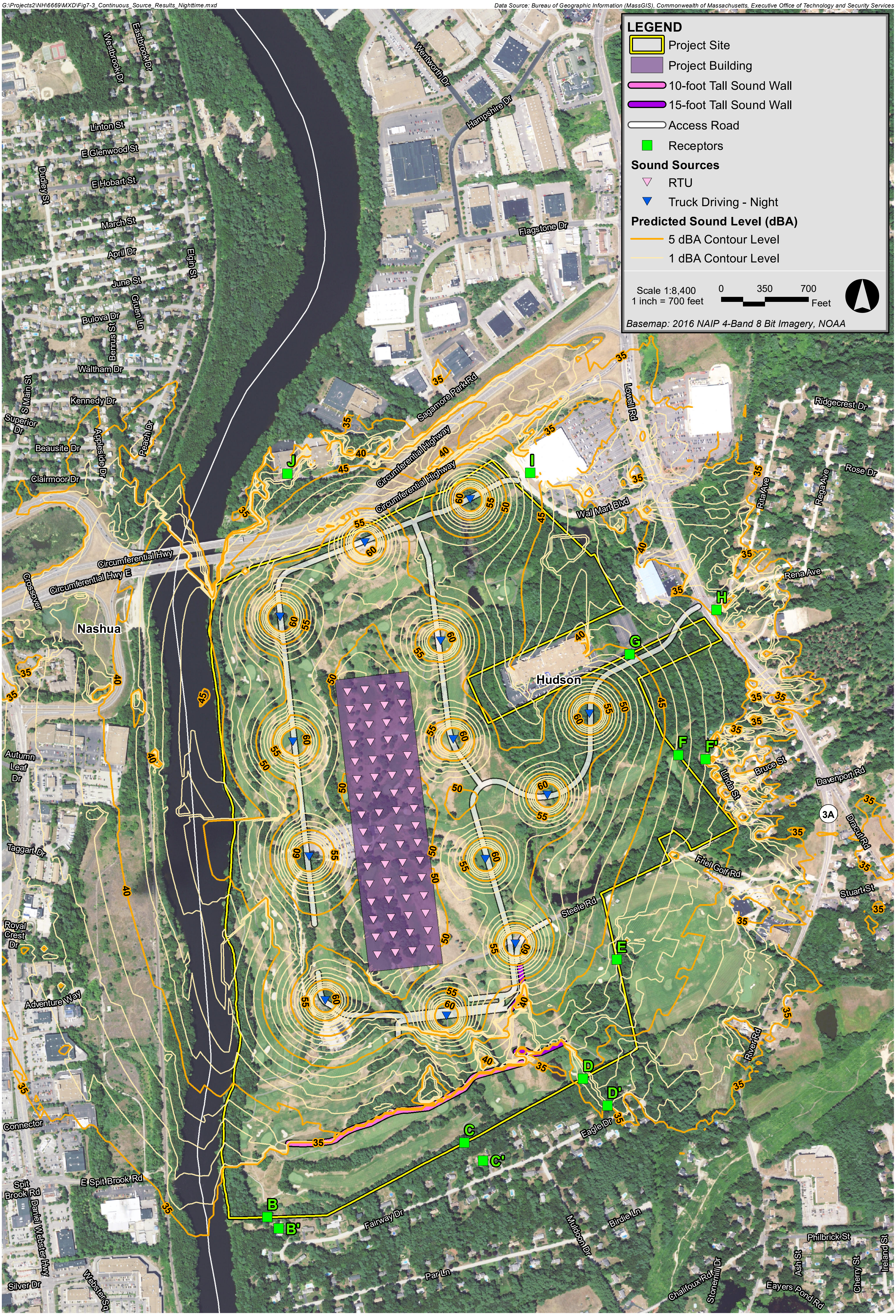


Figure 7-2

Continuous Source Results Daytime



Langan Hudson Hudson, New Hampshire

Epsilon ASSOCIATES INC.

Figure 7-3

Continuous Source Results Nighttime

8.0 SOUND MODELING RESULTS AND EVALUATION

The modeling results are presented and compared to the Hudson Town Code sound level limits in the following sections. In addition, the December 2020 sound modeling results for the previously Approved Project are compared to the sound modeling results for the current Project in Section 8.2.

8.1 Hudson Town Code Noise Limits

Each of the ten noise limits set forth in the Hudson Town Code is evaluated with the appropriate model results and discussed below.

8.1.1 Noise Limit 1 – Noise Pollution

Limit 1 prohibits conditions that contribute to noise pollution. This is a qualitative limit with no numerical restrictions. Compliance with the quantitative limits discussed in other sections of the noise code should prevent noise pollution and therefore satisfy this limit.

