REPORT

# CASSADAGA WIND PRECONSTRUCTION NOISE IMPACT ASSESSMENT

the science of insight

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# 1.0 EXECUTIVE SUMMARY

Cassadaga Wind, LLC, a wholly owned subsidiary of EverPower Wind Holdings, Inc., is proposing to construct a wind power project in Chautauqua County, New York with a generating capacity of up to 126 MW.

This study addresses the noise impact of the proposed Project on sensitive land uses in the surrounding area. It was conducted consistent with:

- The applicable noise regulations of the towns of Cherry Creek, Charlotte, and Arkwright, New York,
- Article 10's "Exhibit 19" noise provisions; and
- Stipulations with the New York Department of Environmental Conservation (NYSDEC) and the New York Department of Public Service (NYSDPS).

## 1.1 | PROJECT INFORMATION

The proposed Cassadaga Wind Project will be located on a series of rounded, elongated ridges that are part of a topographic rise just east of Lake Erie. The project is proposed to composed of up to 58 turbines, with a collector substation, point of interconnection (POI) substation, and other infrastructure. A turbine model has not been selected at this time, but the Gamesa G114 2.625 MW turbine was assumed in this study to represent an acoustically worst-case example.

## 1.2 | PROJECT NOISE DESIGN GOAL

### APPLICABLE NOISE STANDARDS

As noted above, the towns of Cherry Creek, Charlotte, and Arkwright have noise standards that apply to wind turbines. Generally, the standard for each town is 50 dBA $L_{10}$, but there are nuances with exceptions, measurements, and other factors that differ in each of the standards.

There are no federal sound level limits applicable to this project.

Statewide, the project falls under the jurisdiction of the NYSDPS's Article 10 regulations for permitting power plants. These regulations do not list a quantitative sound level limit, but instead list a series of factors that must be considered in any sound studies performed for power plants. The NYSDEC's *Assessing and Mitigating Noise Impacts* (October 2000), also has guidelines for assessing projects. As with Article 10, there is no specific sound level limit given, but rather suggestions and guidelines. The guideline given in the NYSDEC document that is most applicable for this project is 55 dBA $L_{dn}$. The $L_{dn}$ is an annual equivalent average sound level, with a 10 dB penalty added to nighttime sound levels. Therefore, 55 dB $L_{dn}$ would be equivalent to 45 dBA during the night and 55 dBA during the day, or a continuous sound level of 49 dBA.

### PROJECT NOISE DESIGN GOAL

The literature review in this report has concluded that wind turbine noise can be annoying to some people and annoyance increases with sound level. In addition, studies have shown that general environmental noise, not limited to wind turbines, can have a direct effect on sleep quality at high enough sound levels.

To address these issues, we established a 45 dBA $L_{(8)}$ design goal for nighttime noise. This is the World Health Organization's (WHO's) eight-hour guideline for sleep disturbance. It is measured outside a bedroom window, and represents an average over a night.[1] A study on human annoyance to wind turbine noise (Janssen et al 2011) indicate that this approximately corresponds to highly annoyed rate of two percent indoors. This noise design goal also achieves compliance with the quantitative standards of Cherry Creek, Charlotte, and Arkwright, which are applicable to both daytime and nighttime wind turbine noise.

Wind turbines produce infrasound, but at typical receiver distances, this is well below the established human thresholds of audibility and there is no evidence that sub-audible infrasound is perceptible by humans. However, infrasound and low-frequency sound can result in noise induced vibration within homes that can lead to annoyance. We have established a design goal of 65 dB at the 16 Hz[2] and 31.5 Hz octave bands and 70 dB at the 63 Hz octave band to avoid noise-induced vibrations. While this is an interior standard, this is applied to levels outside the home. These octave band limits are consistent with ANSI S12.9-2005 Part 4 and ANSI 12.2-2008 standards.

## 1.3 | BACKGROUND SOUND LEVEL MONITORING

To determine the existing ambient sound levels in representative soundscapes in the project area, sound level monitoring was performed at six locations over two weeks in both the summer and winter.

### A-WEIGHTED SOUND LEVELS

Sound levels were logged each second for the 1/3 octave band range of at least 20 Hz to 10 kHz. Periods with environmental conditions outside the specifications of the monitoring equipment were removed. Seasonal and intermittent noise was also removed in accordance with ANSI 12.9 Part 3. When seasonal tonal high-frequency sound, such as from insects and birds, was detected, the "Ai"-weighting (ANSI 12.100-2014) was used as an additional low-pass filter.

Sound levels were then summarized into 10-minute and period long parameters.

Results show that the project area is typical of rural use. The Agricultural and Pickup Hill locations exhibited sound due to agricultural operations, such as tractors, dairy pumps, and air handling units. Nelson Road, Pickup Hill, and Charlotte Cemetery had a greater proportion of

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[1] "Guidelines for Community Noise" World Health Organization, 1999
[2] At 65 dB in the 16 Hz octave band, the sound would be below established human audibility thresholds.

vehicle traffic. Wooded Area and Boutwell Hill were more remote and influenced by biogenic sounds, without any single dominating source. Overall sound levels for these site types is shown in Table 1.

**TABLE 1: PRECONSTRUCTION MONITORING BY SITE TYPE**

| Location | Average Sound Pressure Level (dBA) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| *Rural Agricultural* | 47 | 27 | 38 | 46 | 48 | 29 | 39 | 47 | 40 | 25 | 34 | 42 |
| *Rural Residential* | 45 | 28 | 35 | 42 | 47 | 29 | 36 | 44 | 38 | 27 | 33 | 40 |
| *Remote* | 38 | 21 | 29 | 40 | 38 | 22 | 30 | 40 | 37 | 21 | 27 | 40 |

During estimated turbine hub height (93 meters) wind speeds sufficient for wind turbines to operate, both equivalent average ($L_{EQ}$) and lower 10$^{th}$ percentile ($L_{90}$) sound levels were positively correlated with wind speed. $L_{90}$ sound levels showed a better correlation with wind speed than $L_{EQ}$. With either metric there is a large spread among sound levels, so wind speeds are not the sole determinant of measured sound level.

An analysis of the temporal accuracy of the monitoring data according to ANSI 12.9 Part 2 showed that locations with dominant, consistent noise sources such as Charlotte Cemetery, Nelson Road, and Agricultural showed high temporal accuracy (Class A or B). Locations where noise sources differed between seasons (Pickup Hill) or that lacked a dominant noise source showed lower temporal accuracy (Class C).

### INFRASOUND MONITORING

Infrasound consists of sound frequencies below the nominal audible range, generally considered below 20 Hz.[3]

Infrasound monitoring was performed for one week at the Boutwell Hill monitoring location.

Infrasound was continually detected during the measurement period, varying in level mostly due to natural and manmade sources, such as wind and airplane overflights. However, the level of infrasound during the entire period was almost always below human perception thresholds.

## 1.4 | SOUND PROPAGATION MODELING

Sound propagation modeling was performed for the sensitive receivers around the project. These included 678 non-participating permanent residences, two locations within Boutwell Hill State Park, a cabin rental business, and five seasonal residences. Two types of modeling were performed. The first estimated the highest one-hour $L_{EQ}$ that will be produced by the project. This modeling was performed according to ISO 9613-2 and a 2 dB uncertainty factor added to the results. The second method was used to calculate seasonal and annualized long-term average and statistical project sound levels. This method used the ISO 9613-2 methodology with CONCAWE meteorological adjustments along with a year's worth of site-specific

[3] ANSI/ASA S1.1-2013, "Acoustical Terminology", American National Standard, 2013.

meteorological data to calculate sound levels at each receptor for every hour of that year. From this nightly, daily, seasonal, and annual statistical sound levels were calculated.

## MODELING OF ONE-HOUR SOUND LEVELS

ISO 9613-2 modeling was conducted with the proposed turbine array along with the Gamesa G114 2.625 MW turbine. To meet the nighttime noise goal of 45 dBA $L_{(8)}$ at all permanent non-participating receptors, and based on the proposed Project layout and landowner participation status, the turbine layout and operational characteristics were altered to remove three turbines and operate some turbines operated under Noise Reduced Operation (NRO). Under this configuration, the modeling also shows that one-hour sound levels will not exceed 48 dBA at any of the seasonal homes. Thus, all homes (seasonal and permanent) are expected to meet the 50 dBA $L_{10}$ sound level limit of the Towns of Arkwright, Charlotte, and Cherry Creek.

This modeling shows that the nighttime noise goal is expected to be met with NRO operations. For the daytime period some turbines would still operate in NRO, but to a lesser extent.

Based upon the dose-response curves of Janssen et al 2011, the modeled nighttime sound levels will result in people experiencing the sound indoors being highly annoyed at approximately three locations. This is based on the statistical likelihood of individuals being annoyed by exposure to a defined sound level. Therefore, it is not possible to identify in advanced which (if any) locations these would be.

Sound levels at project property lines will range between 30 and 57 dBA.

Modeling results show that infrasound and low frequency sound from the project does not exceed the levels required to produce moderately perceptible building vibrations under ANSI 12.2-2008.

## LONG-TERM MODELING

Some noise guidelines for noise exposure are based on annual average sound levels, such as the World Health Organization Europe annual average nighttime guideline and the Composite Noise Rating (CNR).

Annualized modeling showed that 40 dBA $L_{night}$ is not exceeded at any permanent non-participating home. This is the guideline level established by World Health Organization Europe to project against the long-term effects of sleep disturbance.

The CNR rating is used to estimate neighbor response to proposed projects, assigning letter grade rankings, that represent different predicted response levels. Ratings given by CNR analysis range from “A” – “no reaction”, to “I” – “vigorous action.” The CNR result uses as inputs the background sound levels and statistical sound levels modeled at receptors by octave band. Due to the relatively low background $L_{90}$s at the site, most receptors fit into the “CNR

C" ("no reaction")[4] and "CNR D" ("sporadic complaints") categories. Since this compares periods with quiet sound levels and corresponding low wind speeds to project-only sound levels that weight periods with high power production, we find this comparison to be misleading. A second analysis was performed to compare the median (L50) background sound levels with project sound levels. This indicates that almost all receptors fit into the "CNR C" category.[5]

### CONSTRUCTION NOISE MODELING

Construction noise was modeled at three sites:

- The turbine location closest to a non-participating permanent receptor, T11,
- A turbine location, T1, where the closest non-participating receptor is a typical distance from turbines, and
- The project laydown yard.

Modeling was performed with the ISO 9613-2 sound propagation model. Two different modeling scenarios were run at each site. The first scenario modeled the one-second maximum $L_{EQ}$ with all construction noise sources operating simultaneously. Under this scenario, sound levels were 63 dBA for the worst-case receptor and 57 dBA for the typical receptor. Since, this is an unrealistic scenario, with types of equipment modeled simultaneously that are from different phases of construction, and would not be run simultaneously in a single location, the different construction phases were modeled separately. The phases modeled were:

- Clearing;
- Excavation;
- Foundation construction; and
- Turbine erection.

Of these phases, the Clearing phase has the highest predicted sound levels, with maximum one-second $L_{EQ}$ of 61 dBA at the worst-case receptor near the worst-case turbine location and 56 dBA at the worst case receptor near a typical turbine location.

The maximum sound level near the laydown yard at a permanent non-participating receptor was predicted to be 53 dBA.

## 1.5 | WIND SHEAR AND TURBULENCE INTENSITY

An analysis of wind shear and turbulence intensity was performed to determine the likelihood turbines at the Cassadaga Wind Farm will produce excessive amplitude modulation.

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[4] On average, CNR C represents no reaction, but at the higher extreme of CNR C, sporadic complaints are possible.

[5] The analysis was also performed comparing the background $L_{EQ}$ to the project-only $L_{EQ}$, which showed most receptors fitting into the "A" category.

Turbulence intensity at the site is typical, if not slightly lower, than proposed wind farm sites RSG has worked on previously. Turbulence is also typically more prevalent during the day than at night. Wind shear is higher than other sites RSG has worked on. High wind shear alone does not typically produce excessive amplitude modulation, but can exacerbate amplitude modulation. For amplitude modulation to take place, blade stall and/or detached flow must occur, which is usually caused by turbulence.[6] At the Cassadaga site, periods with high wind shear do not typically have high turbulence intensity. Consequently the Cassadaga site does not appear to be conducive to excessive amplitude modulation. Wakes from upwind turbines though, can increase turbulence for downwind turbines under certain conditions.