8.1.2 Noise Limit 2 – Continuous Sources

Limit 2 applies to continuous sounds. There are several sources that will be in continuous operation. These include RTUs, trucks driving on the internal access roads and truck courts, and the life-safety generator (in the rare times that it operates). There are additional short-duration trucking sources that will be discussed in Section 8.1.3 and evaluated under the impulsive sound limits.

8.1.2.1 Truck and RTU

All 64 RTUs may be in continuous operations. Similarly, during periods of heavy truck traffic, the sound from trucks driving onsite may be constant although fluctuating in magnitude. Therefore, both RTUs and truck driving noise have been conservatively modeled as operating simultaneously to evaluate this limit.

Hourly traffic count data provided by Langan from the tenant indicates that the maximum number of trucks entering or exiting the facility per hour on a typical day is expected to be 30 trucks during the day between 4:00 pm and 5:00 pm. During nighttime hours, the maximum number of driving trucks is expected to be 16 between 6:00 am and 7:00 am. For modeling purposes, it was conservatively assumed the maximum number of trucks driving in the facility at any time will be greater than half the hourly count, or 25 trucks during the day and 13 trucks at night.

Sound levels due to the operation of all 64 RTUs and the maximum number of operating trucks are shown in Table 8-1. The highest continuous facility sound level at a residential receptor is 47 dBA during the day and 44 dBA at night. The predicted Project only sound levels are all below the Town of Hudson continuous sound level limits. The source locations are shown in Figure 7-1.

Table 8-1 Truck and RTU Sound Modeling Results Compared to Continuous Limits (Noise Limit 2)

Receptor ID	Receptor Zone	Project Continuous Daytime Level, L_{eq} dBA	Hourly Daytime Limit, 1-Hr L_{eq}, dBA	Project Continuous Nighttime Level, L_{eq} dBA	Hourly Nighttime Limit, 1-Hr L_{eq}, dBA
B	Residential	34	55	31	50
B'	Residential	36	55	34	50
C	Residential	36	55	33	50
C'	Residential	36	55	33	50
D	Residential	38	55	36	50
D'	Residential	40	55	39	50
E	Business	44	65	43	55
F	Residential	47	55	44	50
F'	Residential	45	55	43	50
G	Industrial	47	75	45	75
H	Residential	42	55	40	50
I	Industrial	47	75	45	75
J	Industrial	45	75	41	75

8.1.2.2 Life-Safety Generator

The Project includes one 300 kW life-safety generator onsite for emergency use. The life-safety generator will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of power from the electrical grid, when other nearby businesses and residents will likely be experiencing a similar interruption in power. An additional analysis combined noise from the Project's continuous sources (Table 8-1) and the life-safety generator to reflect worst-case conditions during a period of generator testing. The predicted generator only sound levels are all below the Town of Hudson Town Code's continuous sound level limits. The results are presented with the hourly daytime limits in Table 8-2.

Table 8-2 Generator Sound Modeling Results Compared to Continuous Limits (Noise Limit 2)

Receptor ID	Receptor Zone	Modeled Generator Daytime Level, L_{eq} dBA	Hourly Daytime Limit, 1-Hr L_{eq}, dBA
B	Residential	34	55
B'	Residential	36	55
C	Residential	36	55
C'	Residential	37	55
D	Residential	38	55
D'	Residential	41	55
E	Business	45	65
F	Residential	47	55
F'	Residential	46	55

Receptor ID	Receptor Zone	Modeled Generator Daytime Level, L_{eq} dBA	Hourly Daytime Limit, 1-Hr L_{eq}, dBA
G	Industrial	47	75
H	Residential	42	55
I	Industrial	47	75
J	Industrial	45	75

8.1.3 Noise Limit 3 – Impulsive Sources

Limit 3 applies to impulsive sounds which are defined as sources that usually have a duration of less than one second. Three types of impulsive sounds were identified as likely to occur onsite: truck and terminal tractor back-up alarms, truck hitching, and truck airbrakes.

Due to the brief duration of sound from each of these sources, it is highly unlikely that more than one impulse sound event will occur at the same time. However, to be conservative, two sources of each type were modeled as occurring simultaneously, one on each side of the proposed building. The impulsive sources were modeled at the locations closest to residential receptors where they could potentially occur. Sources were therefore placed at the southernmost loading dock on each side of the building, as shown in Figure 7-1.

Impulsive noise modeling results are shown in Table 8-3 along with the Town of Hudson nighttime impulsive sound limit. The modeling results are presented using C-weighting, per the Hudson Town Code. As shown in Table 8-3, the modeled sound levels at all receptors due to impulsive sources are well below the Hudson limits for impulsive noise.

Table 8-3 Sound Modeling Results for Impulsive Sources (Noise Limit 3)

Receptor ID	Receptor Zone	Modeled Back-Up Alarm Sound Level, dBC	Modeled Hitching Sound Level, dBC	Modeled Airbrake Sound Level, dBC	Impulsive Nighttime Sound Limit, dBC
B	Residential	42	47	42	62
B'	Residential	46	48	46	62
C	Residential	45	49	44	62
C'	Residential	44	49	44	62
D	Residential	44	48	44	62
D'	Residential	46	52	46	62
E	Business	50	56	50	67
F	Residential	49	55	49	62
F'	Residential	50	54	50	62
G	Industrial	49	55	49	87
H	Residential	50	53	50	62
I	Industrial	48	52	48	87
J	Industrial	46	50	46	87

8.1.4 Noise Limit 4 – Background Referenced Sound Level

Limit 4 is based on the measured ambient sound levels to ensure that the Project does not cause a large increase in the existing sound level in the area. The L_{90} sound levels were used to characterize the ambient sound level in accordance with the Hudson Town Code. To be conservative, the L_{90} sound levels were ANS-weighted to remove any high-frequency contribution from insects. The background data are shown in Table 6-1. The measurement location closest to each receptor was used to characterize the ambient level at each receptor.

8.1.4.1 Truck and RTU

Continuous sound levels due to daytime and nighttime truck driving and RTU sources are compared to the daytime and nighttime ambient levels in Table 8-4. As the table shows, the increase above ambient is less than 10 dBA at all receptors per the Hudson Town Code's criteria for Noise Limit 4.

Table 8-4 Truck and RTU Modeling Results Compared to Background Levels (Noise Limit 4)

Receptor ID	Ambient Reference Location	Modeled Truck and RTU Sound Level, L_{eq} dBA	Ambient L_{90} Sound Level, dBA	Total Ambient Plus Project, dBA	Increase Above Ambient, dBA
Daytime Levels (7 am to 6 pm)					
B	ML1	34	37	39	2
B'	ML1	36	37	40	3
C	ML2	36	37	40	2
C'	ML2	36	37	40	3
D	ML2	38	37	41	3
D'	ML2	40	37	42	5
E	ML2	44	37	45	8
F	ML3	47	40	47	7
F'	ML3	45	40	46	6
G	ML3	47	40	47	7
H	ML3	42	40	44	4
I	ML3	47	40	48	7
J	ML3	45	40	46	6
Nighttime Levels (6 pm to 7 am)					
B	ML1	31	36	37	1
B'	ML1	34	36	38	2
C	ML2	33	35	37	2
C'	ML2	33	35	37	2
D	ML2	36	35	39	4
D'	ML2	39	35	40	5
E	ML2	43	35	44	8

Receptor ID	Ambient Reference Location	Modeled Truck and RTU Sound Level, L_{eq} dBA	Ambient L_{90} Sound Level, dBA	Total Ambient Plus Project, dBA	Increase Above Ambient, dBA
F	ML3	44	37	45	7
F'	ML3	43	37	44	6
G	ML3	45	37	46	8
H	ML3	40	37	42	4
I	ML3	45	37	46	9
J	ML3	41	37	43	5

8.1.4.2 Life-Safety Generator

The sound levels due to the life-safety generator combined with the continuous truck and RTU sources are shown compared to the ambient daytime sound levels in Table 8-5. The temporary increase in ambient sound level due to generator operation will be below 10 dBA at all receptors per the Hudson Town Code's criteria for Noise Limit 4.

Table 8-5 Generator Modeling Results Compared to Daytime Background Levels (Noise Limit 4)

Receptor ID	Ambient Reference Location	Modeled Generator Sound Level, L_{eq} dBA	Daytime Ambient L_{90} Sound Level, dBA	Total Ambient Plus Project, dBA	Increase Above Ambient, dBA
Daytime Levels (7 am to 6 pm)					
B	ML1	34	37	39	2
B'	ML1	36	37	40	3
C	ML2	36	37	40	3
C'	ML2	37	37	40	3
D	ML2	38	37	41	4
D'	ML2	41	37	43	5
E	ML2	45	37	46	9
F	ML3	47	40	48	8
F'	ML3	46	40	47	7
G	ML3	47	40	48	8
H	ML3	42	40	44	4
I	ML3	47	40	48	8
J	ML3	45	40	46	6

8.1.5 Noise Limit 5 – Pure-Tone Conditions

Limit 5 prohibits pure-tone conditions where the sound pressure level in one octave band is 3 dB or more than the sound levels in each of the two adjacent octave bands. The modeled Project-only sound levels were logarithmically combined with the ambient L_{90} levels to predicted future sound levels. The octave band data for these analyses are shown below.