## 1.6 | CONCLUSIONS

Based upon results from the analysis completed in this report, showing adherence of the project to appropriate noise guidelines and Town noise ordinances, we can conclude that adverse impacts due to sound from construction and operation of the proposed Cassadaga Wind Farm have been minimized to the extent practicable.

[6] "Wind Turbine Amplitude Modulation: Research to Improve Understanding as to its Cause and Effect." *RenewableUK*. December 2013.

# 2.0 INTRODUCTION

This report is a noise impact assessment of the proposed Cassadaga Wind Project (the "Project") as part of its permit application under Article 10 of the New York Public Service Law.

The Project will be located in the Towns of Charlotte, Cherry Creek, Arkwright, and Stockton in Chautauqua County, New York. The area around the Project is primarily farmland, with some residential land and forested areas. It is a proposed as an up to 126 MW facility, incorporating up to 58 wind turbines and supporting infrastructure. The following noise study was conducted in accordance with Article 10, stipulations with the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Public Service (NYSDPS), and the wind turbine noise regulations of the Towns of Cherry Creek, Arkwright, and Charlotte, New York.

Included in this report are:

- A description of the project;
- Discussion of sound level limit standards and guidelines applicable to the project;
- Discussion of noise issues particular to wind turbines as well as research on human response to wind turbine noise;
- Sound level monitoring procedures;
- Sound level monitoring results from monitoring conducted within the project area;
- Sound propagation modeling procedures;
- Sound propagation modeling results;
- Construction modeling;
- Discussion; and
- Conclusions.

## 3.0 PROJECT DESCRIPTION

The proposed Cassadaga Wind Farm, being developed by Cassadaga Wind, LLC a wholly owned subsidiary of EverPower Wind Holdings, Inc., will be located in southwestern New York State. A map of the project area is shown Figure 1.

The Project area is approximately 17 kilometers (10.5 miles) north of Jamestown New York and approximately 10 kilometers (6.2 miles) southeast of the Village of Fredonia, New York, in Chautauqua County, New York. The proposed wind turbines will be located in around the Towns of Charlotte, Arkwright, and Cherry Creek.

The Project area contains two arterial roads, Route 60 to the west through Sinclairville and Route 83 to east through Cherry Creek. Interstate 86 runs east to west 8.5 miles south of the project boundary but there are no major highways that pass through the Project area, defined as the area within the Project Boundary, shown in Figure 1.

A majority of the land within the Project boundary is covered in forest. Central to the region is the Boutwell Hill State Forest, whose timber resource is managed by the state. The state forest also provides outdoor recreation opportunities, including trails for hiking, snowmobiling, horseback riding, cross-country skiing, and a variety of other outdoor activities. Timber production as a means of forest management is common in the forests of the region. Logging trucks use both public and private roads to transport timber.

The non-forested areas in the region are dominated by livestock agriculture, that is, the raising of cattle for milk and beef. Beef and milk operations include vast cornfields and hayfields for livestock feed, open fields for grazing, milking barns, and the operation of farm equipment on local roads and throughout the fields. It is common for farms to be operated by family groups on plots of land adjacent to their homesteads.

Rural residential homesteads are located throughout the region, mostly occupying cleared land and old farm fields. Seasonal hobby activities such as snowmobiling, “four wheeling”, hunting, fishing, and gardening are widespread. The town centers in the area are typical of rural towns, in which they may include a gas station, convenience store, church, restaurant, and small inn.

Within 1 mile of project turbines, there are 678 permanent non-participating residences.[7] The project is located in a mostly rural area. Primary land uses include: agriculture, and rural residential with some recreational areas. The topography is rolling to hilly and is part of an overall upslope just east of Lake Erie. There are several small creeks, streams, and ponds within the project area, but no major rivers or lakes.

The project will include up to 58 wind turbines, a collector substation, collection lines, and access roads. There will be a Point of Interconnect substation, but it will not contain a transformer or other major sound source.

[7] 681 receptors were modeled, including a cabin rental business and two non-residential locations within Boutwell Hill State Forest. An additional five seasonal residences were modeled using standard ISO 9613-2 modeling procedures, but not statistical modeling procedures. See Section 12.

Although a turbine model has not been selected at this time, the Gamesa G114 2.625 MW turbine was assumed for sound propagation modeling because it has the highest sound power level of any turbine presented in the Article 10 application. The Gamesa turbine has a hub height of 93 meters (305 feet), with a rotor diameter of 114 meters (374 feet) for a total height of 150 meters (492 feet). Other turbines being considered for the project are shown in Table 2.

The collector substation will contain a single 34.5/115 kV step-up transformer rated at 84/112/140 MVA and a BIL of 550 kV. The transformer location is shown in Figure 1.

**TABLE 2: TURBINE MODELS CONSIDERED FOR CASSADAGA WIND PROJECT**

| Turbine Make/Model | Low Noise Trailing Edges? | Sound Power dBA |
|---|---|---|
| Gamesa G114-2.1 | No | 106.6 |
| Gamesa G114-2.625 | No | 106.6 |
| Gamesa G126-2.5 | No | lower |
| GE GE2.3-116 | Yes | lower |
| GE GE2.75-120 | No | lower |
| GE GE3.2-130 | No | lower |
| Nordex N117-3.0MW | No | lower |
| Siemens SWT-2.3-120 | No | lower |
| Siemens SWT-3.3-130 | No | lower |
| Vestas V112-3.0MW | No | lower |
| Vestas V117-3.3MW | Yes | lower |
| Vestas V126-3.3MW | Yes | lower |
| Vestas V126-3.45MW | Yes | lower |
| Vestas V136-3.45MW | Yes | lower |

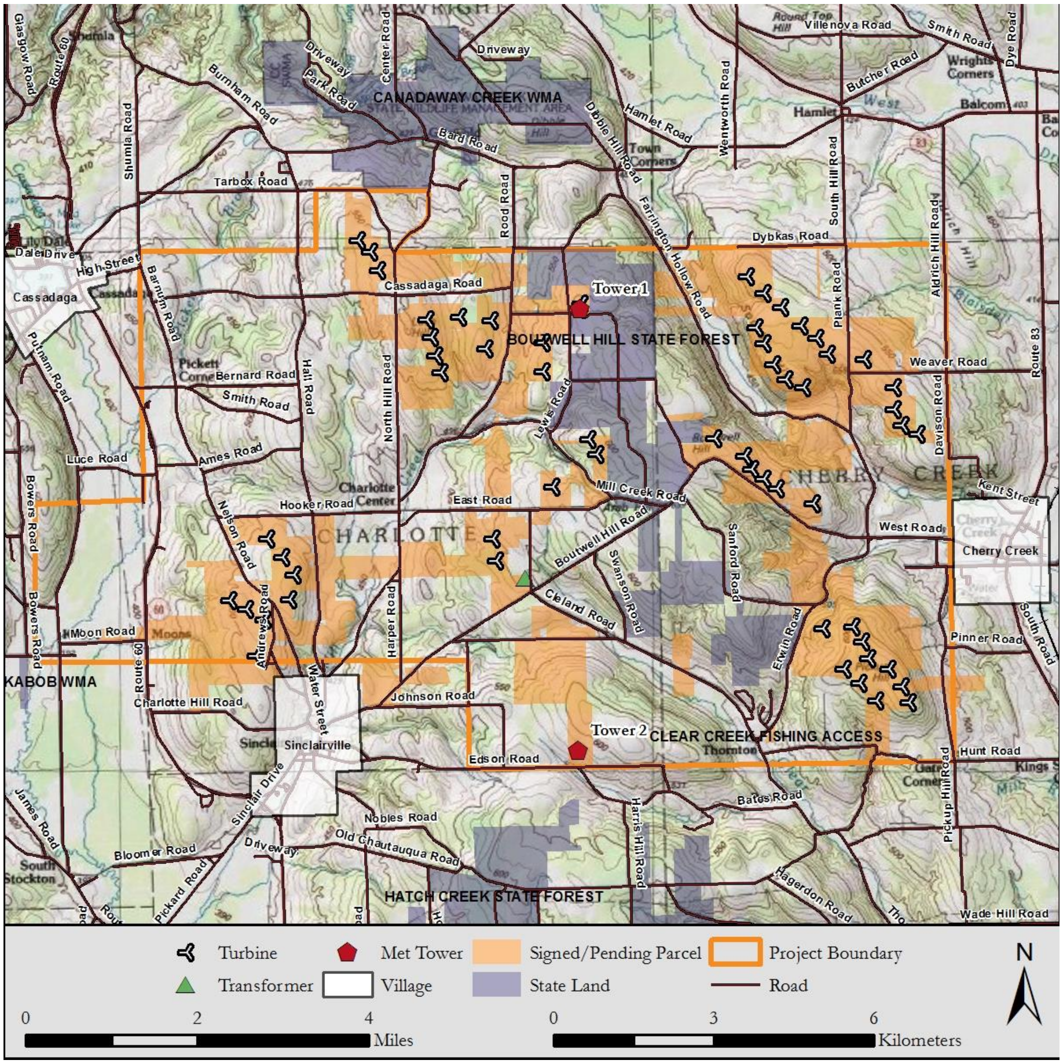


**FIGURE 1: CASSADAGA WIND FARM PROJECT AREA**

# 4.0 PROJECT DESIGN CRITERIA

## 4.1 | LOCAL AND STATE STANDARDS

### LOCAL

Project turbines are proposed in three towns - Arkwright, Charlotte, and Cherry Creek - with formal quantitative sound level standards for wind power facilities. The standards are similar and are reproduced here, in part, and in full in Exhibit 31. In each town standard, the limit is 50 dBA $L_{10}$ at non-participating receptors, unless the ambient sound level is above 50 dBA. In that case, the limit is the background sound level plus 5 dB. If the Project emits a tonal sound, the sound level limit is reduced by 5 dB.

#### *Charlotte*

Wind turbine noise regulations for the Town of Charlotte, New York are found in Section 618.I.E.p.4 and 618.I.j.1 of the town ordinances.

Section 618.I.E.p.4 states:

> "4. Noise Analysis – a noise analysis by a competent acoustical consultant documenting the noise levels associated with the proposed WECS (Wind Energy Conversion System). The study shall document noise levels at property lines and at the nearest residence not on the Site (if access to the nearest residence is not available, the Zoning Board of Appeals may modify this requirement). The noise analysis shall provide pre-existing ambient noise levels and include low frequency noise."

Section 618.I.J.1 - 4 state:

> "1. The statistical sound pressure level generated by a WECS shall not exceed $L_{10}$-50 dBA measured at the closest exterior wall of any primary structure existing at the time of completing the SEQRA review of the application. If the ambient sound pressure exceeds 50 dBA, the standard shall be ambient dBA plus 5 dBA. Independent certification shall be provided before and after construction demonstrating compliance with this requirement. The sound pressure level measurement period shall be seven (7) days for a tonal continuous time period of one hundred sixty-eight (168) hours.
>
> "2. In the event audible noise due to WECS operations contains a steady pure tone, such as a whine, screech, or hum, the standards for audible noise set forth in subparagraph 1) shall be reduced by five (5) dBA. A pure tone is defined to exist if the one-third (1/3) octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one third (1/3) octave bands by five (5) dBA for center frequencies of five hundred (500) and above, by eight (8) dBA for center frequencies between one hundred and sixty (16) Hz and four hundred (400) Hz, or by fifteen (15) dBA for center frequencies less than or equal to one hundred and twenty-five (125) Hz.