8.1.5.1 Truck and RTU

Octave band sound pressure level data for daytime and nighttime truck and RTU continuous sources combined with the ambient L_{90} octave band data are shown in Table 8-6. As the table shows, no pure-tones are anticipated.

Table 8-6 Truck and RTU Pure-Tone Analysis (Noise Limit 5)

Receptor ID	L_{eq} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)[1]								
	31.5	63	125	250	500	1k	2k	4k	8k
Daytime Levels (7 am to 6 pm)									
B	49	49	46	38	37	37	30	25	22
B'	50	50	46	39	38	38	30	25	22
C	49	50	46	40	37	37	30	24	15
C'	49	50	46	40	37	37	31	24	15
D	49	50	46	40	38	38	32	24	15
D'	49	50	46	40	39	39	33	24	15
E	51	52	47	41	41	43	38	27	16
F	52	52	47	41	42	45	40	30	17
F'	53	52	47	41	43	44	38	27	17
G	52	52	47	41	42	45	40	30	17
H	53	52	46	40	40	41	35	25	17
I	52	52	47	41	42	45	40	30	17
J	52	51	47	41	42	44	38	28	17
Nighttime Levels (6 pm to 7 am)									
B	47	48	44	37	37	35	26	20	17
B'	48	49	44	38	37	36	27	20	17
C	47	47	43	38	36	34	27	19	13
C'	47	47	43	37	36	35	27	19	13
D	47	47	43	38	37	36	29	20	13
D'	47	48	43	38	38	38	31	20	13
E	49	50	45	39	39	41	36	25	13
F	50	50	46	39	40	42	37	27	15
F'	50	51	45	40	41	41	35	25	15
G	50	51	46	39	41	43	39	29	16
H	51	51	45	38	38	39	33	23	15
I	50	50	46	39	41	43	39	30	16
J	49	49	45	39	39	40	34	25	15

1. Sound pressure levels have been rounded to whole decibels; calculations were performed using values with additional precision.

8.1.5.2 Life-Safety Generator

The life-safety generator operational levels have been combined with the continuous truck and RTU levels and the ambient L_{90} octave band data in Table 8-7 to demonstrate that no pure-tones are anticipated.

Table 8-7 Generator Pure-Tone Analysis (Noise Limit 5)

Receptor ID	L_{eq} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)[1] 31.5	63	125	250	500	1k	2k	4k	8k
Daytime Levels (7 am to 6 pm)									
B	49	49	46	38	37	37	30	25	22
B'	50	50	46	39	38	38	30	25	22
C	53	50	47	40	38	37	30	24	15
C'	52	50	47	40	38	37	31	24	15
D	53	50	47	40	38	38	32	24	15
D'	61	52	48	41	40	40	33	24	15
E	64	54	49	42	41	43	38	27	16
F	63	54	49	42	43	45	40	30	17
F'	62	54	48	42	43	44	38	27	17
G	63	54	49	42	43	45	40	30	17
H	61	54	48	40	40	42	35	25	17
I	61	53	48	41	42	45	40	30	17
J	53	51	47	41	42	44	38	28	17

1. Sound pressure levels have been rounded to whole decibels; calculations were performed using values with additional precision.

Trucks, terminal tractors, and possibly other onsite vehicles are typically equipped with backup alarms that are tonal by design. These alarms are required for safety reasons and are excluded from regulation under §249-5(4) of the Hudson Town Code.

Based upon, and subject to, the foregoing, Hudson Town Code Noise Limit 5 is met.

8.1.6 Noise Limit 6 – High Noise Level Areas

This limit applies to high noise level areas where the ambient levels are as high as or higher than 3 dB less than the Limit 2 levels. This limit is not applicable to the Project based on ambient measurements.

8.1.7 Noise Limit 7 – Snow-Travelling and Recreational Vehicles

This limit applies to snow-traveling vehicles, trail bikes, and off-highway recreational vehicles and is not applicable to the Project.

8.1.8 Noise Limit 8 – Water Vessels

This limit applies to powered water vessels and is not applicable to the Project.

8.1.9 Noise Limit 9 – Construction

This limit applies to construction and requires outdoor construction to take place only on Monday through Saturday between the hours of 7:00 am and 7:00 pm. In addition, sound levels may not exceed the quantitative limits shown in Table 4-1 and Table 4-2 to comply with Noise Limits 2 and 3. In addition, all construction equipment must have the properly installed and maintained silencing systems provided by the manufacturers. The Project will adhere to a construction schedule that meets these requirements. Based upon, and subject to, the foregoing, Hudson Town Code Limit 9 is met.

8.1.10 Noise Limit 10 – Prohibited Activities

This limit prohibits the unreasonable use of vehicle horns, truck idling for longer than 10 minutes, and unmitigated exhaust discharges. The Project will restrict those activities to comply with these requirements. Based upon, and subject to, the foregoing, Hudson Town Code Limit 10 is met.