> “3. In the event the ambient noise level (exclusive of the development in question) exceeds the applicable standard given above, the applicable standard shall be adjusted so as to equal the ambient noise level. The ambient noise level shall be expressed in terms of the highest whole number sound pressure level in dBA, which is exceeded for more than five (5) minutes per hour. Ambient Noise Levels shall be measured at the exterior of potentially affected existing residences. Ambient noise level measurement techniques shall employ all practical means of reducing the effect of wind generated at the microphone. Ambient noise level measurements may be performed when wind velocities at the proposed project Site are sufficient to all Wind Turbine operation, provided that the wind velocity does not exceed thirty (30) mph at the ambient noise measurement location.
>
> “4. Any noise level falling between two whole decibels shall be the lower of the two.”

Procedures for complaint monitoring are found in Section 618.I.0.1:

> “1. Testing Fund – A Special Use Permit shall contain a requirement that the applicant fund periodic noise testing by a qualified independent third-part acoustical measurement consultant, which may be required as often as every two years, or more frequently upon request of the Zoning Board of Appeals in response to complaints by neighbors. The scope of the noise testing shall be to demonstrate compliance with the terms and conditions of the Special Use Permit and this Article and shall also include an evaluation of any complaints received by the Town. The applicant shall have 90 days after written notice from the Zoning Board of Appeals, to cure any deficiency. An extension of the 90 day period may be considered by the Zoning Board of Appeals, but the total period may not exceed 180 days.”

#### *Cherry Creek*

Wind turbine noise regulations for the Town of Cherry Creek are included in the Town’s *A Local Law Governing Wind Energy Facilities in the Town of Cherry Creek*. There are several sound-related requirements, shown below in the order they appear in the law.

Reporting requirements for the proposed turbines are found in Section 8.A.15:

> “15. For each proposed WECS, include make, model, picture, and manufacturer’s specifications, including noise decibels data. Include Manufacturers’ Material Safety Data Sheet documentation for the type and quantity of all materials used in the operation of all equipment including, but not limited to, all lubricants, and coolants.”

The requirement for a noise study is found in Section 8.A.17(d)

> “17(d) Noise Analysis: a noise analysis by a competent acoustical consultant documenting the noise levels associated with the proposed WECS. The study shall document noise levels at property lines and at the nearest residence not on the site (if access to the nearest residence is not available, the Town Board may modify this requirement). The noise analysis shall provide pre-existing ambient noise levels and include low frequency noise.”

Noise standards for Cherry Creek are found in Sections 13.A-13.D:

A. "The statistical sound pressure level generated by a WECS shall not exceed $L_{10}$ – 50 dBA measured at the closest exterior wall of any residence existing at the time of completing the SEQRA review of the application. If the ambient sound pressure level exceeds 50 dBA, the standard shall be ambient dBA plus 5 dBA. independent certification shall be provided before and after construction demonstrating compliance with this requirement.

B. In the event audible noise due to WECS operations contains a steady pure tone, such as a whine screech, or hum, the standards for audible noise set forth in subparagraph 1) of this subsection shall be reduced by five (5) dBA. A pure tone is defined to exist if the one-third (1/3) octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one third (1/3) octave bands by five (5) dBA for center frequencies of five hundred (500) Hz and above, by eight (8) dBA for center frequencies between one hundred and sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dBA for center frequencies less than or equal to one hundred and twenty-five (125) Hz.

C. In the event the ambient noise level (exclusive of the development in question) exceeds the applicable standard given above, the applicable standard shall be adjusted so as to equal the ambient noise level. The ambient noise level shall be expressed in terms of the highest whole number sound pressure level in dBA, which is exceed for more than five (5) minutes per hour. Ambient noise levels shall be measured at the exterior of potentially affected existing residences. Ambient noise level measurement techniques shall employ all practical means of reducing the effect of wind generated noise at the microphone. Ambient noise level measurements may be performed when wind velocities at the proposed project Site are sufficient to allow Wind Turbine operation, provided that the wind velocity does not exceed thirty (30) mph at the ambient noise measurement location.

D. Any noise level falling between two whole decibels shall be the lower of the two."

Both local ordinances require sound levels to be lower than 50 dBA for the $L_{10}$, measured at residences surrounding the project. If the ambient sound level without the turbines operating is above 50 dBA ($L_8$), the sound level limit will be the ambient sound level. Both ordinances specify a 5 dB sound limit reduction for turbines that have tonal sound emissions.

### *Arkwright*

The Town of Arkwright has a local ordinance that limits noise from wind projects (Local Law #2, 2007). The standard is similar to the other towns - the limit is 50 dBA $L_{10}$ at non-participating residences. In this case, if the ambient sound level is above 48 dBA, the limit is the ambient sound level plus 5 dB. If the Project emits a tonal sound, the sound level limit is reduced by 5 dB. Sound levels are measured, "at the exterior of potentially affected existing residences, schools, hospitals, churches, and public libraries." In addition, any sound level falling between two whole decibels shall be the lower of the two.

Section 658.D provides requirements for the application:

> "Noise Analysis: a noise analysis by a competent acoustical consultant documenting the noise levels associated with the proposed WECS. The study shall document noise levels at property lines and at the nearest residence not on the Site (if access to the nearest residence is not available, the Town Board may modify this requirement). The noise analysis shall provide pre-existing ambient noise levels and include low frequency noise."

The Town requires "independent certification…before and after construction demonstrating compliance with this requirement." We understand this to mean pre-construction modeling, as is found in this report, and post-construction sound monitoring and complaint response procedures after the project is begins operating. With respect to post-construction sound monitoring,

> "A Special Use Permit shall contain a requirement that the applicant fund periodic noise testing by a qualified independent third-party acoustical measurement consultant, which may be required as often as every two years, or more frequently upon request of the Town Board in response to complaints by neighbors."

## STATE

### *NYSDEC Program Policy*

There is no quantitative state noise standard that applies to this project.

In October 2000, the New York State Department of Environmental Conservation (NYSDEC), published a Program Policy, *Assessing and Mitigating Noise Impacts*. This document includes information about background sound level measurements, jurisdiction limits of the NYSDEC, and a review of guidelines from the other sources, among other topics. In particular, the purpose of the Policy is as follows:

> "This policy is intended to provide direction to the staff of the Department of Environmental Conservation for the evaluation of sound levels and characteristics (such as pitch and duration) generated from proposed or existing facilities. This guidance also serves to identify when noise levels may cause a significant environmental impact and gives methods for noise impact assessment, avoidance, and reduction measures…."

The sound level guidelines are found in Section V.B.1.c. Two types of thresholds are mentioned – one that is relative to existing background sound levels, and the other that is fixed.

> "The goal for any permitted operation should be to minimize increases in sound pressure level above ambient levels at the chosen point of sound reception. Increases ranging from 0-3 dB should have no appreciable effect on receptors. Increases from

> 3-6 dB may have potential for adverse noise impact only in cases where the most sensitive of receptors are present. Sound pressure increases of more than 6 dB may require a closer analysis of impact potential depending on existing SPLs and the character of surrounding land use and receptors. SPL increases approaching 10 dB result in a perceived doubling of SPL. The perceived doubling of the SPL results from the fact that SPLs are measured on a logarithmic scale. An increase of 10 dB(A) deserves consideration of avoidance and mitigation measures in most cases. The above thresholds as indicators of impact potential should be viewed as guidelines subject to adjustment as appropriate for the specific circumstances one encounters.
>
> "Establishing a maximum SPL at the point of reception can be an appropriate approach to addressing potential adverse noise impacts. Noise thresholds are established for solid waste management facilities in the Department's Solid Waste regulations, 6 NYCRR Part 360. Most humans find a sound level of 60 - 70 dB(A) as beginning to create a condition of significant noise effect (EPA 550/9-79-100, November 1978). In general, the EPA's "Protective Noise Levels" guidance found that ambient noise levels # 55 dBA L(dn) was sufficient to protect public health and welfare and, in most cases, did not create an annoyance (EPA 550/9-79-100, November 1978). In non-industrial settings the SPL should probably not exceed ambient noise by more than 6 dB(A) at the receptor. An increase of 6 dB(A) may cause complaints. There may be occasions where an increase in SPLs of greater than 6 dB(A) might be acceptable. The addition of any noise source, in a nonindustrial setting, should not raise the ambient noise level above a maximum of 65 dB(A). This would be considered the "upper end" limit since 65 dB(A) allows for undisturbed speech at a distance of approximately three feet. Some outdoor activities can be conducted at a SPL of 65 dB(A). Still lower ambient noise levels may be necessary if there are sensitive receptors nearby. These goals can be attained by using the mitigative techniques outlined in this guidance."

Precedent established by such cases as the nearby Arkwright Summit Wind Farm call for the use of the equivalent average sound level ($L_{EQ}$) for both the existing and build sound levels.

The guidelines state that they do "not supercede any local noise ordinances or regulations."

### *NYSDPS Chapter 10*

In 2012, the New York Department of Public Services (NYSDPS) revised its rules for electric generation and siting, contained in New York Code, Rules, and Regulations 16, Chapter 10. Exhibit 19 (1001.19) pertains to noise.

The NYSDPS regulations do not list a specific sound level limit, but instead describe information requirements and analysis requirements for a permit application. In coordination with NYSDPS, NYSDEC, and Cassadaga Wind, RSG developed stipulations to describe information that would be supplied to comply with Exhibit 19 requirements. These stipulations are described below.

Exhibit 19 shall comply with the requirements of 16 NYCRR § 1001.19 by containing:

A study of the noise impacts of the construction and operation of the facility. The name and qualifications to perform such analyses of the preparer of the study shall be stated. If the results of the study are certified in any manner by a member of a relevant professional society, the details of such certification shall be stated. If any noise assessment methodology standards are applied in the preparation of the study, an identification and description of such standards shall be stated.

a) A map of the Study Area showing the location of sensitive sound receptors in relation to the Facility. The map will be created using aerial imagery and field verification. [See Figure 96]

b) An evaluation of ambient pre-construction baseline noise conditions, including identification of A-weighted sound levels, prominent tones, if any, at representative of potentially impacted receptors, using actual measurement data recorded in winter and summer (i.e., leaf off and leaf on) during the day and at night as a function of time and frequency [See Sections 8.0 and 9.2]. Ambient sound levels will be measured utilizing suitable and suitably calibrated sound level meter(s) and fractional octave band analyzer(s). Brand and model number of the sound level meters and calibrators used will be specified; locations, dates, and times of testing, weather conditions (wind speed, wind direction, temperature, relative humidity and precipitation), frequency range of measurement, meter settings and general methodology and procedures will be specified and described [See Section 6.0]. Ambient measurements to cover the infrasound range (from 0.8 Hz to 20 kHz) will be included as a separate measurement using specialized equipment [See Sections 8.2 and 9.0]. Noise descriptors including Leq and L90 will be calculated and included as part of the tabular results provided in Section f) below [See Section 9.2]. Temporal accuracy (for the number of days tested) will be calculated and reported based on a 95% confidence interval following the procedures included in ANSI Standard S12.9-1992 (R2013)/Part 2 [See Section 9.2]. Weather information can be supplemented with data from the most representative and proximal weather station(s) [See Section 11.4]. The ambient pre-construction baseline sound level will be filtered to exclude seasonal and intermittent noise, periods of rain, thunderstorms and excessive wind and gusts as appropriate. The "Ai" frequency-weighting network will be used where appropriate (i.e. bird and insect sound is prominent), also called ANS-weighted sound levels in ANSI/ASA S3/SC1.100-2014 - S12.100-2014 [See Section 6.0].

c) An evaluation of future noise levels during construction of the proposed Facility including predicted A-weighted sound levels at proximate potentially impacted and representative sensitive sound receptors using a Cadna/A propagation model or similar, predicted construction traffic levels, construction equipment and construction activities sound emissions, and by following the guidelines and recommendations of FHWA Highway Construction Noise Handbook FHWA-HEP-06-015 as applicable. Information will include noise contours at one representative turbine location including all construction related noise and at the proposed batch plant/laydown area [See Section 13.0].

d) An estimate of the noise level to be produced by operation of the proposed Facility using computer noise modeling under the ISO 9613-2 conditions relating to a moderate nighttime inversion or, equivalently, downwind propagation, and the least attenuation due to temperature and humidity. Noise contours for these conditions representing the maximum one-hour equivalent average (Leq 1-h) sound levels for the highest wind turbine sound power levels will be provided [See Section 11.2]. Noise modeling and calculation of the CONCAWE meteorological adjustments will include 64 different meteorological conditions and one year of turbine sound levels at each receiver by the use of computer noise model with estimates of hourly turbine power and one year of met tower data [See Section 11.4]. These will be used to provide worst case (L10) and typical (L50) sound levels at all sensitive sound receptors, as required by Section (f) below [See Appendix C]. The model will also include relevant noise sources from substations [See Section 11.0]. The Application will include a brief discussion about the accuracy of selected outdoor propagation models, methodologies, ground absorption values, assumptions and the correlation between measurements and predictions for documented cases as compared to other alternatives, if available [See Section 11.0].

e) An evaluation of:

1) Future noise levels during operation of the proposed Facility including predicting A-weighted sound levels and un-weighted full octave band low frequency levels at all sensitive sound receptors [See Appendix B];

2) A tonal evaluation based on the reported sound power of the wind turbines and substation transformers [See Figures 94 and 95];

3) Noise modeling shall be performed for the turbine model with the highest sound power levels discussed in the Application and the final turbine model selected will not have sound power levels greater than those presented in the Application. There will be discussion on the Applicant's avoidance and minimization of sound impacts presented in the Application [See Section 10.6].