8.2 Comparison to Previous Project Analysis

A sound level analysis was performed for the previously Approved Project by Ostergaard Associates in December 2020[6]. The modeled results from the previously Approved Project are compared to the results for continuous truck and RTU sources associated with the current Project and are shown in Table 8-8. Table 8-8 indicates that as modeled, the proposed Project has lower continuous sound levels at all locations and time periods than the levels presented for the Approved Project.

Table 8-8 Truck and RTU Sound Modeling Results Compared to Previous Project Results

Receptor ID	Receptor Zone	Modeled Daytime Levels Due to Current Project, L_{eq} dBA	Modeled Nighttime Levels Due to Current Project, L_{eq} dBA	Modeled Levels due to Previous Project, L_{eq} dBA
B	Residential	34	31	48
B'	Residential	36	34	49
C	Residential	36	33	50
C'	Residential	36	33	51
D	Residential	38	36	51
D'	Residential	40	39	50

[6] Ostergaard Acoustical Associates. (December 2020). *Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, NH, Revision 2.*

Receptor ID	Receptor Zone	Modeled Daytime Levels Due to Current Project, L_{eq} dBA	Modeled Nighttime Levels Due to Current Project, L_{eq} dBA	Modeled Levels due to Previous Project, L_{eq} dBA
E	Business	44	43	56
F	Residential	47	44	51
F'	Residential	45	43	51
G	Industrial	47	45	71
H	Residential	42	40	46
I	Industrial	47	45	68
J	Industrial	45	41	54

8.3 Site Plan Criteria

As described above, Section 275-6.H of the Town of Hudson Code provides that the Project proponent must demonstrate that adequate provisions be made by the Owner or his/her/its authorized agent for the limitation of undesirable and preventable elements of pollution, *such as noise*. into the environment which might prove harmful to persons, structures or adjacent properties. Based upon the demonstrated compliance with the Hudson Noise Regulations under Chapter 249 of the Hudson Town Code, we have demonstrated that the sound levels generated by the Project will not prove harmful to persons, structures or adjacent properties, and such sound levels from the proposed Project will have less of a potential impact when compared to the Approved Project.

9.0 RECOMMENTATIONS

Epsilon recommends the following sound mitigating measures:

- The proposed earthen berm and sound fences discussed in Section 2.0 should be constructed at the locations shown in Figure 7-1. The current plans have the berm located south of the Project with a 10-foot-tall, 2,010-foot-long sound fence on top of the berm. There plans also include two 15-foot-tall fences, a 378-foot-long fence near the southeast edge of the main building and 407-foot-long fence east of the berm as shown in Figure 7-1.

- Onsite terminal tractors can be equipped with broadband or ambient-sensing backup alarms to minimize any tonal noise from reversing vehicles. These are designed to provide a similar level of worker protection while minimizing the impact of tonal sounds on nearby receptors.

- Construction activities should adhere to the limitations set forth in Noise Limit 9 as discussed in Section .8.1.9 of this report.

- Certain site activities such as idling and horn use should be restricted to comply with the requirements of Noise Limit 10 as discussed in Section 8.1.10 of this report.

10.0 CONCLUSIONS

Plans call for Property to be redeveloped into the Hudson Logistics Center in Hudson, NH. The new development will contain a main building with accessory structures that will all require truck activity. Existing residences are nearby to the east and south; industrial and non-noise sensitive uses are in the other directions. The Hudson Noise Ordinance provides average hourly code and other limits that apply to site sound. In addition to this, the Hudson Noise Ordinance requires that site sound not exceed the background sound level by more than 10 dB.

The results of the modeling demonstrate that, with the proposed mitigation measures, and provided that applicable performance practices under the Hudson Noise Ordinance are complied with, the future sound levels from the Project are predicted to be below the limits set forth in the Hudson Town Code. This includes limits applicable under §249-4 that are not otherwise excluded or exempt under § 249-5, at all receptors under the Hudson Noise Ordinance and applicable noise requirements under the Site Plan Regulation criteria. Thus, no negative acoustical impact is anticipated.

The proposed mitigation features and use of non-tonal back-up alarms for on-site terminal tractors demonstrate good acoustical planning and will put the end users in the best position to minimize impacts on neighbors. Section 249-1 of Chapter 249 of the Hudson Ordinances states the Noise Ordinance "is enacted to protect, preserve and promote the health, safety, welfare and quality of life for the citizens of Hudson, New Hampshire, through the reduction, control and prevention of noise by establishing maximum noise levels upon and between premises, prohibiting certain noise-producing activities…" Based upon the foregoing, and assuming the performance standards described in the Hudson Noise Ordinance above are followed, the proposed site activities will comply with the applicable standards described under Chapter 249.

The proposed Project also results in a further reduction in predicted continuous noise levels at the receptor locations adjacent to the residential and other areas when compared to the previously Approved Project. Moreover, since the applicable provisions of the Hudson Noise Ordinance will be complied with, the proposed Project and related operations at the site make adequate provision "… to guard against such conditions as would involve danger or injury to health or safety,…" and will eliminate," undesirable and preventable elements of pollution, such as noise, ..., into the environment which might prove harmful to persons, structures or adjacent properties," all as required under Section 275-6.H of the Hudson Site Plan Regulations.

Appendix A

Graphs of Ambient Sound Levels at Measurement Locations

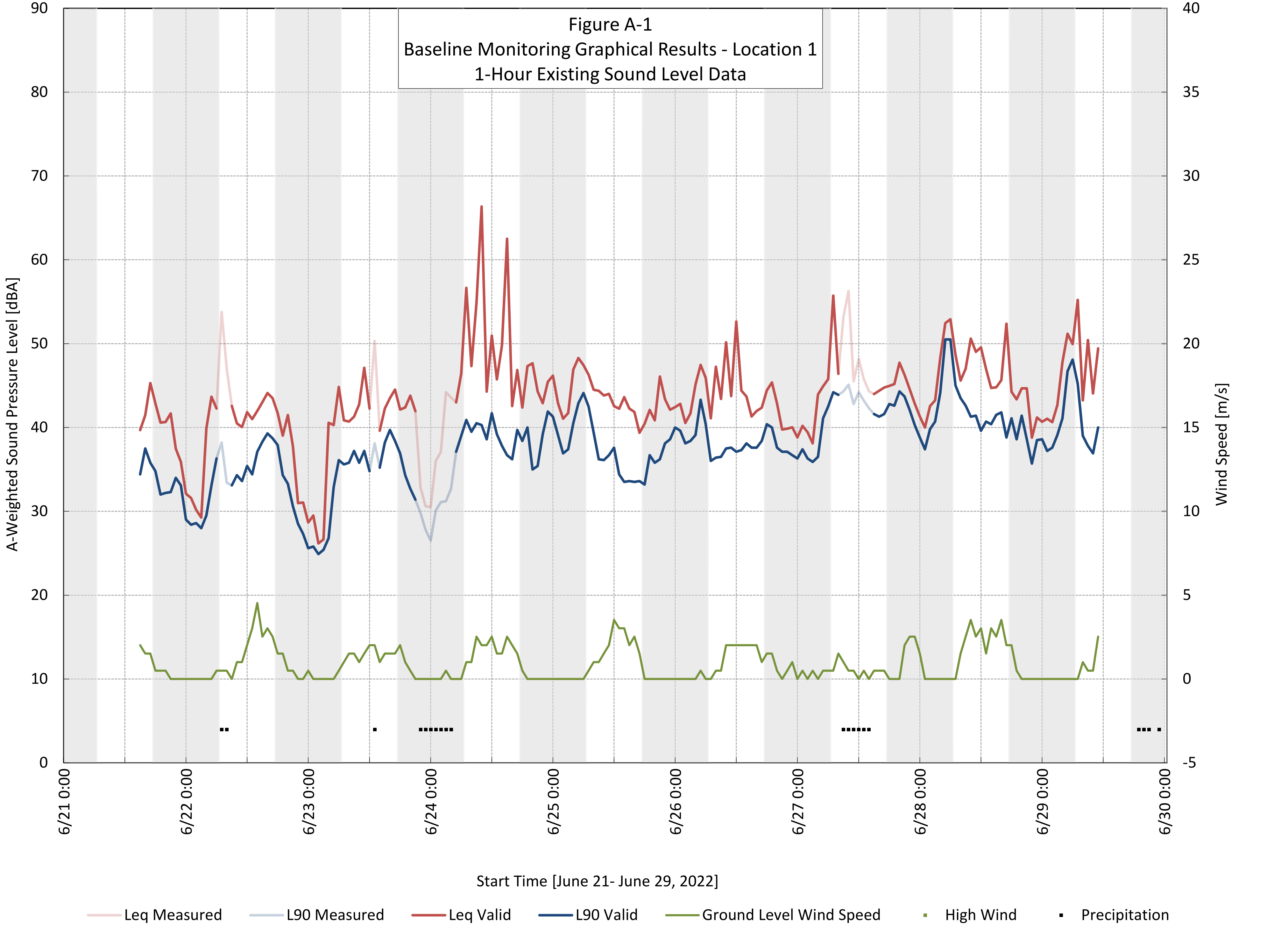


Figure A-1
Baseline Monitoring Graphical Results - Location 1
1-Hour Existing Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s]
90
80
70
60
50
40
30
20
10
0
40
35
30
25
20
15
10
5
0
-5
6/21 0:00
6/22 0:00
6/23 0:00
6/24 0:00
6/25 0:00
6/26 0:00
6/27 0:00
6/28 0:00
6/29 0:00
6/30 0:00
Start Time [June 21- June 29, 2022]
Leq Measured
L90 Measured
Leq Valid
L90 Valid
Ground Level Wind Speed
High Wind
Precipitation