4) A discussion of the potential for low frequency and infrasound emissions using literature and manufacturer data, extrapolated as applicable and appropriate, and manufacturer low frequency and infrasound data if available [Section 10.5 and 11.2].

5) The Application will state the basis for the sound power levels used [Section 11.1].

6) Amplitude modulation generation estimates will reference the methods outlined in IEC 61400-11 Annexes B and D as applicable and

appropriate. The potential for excessive amplitude modulation will be evaluated by review of the wind shear and turbulence intensity at the Facility. Amplitude modulation will be addressed by determining whether the area has unusually high wind shear or turbulence that could contribute to the phenomenon. One year of meteorological data will be evaluated to determine the frequency of unusually high wind shear events [Section 12.0].

f) A summary, in tabular and/or graphical format, of A-weighted sound levels indicated by measurements and computer noise modeling at the representative external property boundaries of the Facility, and at the representative nearest and average sensitive sound receptors, for the following scenarios [Appendix C]:

1) Daytime ambient noise level – a single value of sound level equivalent to the level of sound exceeded for 90 percent of the time during the daytime hours (7 am – 10 pm) of a year (L90).

2) Summer nighttime ambient noise level – a single value of sound level equivalent to the level of sound exceeded for 90 percent of the time during the nighttime hours (10 pm – 7 am) during the summer (L90).

3) Winter nighttime ambient noise level – a single value of sound level equivalent to the level of sound exceeded for 90 percent of the time during the nighttime hours (10 pm – 7 am) during the winter (L90).

4) Worst case future noise level during the daytime period – the daytime ambient noise level (L90) as indicated in (f)(1) above, plus the modeled upper tenth percentile sound level (L10) of the Facility in a year. Long-term statistical sound level L10 will be determined for scenarios that both include and exclude low wind periods when turbines will not be in operation.

5) Worst case future noise level during the summer nighttime period - the summer nighttime ambient noise level (L90), as indicated in (f) (2) above, plus the modeled upper tenth percentile sound level (L10) of the Facility in a year. Long-term statistical sound level L10 will be determined for scenarios that both include and exclude low wind periods when turbines will not be in operation.

6) Worst case future noise level during the winter nighttime period - the winter nighttime ambient noise level (L90), as indicated in (f) (3) above, plus the modeled upper tenth percentile sound level (L10) of the Facility in a year. Long-term statistical sound level L10 will be determined for scenarios that both include and exclude low wind periods when turbines will not be in operation.

7) Daytime ambient average noise level – a single value of sound level equivalent to the energy-average ambient sound levels (Leq) during daytime hours (7 am –10 pm).

8) Nighttime ambient average noise level – a single value of sound level equivalent to the energy-average ambient sound levels (Leq) during nighttime hours (10 pm – 7 am).

9) Typical facility noise levels - the noise level from the proposed new sources modeled as a single value of sound level equivalent to the level of the sound exceeded 50 percent of the time by such sources under normal operating conditions by such sources in a year (L50), and in combination with the energy-average ambient sound level during the daytime hours (Leq), as indicated above in (f) (7). Long-term statistical sound level L50 will be determined for scenarios that both include and exclude low wind periods when turbines will not be in operation.

g) A description of noise standards applicable to the Facility, including any local regulations, noise design goals at representative sensitive sound receptors, and at representative external property boundaries [Section 4.0].

h) A table outlining noise standards applicable to the Facility, including any local regulations, and noise design goals at representative sensitive sound receptors and at representative external property boundaries, including the degree of compliance indicated by computer noise modeling [Appendix D].

i) A noise complaint resolution plan covering the construction period including noise abatement measures for Facility activities along with procedures for handling complaints [As part of separate documentation].

j) An identification and evaluation of reasonable noise abatement measures for the final design and operation of the Facility including the use of alternative technologies, alternative designs, and alternative Facility arrangements [Section 10.6].

k) A discussion of:

1) The potential for the Facility to result in hearing damage based on OSHA standards, the recommendations of the United States Environmental Protection Agency and the guidelines of the World Health Organization [Sections 4.2 and 4.3].

2) A discussion of the potential for indoor and outdoor speech interference based on guidelines from the United States Environmental Protection Agency and the World Health Organization, including discussion of sound spectra at the appropriate frequency bands [Sections 4.2, 4.3, and 4.6].

3) A review of studies, peer reviewed, government, scientific and professional publications, specific to the relationship between wind turbine noise and annoyance/complaints will be included. Community complaint potential will be evaluated based upon identified factors, thresholds and guidelines and [Sections 4.5 and 11.2];

4) At a minimum, the potential for sound-induced vibration and annoyance and the potential for structural damage, and the potential for interference with technological, industrial or medical activities that are sensitive to vibration or infrasound at the low frequency bands of 16, 31.5 and 63 Hz will be assessed using outdoor criteria established in annex D of ANSI standard S12.9 -2005/Part 4. Applicable portions of ANSI 12.2 (2008) may be used for the evaluation of frequency bands where ANSI 12.2 (2008) may be a more restricting criteria or if it is expected ANSI S12.9-2005/Part 4- Annex D guidelines being met but still represent a potential for perceptible vibrations at indoor locations of sensitive sound receptors [Sections 4.5 and 11.2].

5) The potential for structural damage; and the potential for interference with technological, industrial or medical activities that are sensitive to vibration or infrasound. [Sections 11.3 and 13.0].

l) A post-construction noise evaluation protocol and studies that will be performed to establish conformance with operational noise design goals [Included as part of separate documentation].

m) An identification of practicable post-construction operational controls and other mitigation measures that will be available to address reasonable complaints [Section 10.6], including a description of a complaint-handling procedure that shall be implemented during periods of operation [Included as part of separate documentation.

n) The computer noise modeling values used for the major noise-producing components of the Facility shall fairly match the unique operational noise characteristics of the particular equipment models and configurations proposed for the Facility. The software input parameters, assumptions, and associated data used for the computer modeling will be provided as an appendix [Section 11.1 and Appendix B]. GIS files that contain modeled topography, proposed turbine and substation noise source locations, sensitive sound receptors, and all representative external boundary lines, identified by Parcel ID number, will be provided to DPS-Staff in digital format [Included as part of separate documentation]. The Application will also include:

1) A comparison between future noise levels or change in noise levels at noise sensitive receptors against any identified noise levels or thresholds by using the noise descriptors and specific requirements of local town

laws, DEC Noise Policy (DEP-00-1, Feb 2, 2001), WHO guidelines, 16 NYCRR § 1001.19 and any identified and applicable annoyance/complaint thresholds or guidelines [Sections 11.2, 11.5, and 14; and Appendix D].

2) Estimates of:

   i) the percentage of the population expected to be impacted by sound levels lower or higher than the threshold values or identified ranges [Sections 4.6 and 11.2], and

   ii) absolute values of the population expected to be impacted by sound levels lower or higher than the threshold values or identified ranges [Section 11.2].

## 4.2 | WORLD HEALTH ORGANIZATION

The United Nation's World Health Organization (WHO) has published "Guidelines for Community Noise" (1999) which uses research on the health impacts of noise to develop guideline sound levels for communities. The foreword of the report states, "The scope of WHO's effort to derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments."

Table 4.1 of the WHO's "Guidelines for Community Noise" (1999) provides guideline values for community noise in specific environments. The WHO guidelines suggest a daytime and nighttime protective noise level. During the day, the levels are 55 dBA $L_{EQ(16)}$, that is, an average over a 16-hour day, to protect against serious annoyance and 50 dBA $L_{EQ(16)}$ to protect against moderate annoyance.

During the night, the WHO recommends limits of 45 dBA $L_{EQ(8)}$[8] and an instantaneous maximum of 60 dBA $L_{Fmax}$ (fast response maximum). These are to be measured outside the bedroom window. These guidelines are based on the assumption that sound levels indoors would be reduced by 15 dBA with windows partially open. That is, sound level inside the bedroom that is protective of sleep is 30 dBA $L_{EQ(8)}$. So long as the sound levels outside of the house remain at or below 45 dBA, sound levels in the bedroom will generally remain below 30 dBA. Given the climate in this region, this is essentially a summertime standard, since residents are less likely to have their windows open during other times of the year. By closing windows, an additional ~10 dB of sound attenuation will result. In addition to protection against annoyance, these guidelines are intended to protect against speech intelligibility, sleep disturbance, and hearing impairment. Of these factors, protection against annoyance and sleep disturbance require the lowest limits.

[8] This is the equivalent average sound level, averaged over eight nighttime hours, measured outside the bedroom window.

The WHO suggest that full sentence intelligibility requires a signal to noise ratio of about 15 dB. For speech volume of 50 dBA, this would indicate some speech interference as low as 35 dBA $L_{EQ}$ for "smaller rooms". Although speech interference is influenced by the spectrum of the masking sound, no particular guidance is given to adjust the WHO's guidelines for sound sources of different frequency content. Since speech may range from 100 Hz to 6 kHz, there will be overlap between the spectra of wind turbine noise and speech. This guideline is generally intended for classrooms and so includes corrections for the hearing impaired, reverberation, children, and lack of language proficiency. 50 dBA is also a low sound level for speech at close distances, with most normal speech being 60 dBA at close distances, as stated in ANSI 12.65-2011 (Figure 2).

The WHO long-term guideline to protect against hearing impairment is 70 dBA $L_{(24)}$ over a lifetime exposure, and higher for occupational or recreational exposure.

The WHO indicate that sound sources with high levels of low frequency can be more intrusive. The guidelines do not include specific limits and instead state:

> "When noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided. For noise with a large portion of low-frequency sound a still lower guideline is recommended."

No specific definition is given for what entails a "large portion" of low frequency sound. The WHO recommends doing a frequency analysis if the difference between the C- and A-weighted sound levels exceeds 10 dB. As WHO indicates, this only gives "crude information" about low-frequency content, and is not an indicator in and of itself.

Since the WHO guidelines were developed to protect human health, all suggested limits apply to sound levels at residences or areas where humans typically frequent. For example, the guidelines reflective of sleep disturbance are specified to be measured outside the bedroom window.

In October, 2009, WHO Europe conducted an updated literature review and built upon WHO's guidelines for nighttime noise in Europe. They added an *annual average* nighttime guideline level to protect against adverse effects on sleep disturbance. This guideline is 40 dB $L_{night}$, measured outside the bedroom window.

Neither the 1999 or 2009 guidelines were developed specifically for wind turbine noise.