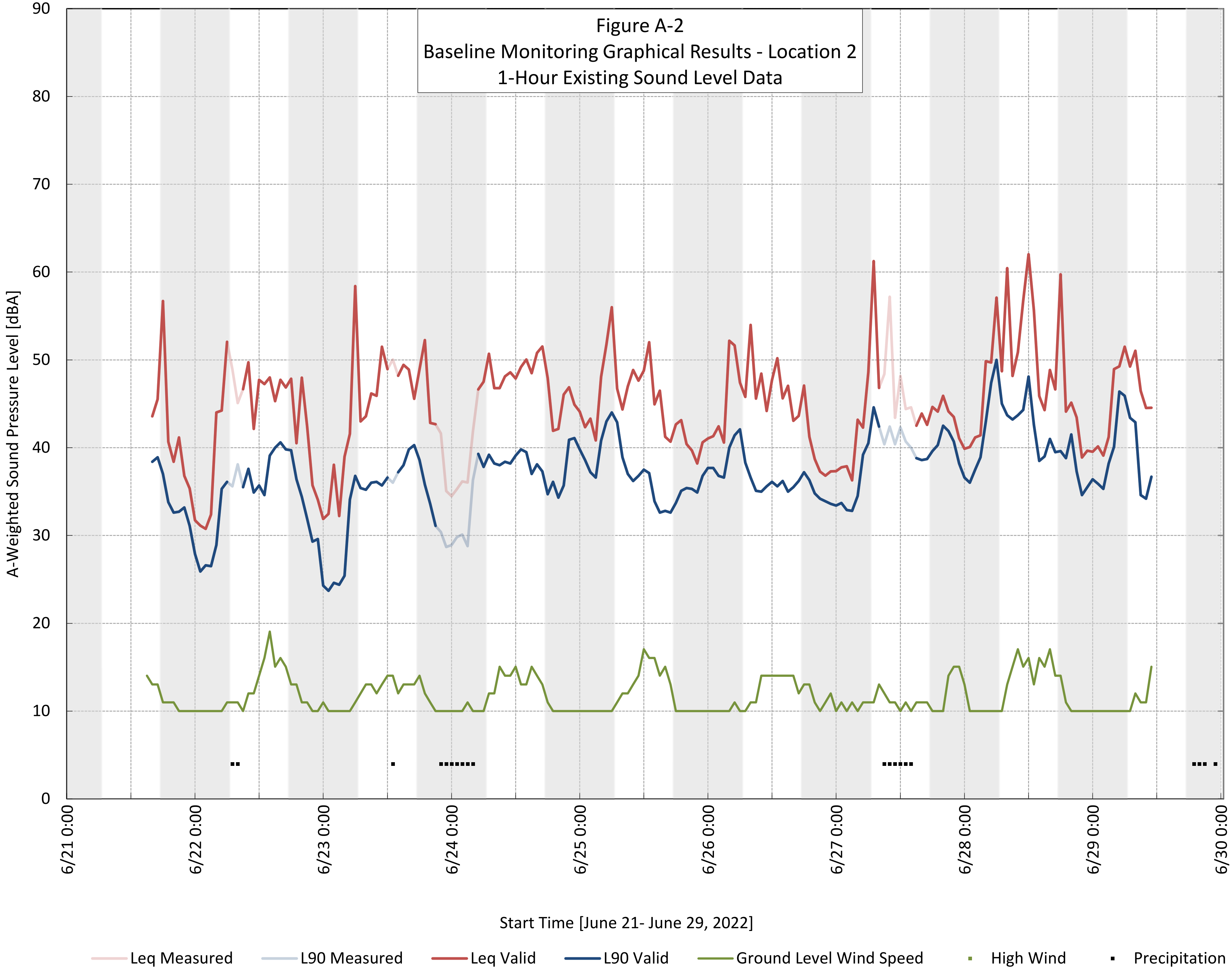


Figure A-2
Baseline Monitoring Graphical Results - Location 2
1-Hour Existing Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s]
90
80
70
60
50
40
30
20
10
0
40
35
30
25
20
15
10
5
0
-5
6/21 0:00
6/22 0:00
6/23 0:00
6/24 0:00
6/25 0:00
6/26 0:00
6/27 0:00
6/28 0:00
6/29 0:00
6/30 0:00
Start Time [June 21- June 29, 2022]
Leq Measured
L90 Measured
Leq Valid
L90 Valid
Ground Level Wind Speed
High Wind
Precipitation