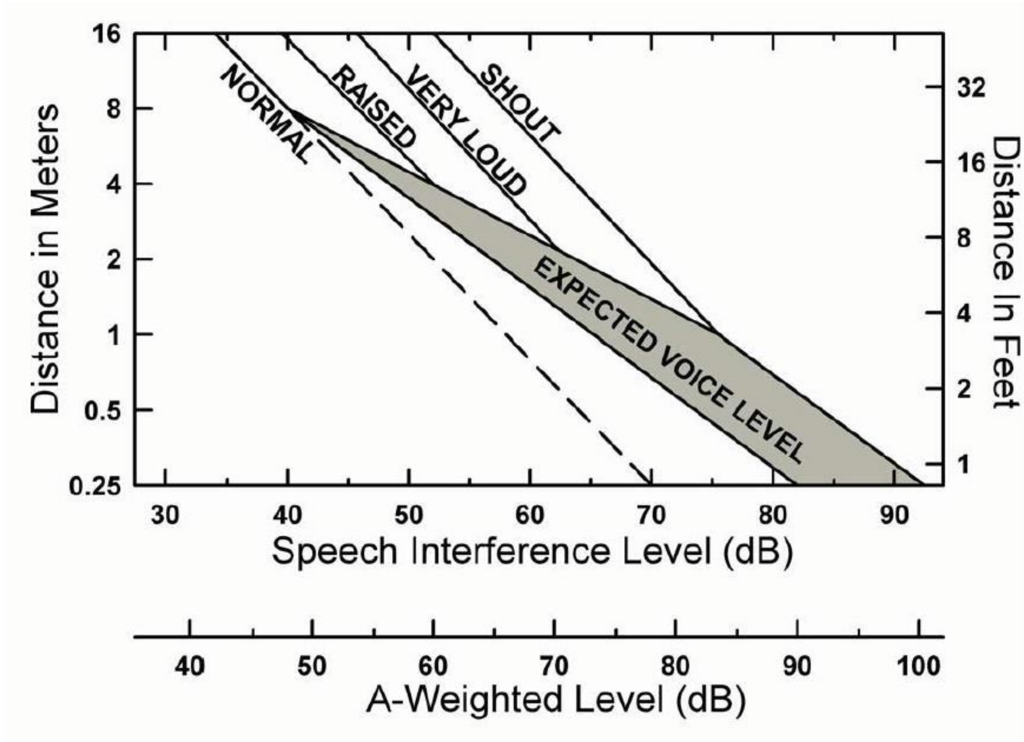


**FIGURE 2: SOUND PRESSURE LEVEL OF SPEECH (FROM ANSI S12.65-2011)**

## 4.3 | FEDERAL STANDARDS AND GUIDELINES

There are no federal standards that apply to wind turbines on private land.

Many federal agencies have adopted guidelines and standards that apply to other types of facilities. A summary of some of these standards is shown in Table 3. Note that these standards are in terms of $L_{EQ}$, Ldn, or $L_{10}$. The $L_{EQ}$ is the pressure weighted average sound level, over a specified period of time. The Ldn is the A-weighted day-night $L_{EQ}$, where a penalty of 10 dB is applied to nighttime sound. The $L_{10}$ is the 10$^{th}$ percentile sound level. It is the level that is exceeded 10% of the time, and thus represents the higher sound levels over a period of time.

**TABLE 3: SUMMARY OF FEDERAL GUIDELINES AND STANDARDS FOR EXTERIOR NOISE**

| Agency | Applies to | Standard (dBA) |
|---|---|---|
| Environmental Protection Agency | Guideline to protect public health and welfare with an adequate margin of safety | 55 dB Ldn |
| Environmental Protection Agency | Level of intermittent noise identified to protect against hearing loss | 70 dB $L_{(24)}$ |
| Environmental Protection Agency | 100 percent speech intelligibility indoors and 99 percent speech intelligibility outdoors at 1 meter (3.3 feet) | 55 dB Ldn |
| Occupational Safety and Health Administration | Maximum allowable sound level for an 8 hour work day | 90 dB $L_{(8)}$ |
| Bureau of Land Management (BLM) | Guidelines for the development of wind turbines on federal lands managed by BLM | Refers to the EPA 55 dB Ldn guideline. |
| Federal Energy Regulatory Commission (FERC) | Compressor facilities under FERC jurisdiction | 55 dB Ldn |
| Federal Highway Administration (FHWA) | Federally funded highway projects. For "Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential for the area to continue to serve its intended purpose." | 57 dBA $L_{EQ}$ or 60 dBA $L_{10}$ during the highest hour. |
| | For residential, active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings | 67 dBA $L_{EQ}$ or 70 dBA $L_{10}$ |
| Federal Interagency Task Force | This Taskforce is set up to develop consistency of noise standards among federal agencies | 55 to 65 dB Ldn for impacts on residential areas |

The United States Department of the Interior, Bureau of Land Management (BLM) has developed a Programmatic Environmental Impact Statement (PEIS) for Wind Energy

Development on BLM Lands in the Western United States. Noise is addressed in several sections of the PEIS. Several relevant points made in the PEIS are listed below:

- From Section 4.5.1: "at many wind energy project sites on BLM-administered lands, large fluctuations in broadband noise are common, and even a 10-dB increase would be unlikely to cause an adverse community response. In addition, noise containing discrete tones (tonal noise) is much more noticeable and more annoying at the same relative loudness level than other types of noise, because it stands out against background noise."
- From Section 4.5.2: "In general, background noise levels (i.e., noise from all sources not associated with a wind energy facility) are higher during the day than at night. For a typical rural environment, background noise is expected to be approximately 40 dB(A) during the day and 30 dB(A) at night (Harris 1979), or about 35 dB(A) as DNL (Miller 2002)."
- From Section 4.5.4: "The EPA guideline recommends an Ldn of 55 dB(A) to protect the public from the effect of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974). This level is not a regulatory goal but is 'intentionally conservative to protect the most sensitive portion of the American population' with 'an additional margin of safety.' For protection against hearing loss in the general population from non-impulsive noise, the EPA guideline recommends an $L_{EQ}$ of 70 dB(A) or less over a 40-year period."
- From Section 5.5.3.1: "aerodynamic noise is the dominant source from modern wind turbines (Fégeant 1999)."
- From Section 5.5.3.1: "Considering geometric spreading only, this results in a sound pressure level of 58 to 62 dB(A) at a distance of 50 m (164 ft) from the turbine, which is about the same level as conversational speech at a 1 m (3 ft) distance. At a receptor approximately 2,000 ft (600 m) away, the equivalent sound pressure level would be 36 to 40 dB(A) when the wind is blowing from the turbine toward the receptor. This level is typical of background levels of a rural environment (Section 4.5.2). To estimate combined noise levels from multiple turbines, the sound pressure level from each turbine should be estimated and summed. Different arrangements of multiple wind turbines (e.g., in a line along a ridge versus in clusters) would result in different noise levels; however, the resultant noise levels would not vary by more than 10 dB."
- From Section 5.5.3.1: "In general, the effects of wind speed on noise propagation would generally dominate over those of temperature gradient."
- From Section 5.5.3.1: "Wind-generated noise would increase by about 2.5 dB(A) per each 3 ft/s (1 m/s) wind speed increase (Hau 2000); the noise level of a wind turbine, however, would increase only by about 1 dB(A) per 3 ft/s (1 m/s). In general, if the background noise level exceeds the calculated noise level of a wind turbine by about 6 dB(A), the latter no longer contributes to a perceptible increase of noise. At wind speed of about 33 ft/s (10 m/s), wind-generated noise is higher than aerodynamic

noise. In addition, it is difficult to measure sound from modern wind turbines above a wind speed of 26 ft/s (8 m/s) because the background wind-generated noise masks the wind turbine noise at that speed (DWIA 2003)."

- From Section 6.4.1.6: "Noise generated by turbines, substations, transmission lines, and maintenance activities during the operational phase would approach typical background levels for rural areas at distances of 2,000 ft (600 m) or less and, therefore, would not be expected to result in cumulative impacts to local residents."

These statements from the BLM's Wind Energy Development PEIS do not represent a regulatory standard itself, but they do provide some insight on how one federal agency is approaching noise generated from wind turbine projects.

The EPA discussed speech intelligibility relative to a day-night exterior sound level of 55 dBA (55 dBA $L_{DN}$ is the EPA's guideline sound level to protect public health). 55 dBA $L_{DN}$ is equivalent to a 45 dBA $L_{EQ}$ sound level at night and 55 dBA $L_{EQ}$ sound level during the day. Or alternatively a sound level of 48.6 dBA $L_{EQ}$ through the night. The EPA states that on average this will yield 100 percent speech intelligibility indoors, with a 5 dB margin of safety and 99 percent speech intelligibility at 1 meter (3.3 feet) outdoors.

## 4.4 | NATIONAL ACADEMY OF SCIENCES STUDY

In 2008, the National Research Council of the National Academy of Sciences issued a report "Environmental Impacts of Wind-Energy Projects." This report summarized the state of understanding of wind energy projects with respect to its ecological and human impacts, the latter of which includes noise.

With respect to noise, the report concludes,

> "Noise produced by wind turbines generally is not a major concern for humans beyond a half mile or so because various measures to reduce noise have been implemented in the design of modern turbines. The mechanical sound emanating from rotating machinery can be controlled by sound-isolating techniques. Furthermore, different types of wind turbines have different noise characteristics. As mentioned earlier, modern upwind turbines are less noisy than downwind turbines. Variable-speed turbines (where rotor speeds are lower at low wind speeds) create less noise at lower wind speeds when ambient noise is also low, compared with constant-speed turbines. Direct-drive machines, which have no gearbox or high speed mechanical components, are much quieter."

The Cassadaga Wind project is proposing to use variable speed upwind turbines. The gearbox and other mechanical components include noise isolation to reduce impacts.

## 4.5 | WIND TURBINE SOUND ANNOYANCE AND STANDARDS

Sound level standards and guidelines such as those published by the World Health Organization are typically based on research conducted for transportation noise. There have been some studies that conclude that wind turbine noise is more intrusive to some listeners than a transportation source of equivalent magnitude. Suggested reasons for increased annoyance include: amplitude modulation, tonality, low frequency content, and the newness of wind turbine noise as an environmental noise source.

Some studies have looked at the response of residents surrounding wind farms relative to the audio frequency[9] and sound level emitted by the wind turbines. Similar wide-spread studies have not compared annoyance to low frequency or infrasound levels, though there is a high correlation between A- and C-weighted sound levels.[10]

The studies that have been performed for human response to low frequency sound and infrasound from wind turbines largely been laboratory studies.

The following subsection of this report reviews these studies that have been performed comparing human response to audible sound and infrasound from wind turbines.

## RESPONSE IN THE AUDIO FREQUENCY RANGE

Studies of human response to wind turbine sound were performed in Sweden (in 2000 and 2005) and The Netherlands (2007) by Eja Pederson and other authors (Waye, Lassman, etc.).[11,12,13,14] There have been several papers about these studies, including a summary written by Janssen et al (2011) that included a combined dose response curve.[15] The Pederson studies were performed by sending self-reporting surveys to respondents living in and around wind farms and comparing responses from these surveys to modeled sound levels at those residences. A total of 1,830 people responded to these surveys.

The Janssen dose-response curve based on these studies is shown in Figure 3. This shows that for sound at 45 dBA $L_{EQ}$ (calculated outdoors), there is an annoyance rate of approximately 12 percent for residents outdoors and 5 percent for residents indoors. The highly annoyed rate is 5 percent outdoors and 2 percent indoors for this sound level. Note that sound levels were calculated using the equations of the Swedish Environmental Protection Agency and assumes that receptors are always downwind of the source.

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[9] The audio frequency range, also called the audible frequency range, extends from 20 Hz to 20 kHz and includes the frequency range most audible to humans.

[10] Tachibana, Hideki, et al. "Nationwide Field Measurements of Wind Turbine Noise in Japan." Institute of Noise Control Engineering Journal. 62(2), March-April 2014.

[11] Pedersen, Eja and Waye, Kerstin. "Perception and annoyance due to wind turbine noise - a dose-response relation." Journal of the Acoustical Society of America. 116(6). pp. 3460-3470.

[12] Pedersen, Eja, et al.. "Response to wind turbine noise in the Netherlands." Acoustics 2008. Paris, France.: 29 June – 4 July 2008.

[13] Pedersen, Eja and Persson Waye, Kerstin. "Wind turbines-low level noise sources interfering with restoration?" Environ. Res. Lett. 3 (January-March 2008). 11 January 2008.

[14] Pedersen, Eja and Larsman Pernilla. "The impact of visual factors on noise annoyance among people living in the vicinity of wind turbines." Journal of Environmental Psychology. 28(2008). pp. 379-389.

[15] Janssen, Sabine, et al. "A comparison between exposure-response relationships for wind turbine annoyance and annoyance due to other noise sources." *J. Acoust. Soc. Am.* 130(6). December 2011. pp. 3746-3753.

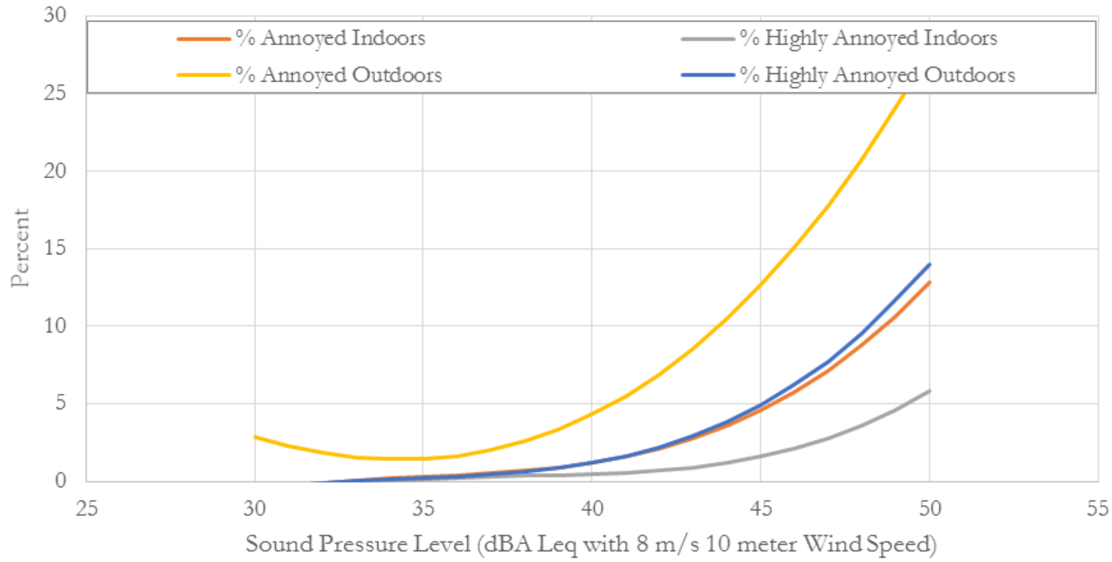


**FIGURE 3: WIND TURBINE NOISE DOSE-RESPONSE CURVE DERIVED BY JANSSEN ET AL. (2011)**

A common finding among the various studies is that annoyance was lower among residents who benefited economically from the wind turbines. Annoyance also increases with age, visibility of the turbines from the residence, and noise sensitivity.

Health Canada studied health indicators among populations exposed to wind turbine sound.[16] Just as with Pedersen's studies, self-reporting surveys were distributed to participants (1,238 in total). Correlations were found between wind turbine modeled sound levels and annoyance towards noise, shadow-flicker, turbine visibility, blinking lights, and vibration. Although C-weighted sound levels were calculated for the study, A-weighted levels were primarily assessed, due to the high correlation between A-weighted and C-weighted levels ($R^2$=0.88). The rate of highly annoyed residents due to wind turbine noise was found to be approximately three percent at sound levels between 40 and 46 dBA $L_{EQ}$. This sound level assumes wind turbines emissions at an 8 m/s wind speed measured at a height of 10 meters. Also note, that the Health Canada study assumed a ground absorption factor of G=0.7 with no uncertainty factor added to the wind turbine sound power, so levels modeled by Health Canada will be about 3 dB lower than the equivalent scenario modeled in this report. Therefore, the three percent highly annoyed would be equivalent to a range of 43 to 49 dBA using the modeling parameters used in this report.

A Japanese study also looked at the relative annoyance of residents surrounding wind farms, compared with the $L_{EQ,n}$, or average of the A-weighted 10-minute sound levels from each hour over the night with the wind turbine(s) at their rated capacity.[17] The $L_{EQ,n}$ measured by the study is lower, on average, than the sound level downwind with the ten meter wind speed at

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16 Michaud, David. "Wind Turbine Noise and Health Study: Summary of Results." *6th International Meeting on Wind Turbine Noise.* Glasgow, Scotland: 20-23 April 2015.

17 Kuwano, Sonoko, et al. "Social Survey on Wind Turbine Noise in Japan." *Noise Control Engr. J. 62(6). November-December 2014. pp. 503-520.*

eight m/s, due to the directionality of turbines. Due to differences in wind farm layouts (single turbine, grid layout, ridgeline layout, etc.), this difference was not readily determined. The authors estimated that, on average, the $L_{EQ,n}$ will be about 6 dB less than the Ldn. Using this assumption the authors found that wind turbine noise is between 6 and 9 dB more annoying than road traffic noise. The study found that between 41 and 45 dB $L_{EQ,n}$ approximately 14 percent of respondents were extremely annoyed and 19 percent were moderately annoyed.[18] Other findings included that visual disturbance was well correlated with wind turbine noise disturbance, and that insomnia, though low in incidence overall, was more prevalent near wind turbine sites. Insomnia was also found to be related to visual disturbance. Wind turbine noise was also found to have an effect on sleep disturbance, when audible, and particularly when sound levels were greater than 40 dB $L_{EQ,n}$.

## INFRASOUND

Infrasound is generally defined as the portion of the frequency spectrum below 20 Hz. Low-frequency sound is generally considered in the frequency range from 20 Hz to 200 Hz.

Measurements of infrasound at distances from wind turbines typical of their nearest residential neighbors have consistently found that infrasound levels are below published audible human perception limits. O'Neal et al. measured sound from wind projects that used the GE 1.5 sle and Siemens SWT 2.3-93 model wind turbines. They found that at typical receptor distances away from a wind turbine, more than 1,000 feet away, wind turbine sound is typically audible starting at 50 Hz.[19]

Tachibana et al. measured sound levels from 34 wind projects around Japan over a three-year period.[20] They found that infrasound levels were "much lower than the criterion curve" proposed by Moorehouse et al.[21] RSG et al. studied infrasound levels at two wind turbine projects in the northeastern U.S. Both indoor and outdoor measurements were made.[22] Comparisons between turbine-on periods and adjacent turbine shutdown periods indicated the presence of wind-turbine-generated infrasound, but well below ISO 389-7[23] and Wattanabe et al.[24] perception limits. In their review of several wind turbine measurement studies (including

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[18] Yano, Takaski, et al. "Dose-response relationships for wind turbine noise in Japan." *Internoise 2013*. Innsbruck, Austria: 15-18 September 2013.
[19] O'Neal, R. et al. "Low frequency noise and infrasound from wind turbines." Noise Control Engineering J. 59 (2), 2011.
[20] Tachibana, et al. "Nationwide field measurements of wind turbine noise in Japan." Noise Control Engr. J. 62 (2) 2014.
[21] Moorehouse, A. T. "A procedure for the assessment of low frequency noise complaints." J. Acoust. Soc. Am. 126 (3) 2009
[22] RSG, et al. "Massachusetts study on wind turbine acoustics." Prepared for MassCEC and MassDEP, February 2016.
[23] *Acoustics -- Reference zero for the calibration of audiometric equipment -- Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions,* International Standards Organization, ISO 389-7:2005, last reviewed 2013
[24] Watanabe, T., and Moller, H., "Low frequency hearing thresholds in pressure field and in free field," *J. Low Freq. Noise Vib., Vol. 9(3), 106-115*

O'Neal and Tachibana), McCunney et al. did not find evidence of audible or perceptible infrasound levels and typical residential distances from wind projects.[25]

Authors Salt, Pierpont, and Schomer have theorized that infrasound from wind farms can be perceived by humans and cause adverse reactions, even when it is below measured audibility thresholds.[26,27,28] Some of these theories have focused on the human vestibular system, hypothesizing that sub-audible infrasound could stimulate the vestibular system, upsetting the human body's manner of determining balance and causing symptoms such as dizziness, nausea, and headaches, along with disruptions in sleep. In response, McCunney et al. and Leventhall contend that there has been no demonstration that humans can perceive sub-audible infrasound, citing the relative insensitivity of the inner ear (where the vestibular system is located) to airborne sound and the presence of other low to moderate magnitude infrasound sources in the body and the environment.[29,30]

Yokoyama et al. conducted laboratory experiments with subjects exposed to synthesized infrasound from wind turbines. In one experiment, he filtered synthesized wind turbine sound to eliminate high frequency sound at ten different cutoff frequencies from 10 Hz to 125 Hz.[31] The results indicate that when all sound above 20 Hz was filtered out, none of the respondents could hear or sense the wind turbine sound. In a second experiment correlating the subject response of wind turbine sound to different frequency weighting schemes, they found that the subjective loudness of wind turbine sound was best described by the A-weighted sound level rather than other weightings that focused on low-frequency sound or infrasound.[32]

Hansen et al. compared subject response to infrasound and "sham" infrasound.[33] In one case, recordings of wind turbine noise, filtered to exclude sound above 53 Hz, were presented to subjects with the infrasonic content present, with only the infrasonic content present, and with the infrasonic content removed. Results showed that adverse response to the sound, was determined by the low frequency, not infrasonic content of the sound. A study by Walker, et

[25] McCunney, Robert, et al. "Wind Turbines and Health: A Critical Review of the Scientific Literature." *Journal of Occupational and Environmental Medicine.* 56(11). November 2014. pp. e108-e130.
[26] Salt, Alec and Hullar, Timothy. "Responses of the Ear to Low-Frequency Sounds, Infrasound, and Wind Turbines." *Hear Res.* 268(2010). pp. 12-21.
[27] Pierpont, Nina. "Wind Turbine Syndrome: A Report on a Natural Experiment." *K-Selected Books*: Santa Fe, New Mexico: 2009.
[28] Schomer, Paul, et al. "A Theory to Explain Some Physiological Effects of the Infrasonic Emissions at Some Wind Farm Sites." *J. Acoust. Soc. Am.* 137(3). March 2015. pp. 1357-1365.
[29] McCunney, Robert, et al. "Wind Turbines and Health: A Critical Review of the Scientific Literature." *Journal of Occupational and Environmental Medicine.* 56(11). November 2014. pp. e108-e130.
[30] Leventhall, Geoff. "Infrasound and the ear." *Fifth International Conference on Wind Turbine Noise.* Denver, Colorado: 28-30 August 2013.
[31] Yokoyama S., et al. "Perception of low frequency components in wind turbine noise." Noise Control Engr. J. 62(5) 2014
[32] Yokoyama et al. "Loudness evaluation of general environmental noise containing low frequency components." Proceedings of InterNoise2013, 2013
[33] Hansen, K, et al. "Perception and Annoyance of Low Frequency Noise Versus Infrasound in the Context of Wind Turbine Noise." *6th International meeting on Wind Turbine Noise.* Glasgow, Scotland: 20-23 April 2015.

al. found that feelings of nausea and annoyance were more correlated with audible range blade swish than infrasonic components.[34]

Research by Tonin, et al. found that response to infrasound was more determined by information the subject had received than the presence of infrasound in a sound signal.[35]

While infrasound from wind farms has not been shown to be audible by humans, infrasound and low-frequency sound can create noise-induced vibration in lightweight structures. ANSI 12.2-2008 Table 4 lists low frequency noise criteria to prevent “perceptible vibration and rattles in lightweight wall and ceiling structures.”[36] These criteria are shown in Table 4. While these are interior levels, the equivalent exterior sound levels will be higher due to building noise reduction. [37, 38, 39] Outside to inside noise reduction is a function of sound frequency and whether windows are open or closed.

ANSI S12.9 Part 4 addresses the annoyance of sounds with strong low-frequency content. Table 6 shows the “Annex D” criteria for minimal annoyance. Annex D suggests that sounds at these frequencies are similar indoors and outdoors as any transmission loss of the walls and windows can be offset by modal resonance amplification in enclosed rooms.