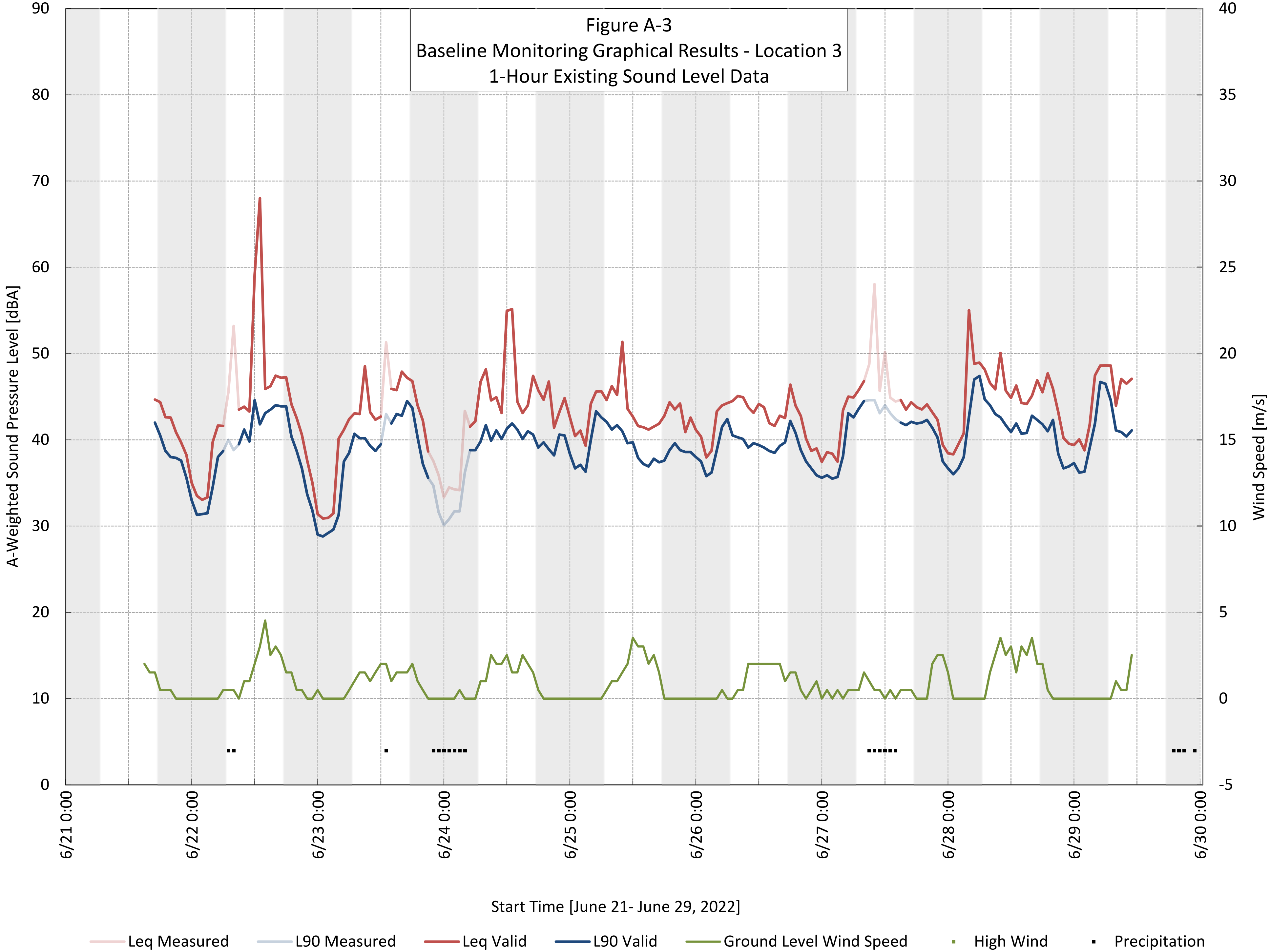


Figure A-3
Baseline Monitoring Graphical Results - Location 3
1-Hour Existing Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s]
0
10
20
30
40
50
60
70
80
90
-5
0
5
10
15
20
25
30
35
40
6/21 0:00
6/22 0:00
6/23 0:00
6/24 0:00
6/25 0:00
6/26 0:00
6/27 0:00
6/28 0:00
6/29 0:00
6/30 0:00
Start Time [June 21- June 29, 2022]
Leq Measured
L90 Measured
Leq Valid
L90 Valid
Ground Level Wind Speed
High Wind
Precipitation