For comparison, Moorehouse’s proposed interior criteria for infrasound and low frequency sound are 94 dB, 69 dB, and 52 dB for the 16 Hz, 31.5 Hz, and 63 Hz octave bands, respectively.[40]

#### TABLE 4: ANSI 12.2 SECTION 6 – INTERIOR SOUND LEVELS FOR PERCEPTIBLE VIBRATION AND RATTLES IN LIGHTWEIGHT WALL AND CEILING STRUCTURES

| 1/1 Octave Band Center Frequency | 16 Hz | 31.5 Hz | 63 Hz |
|---|---|---|---|
| Clearly perceptible vibration and rattles likely | 75 dB | 75 dB | 80 dB |
| Moderately perceptible vibration and rattle likely | 65 dB | 65 dB | 70 dB |

#### TABLE 5: ANSI 12.9 PART 4 ANNEX D – LOW FREQUENCY SOUND LEVELS BELOW WHICH ANNOYANCE IS MINIMAL

| 1/1 Octave Band Center Frequency | 16 Hz | 31.5 Hz | 63 Hz |
|---|---|---|---|

[34] Walker, Bruce and Celano, Joseph. “Progress Report on Synthesis of Wind Turbine Noise and Infrasound.” *6th International Meeting on Wind Turbine Noise*. Glasgow, Scotland: 20-23 April 2015.
[35] Tonin, Renzo and Brett, James. “Response to Simulated Wind Farm Infrasound Including Effect of Expectation.” *6th International Meeting on Wind Turbine Noise.* Glasgow, Scotland: 20-23 April 2015.
[36] “American National Standard Criteria for Evaluating Room Noise”, American National Standards Institute ANSI/ASA S12.2-2008, Acoustical Society of America, (2008).
[37] O’Neal, R. et al. “Low frequency noise and infrasound from wind turbines.” Noise Control Engineering J. 59 (2), 2011.
[38] RSG, et al. “Massachusetts study on wind turbine acoustics.” Prepared for MassCEC and MassDEP, February 2016.
[39] Delta Electronics Light & Acoustics, *Low frequency noise from large wind turbines, Summary and conclusions on measurements and methods,* Danish Energy Authority, EFP-06 Project, 19 December 2008
[40] Moorehouse, A., et al. “Proposed criteria for the assessment of low frequency noise disturbance,” Acoustics Research Centre, Salford University DEFRA NANR45, 2005.

| | | | |
|---|---|---|---|
| Sound Level Below Which Annoyance is Minimal | 65 dB | 65 dB | 65 dB |

## 4.6 | AUDIBLE SOUND DESIGN GOALS FOR CASSADAGA WIND

Given the scientific evidence regarding sleep disturbance and other impacts that were reviewed by WHO, the project is being designed to not exceed 45 dBA $L_{EQ(8)}$, which is averaged over the entire night (11 pm to 7 am) outside at non-participating permanent residences. This would not apply to areas that have transient uses such as seasonal homes/camps, driveways, trails, farm fields, and parking areas.[41] This level is more stringent than all of the federal guidelines mentioned above and will be well below the level that can cause hearing impairment according to WHO, the EPA, and OSHA. It is less than or equal to the most applicable NYSDEC guidelines of 55 dBA $L_{dn}$. This is also below the 50 dBA $L_{10}$ standard of the towns of Arkwright, Charlotte, and Cherry Creek. The goal is both protective of human health and hearing loss, and prevents any quality-of-life concerns. It is also below thresholds to prevent speech interference. Since the WHO and EPA guidelines are intended to protect human health and are based on long-term averages, they are applied at sensitive receptors such as residences. Neither the WHO Guidelines, EPA guidelines, nor the town standards should be applied to unoccupied property lines. A property line design goal has not been developed for this project. During the day, the project design goal will be 47 dBA $L_{EQ}$ to remain below the Town ordinances of 50 dBA $L_{10}$. This is more conservative than the WHO guidelines of 50 dBA $L_{EQ(16)}$ for the daytime, to protect against moderate annoyance.

For 100 percent speech intelligibility, the WHO recommends a 15 dB signal-to-noise ratio. Assuming a minimum speech volume of 50 dBA, this results in estimated full intelligibility at 35 dBA. Assuming a more moderate speech volume of 60 dBA, this results in full-sentence intelligibility at 45 dBA. The WHO's 15 dB signal to noise ratio is conservative, and assumes a variety of things including: neurological immaturity, hearing loss, unfamiliarity with the language, and presence of reverberation.[42] For comparison, other sources cite a 0 dB signal-to-noise ratio necessary for full-sentence speech intelligibility greater than 95 percent.[43] The sound level for speech is also conservative. According to ANSI S12.65-2011, "Normal" speech at 2 meters will be approximately 60 dBA. The EPA has also looked into speech intelligibility, relative to their 55 dBA $L_{DN}$ guideline to protect human health. At this level, they predict 100 percent speech intelligibility indoors and 99% speech intelligibility outdoors at a distance of 1 meter (3.3 feet).

[41] Seasonal receptors were evaluated to the sound level limits of the town (50 dBA $L_{10}$). Since the $L_{10}$ sound level is typically less than 2 dB more than the $L_{EQ}$ for a given period, these receptors were evaluated against a 48 dBA $L_{EQ(8)}$ limit.
[42] "American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools", American National Standards Institute ANSI/ASA S12.60-2002, Acoustical Society of America, (2002).
[43] Levitt, Harry and Webster, John. "Effects of Noise and Reverberation on Speech." Handbook of Acoustical Measurements and Noise Control. Harris, Cyril. New York, New York: McGraw Hill, Inc., 1991. pp. 16.6-16.8.

Given the modeled sound levels from the wind turbines, the Facility is expected to have minimal impact on speech intelligibility at short to moderate distances and at normal speech volumes.

Based on research regarding human response to wind turbine noise, approximately 5 percent of the population will be annoyed indoors and 12 percent outdoors by exterior sound levels of 45 dBA ($L_{EQ}$ at 8 m/s), according to dose-response curves derived by Janssen et al (2011). These values are reasonably consistent with data from the Health Canada and Japanese studies, but dose response curves have not been derived based on those studies.

# 5.0 BACKGROUND SOUND MONITORING SITES

As noted in Section 3.1, the rules of the New York State Board on Electric Generation Siting and the Environment regarding noise are primarily found in 16 NYCRR § 1011.19. Under the rules, the application must include an "Exhibit 19" on "Noise and Vibration".

Part of the stipulations were written to address these requirements. Pertinent sections of the stipulations are included below.

> b) An evaluation of ambient pre-construction baseline noise conditions, including identification of A-weighted sound levels, pure tones, if any, at representative of potentially impacted receptors, using actual measurement data recorded in winter and summer (i.e., leaf off and leaf on) during the day and at night as a function of time and frequency. Ambient sound levels will be measured utilizing suitable and suitably calibrated sound level meter(s) and fractional octave band analyzer(s). Brand and model number of the sound level meters and calibrators used will be specified; locations, dates, and times of testing, weather conditions[44] (wind speed, wind direction, temperature, relative humidity and precipitation), frequency range of measurement, meter settings and general methodology and procedures will be specified and described. Ambient measurements to cover the infrasound range (from 0.8 Hz to 20 kHz) will be included as a separate measurement using specialized equipment. Noise descriptors including Leq and L90 will be calculated and included as part of the tabular results provided in section f) below. Temporal accuracy (for the number of days tested) will be calculated and reported based on a 95% confidence interval following the procedures included in ANSI Standard S12.9-1992 (R2013)/Part 2. Weather information can be supplemented with data from the most representative and proximal weather station(s). The ambient pre-construction baseline sound level will be filtered to exclude seasonal and intermittent noise, periods of rain, thunderstorms and excessive wind and gusts as appropriate. The "Ai" frequency-weighting network will be used where appropriate (i.e. bird and insect sound is prominent), also called ANS-weighted sound levels in ANSI/ASA S3/SC1.100-2014 - S12.100-2014.

A detailed monitoring program was developed to assess the existing ambient sound levels for the variety of soundscapes within the Project area. The Project area primarily contains working farms and farmland, rural homesteads, wilderness areas, local roads, and portions of the towns of Sinclairville, Charlotte, and Cherry Creek. Sites were distributed throughout the project boundary to be as representative as possible of the broader local soundscapes experienced in the region.

## 5.1 | REPRESENTATIVE MONITOR LOCATIONS

Six monitoring locations, distributed within the Project boundary, were selected as representative of the different ambient soundscapes in the area. Metrics characterizing potential soundscapes of the area were developed and sites that were diversified amongst these

[44] Weather conditions are used to evaluate validity of the ambient measurement. Relevant conditions include wind speed, temperature (check if within equipment tolerances) and precipitation (rainfall generally invalidated data).

metrics were selected for monitoring. The various representative areas including rural residential, farming, town, low and high traffic roads, high truck traffic, and remote areas.

The six selected monitoring locations that represent these areas are referred to as "Agricultural", "Boutwell Hill", "Cemetery", "Nelson Road", "Pickup Hill", and "Wooded Area". The monitoring locations are listed in Table 6, which also indicates the defining characteristics of each location. The geographical distribution of the sites is shown on the map in Figure 4. Each of the sites is discussed further below.

**TABLE 6. DEFINING CHARACTERISTICS OF SELECTED MONITORING LOCATIONS**

| Site Name | Rural Residential | Active Farm | Town Setting | Low Traffic Road | High Traffic Road | Truck Traffic | Remote Area |
|---|---|---|---|---|---|---|---|
| Agricultural | X | X | | | X | X | |
| Boutwell Hill | X | | | X | | X | X |
| Cemetery | | | X | X | | X | |
| Nelson Road | X | | | | X | | |
| Pickup Hill | X | X | | X | | | |
| Wooded Area | | | | X | | X | X |

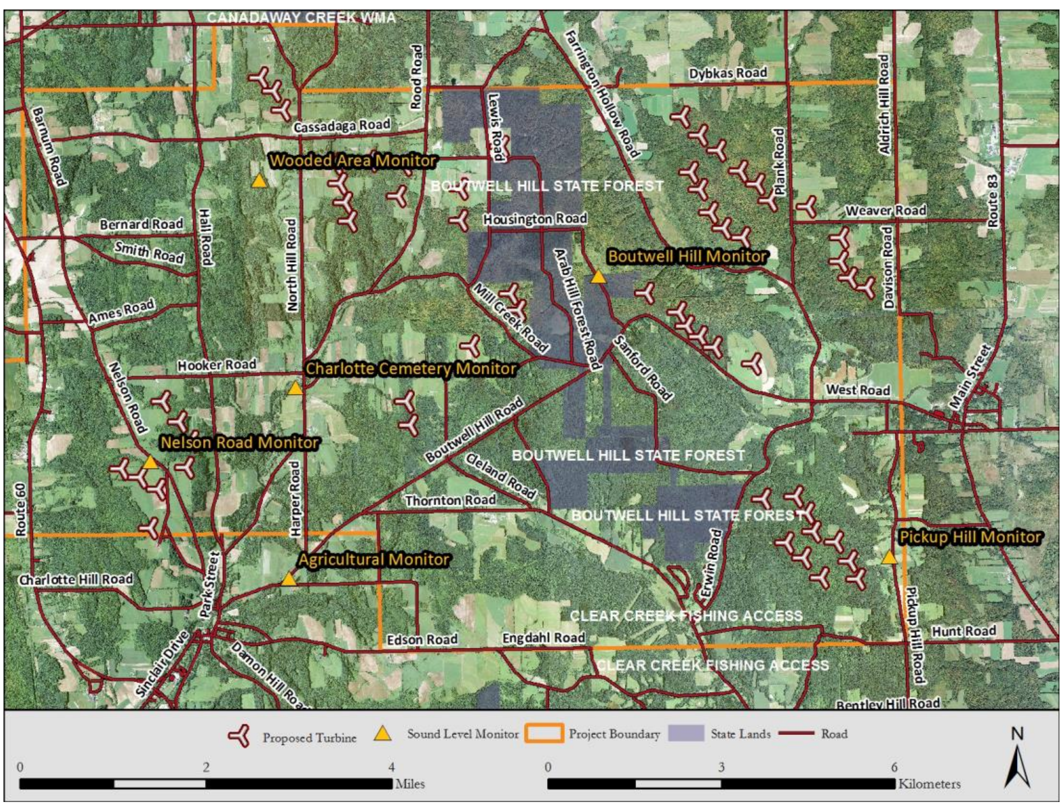


**FIGURE 4: OVERVIEW OF MONITORING LOCATIONS FOR CASSADAGA**

## MONITOR 1: AGRICULTURAL

The Agricultural monitor was installed at 2872 Thornton Road in Sinclairville, New York, near the intersection with Johnson Road. It was located on the southern property line of an active dairy operation. For the winter monitoring period, the monitor was installed near the fence dividing the dairy barn from the eastern pasture. This location was next to an occupied mobile home. To mitigate transient events experienced during winter monitoring related to the residents of the mobile home, the monitor for summer monitoring was moved to the west, on the opposite side of the mobile home. The summer monitor was installed near the fence dividing the dairy barn from the adjacent pasture to the south, approximately 27.5m (90 ft) from the road. Both locations are indicated on the map in Figure 5. Figure 6 is a photo of the monitor installed for the winter monitoring period and Figure 7 is a photo of the monitor installed for the summer monitoring period, with the microphone (in its windscreen) highlighted in red.

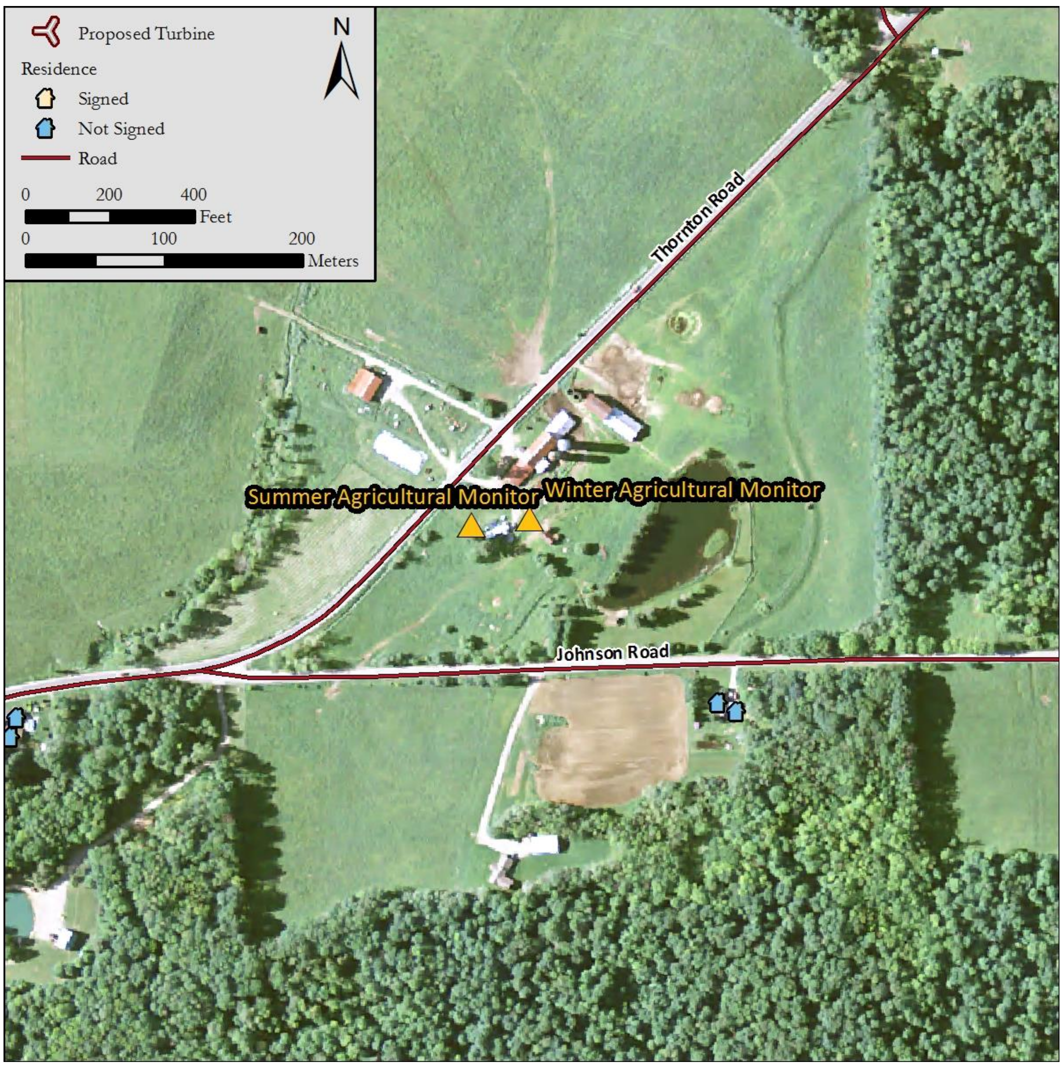


FIGURE 5: LOCATION OF "AGRICULTURAL" MONITOR

**FIGURE 6: PHOTOGRAPH OF THE "AGRICULTURAL" MONITOR SITE, WINTER, LOOKING NORTHEAST**

**FIGURE 7: PHOTOGRAPH OF THE "AGRICULTURAL" MONITOR SITE, SUMMER, LOOKING WEST**

## MONITOR 2: BOUTWELL HILL (AUDIBLE AND INFRASOUND)

Two sound monitors were installed at Boutwell Hill – one for audible sound and one for infrasound.

The "Boutwell Hill" audible sound monitor was located at 7241 Housington Road, Cherry Creek, New York, in the wooded area approximately 36 m (118 ft) from the road. The monitoring location is representative of a rural residential property in a remote area, with homesteads located to the north and Boutwell Hill State Forest to the south. The position of the monitoring location is shown on the map in Figure 8. Figure 9 is a photo of the winter installation, looking northeast toward the nearby residence. An anemometer was co-located with the microphone: both are highlighted in the figure. A photograph of the summertime installation is shown in Figure 10.

Infrasound monitoring was conducted at this site during a different time period (late winter) and at a slightly different location. The monitor was approximately 170 m (560 ft) east of Housington Road, in a clearing behind the camp located on the property (Figure 8). A picture of the installation is shown in Figure 11, looking north.


**FIGURE 8: LOCATION OF "BOUTWELL HILL" MONITOR AND “BOUTWELL HILL” INFRASOUND MONITOR**

FIGURE 9: PHOTOGRAPH OF "BOUTWELL HILL" SITE, WINTER, LOOKING NORTHEAST

FIGURE 10: PHOTOGRAPH OF "BOUTWELL HILL" SITE, SUMMER, LOOKING NORTHEAST

**FIGURE 11: PHOTOGRAPH OF "BOUTWELL HILL" INFRASOUND SITE, LOOKING NORTH**

## MONITOR 3: CHARLOTTE CEMETERY

The “Cemetery” monitor was located on the western side of Charlotte Cemetery, at 6921 CTR 77 (County Road 49) in Charlotte, New York. The monitor was located in one of the more densely populated areas of the Project, representing a town setting. The site is located on the map in Figure 12. The monitor was placed approximately 130 m (425 ft) from Charlotte Center Road. A picture of the monitor installed for winter monitoring is provided in Figure 13. This site also included an anemometer to measure wind speed, which is indicated in the photograph. A photograph of the monitor installed in the summer is shown in Figure 14, looking to the northeast.

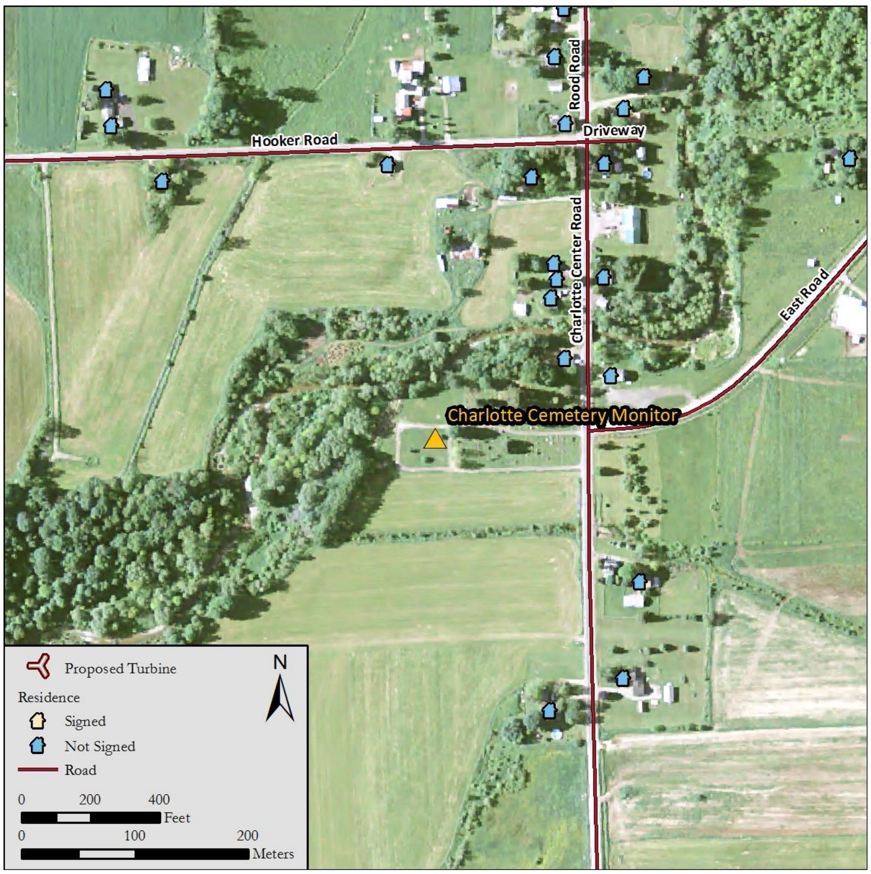


**FIGURE 12: LOCATION OF "CEMETERY" MONITOR**

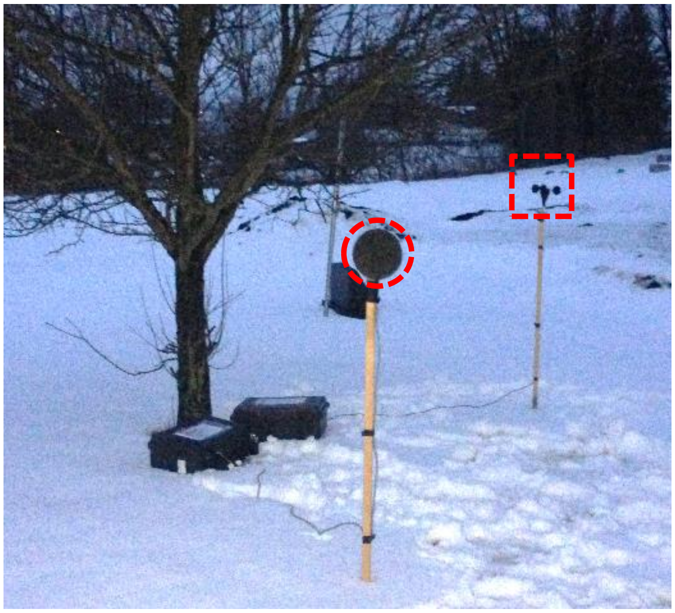

**FIGURE 13: PHOTOGRAPH OF THE "CEMETERY" SITE, LOOKING NORTHEAST**

**FIGURE 14: PHOTOGRAPH OF THE "CEMETERY" SITE, LOOKING NORTHEAST**

## MONITOR 4: NELSON ROAD

The "Nelson Road" Monitor was located at 6662 CTR 75 (Nelson Road) in Sinclairville, New York. The monitoring location is representative of a rural residential landscape surrounded by active farmland and a high-speed local road. The monitor was placed behind an uninhabited residence there, approximately 56 m (184 ft) from the road and 23 m (75 ft) from the northernmost house. The site is located on the map in Figure 15. A photo of the wintertime monitoring location is shown in Figure 16. Figure 17 is a photograph of the summer installation looking northeast toward the structures on the property.

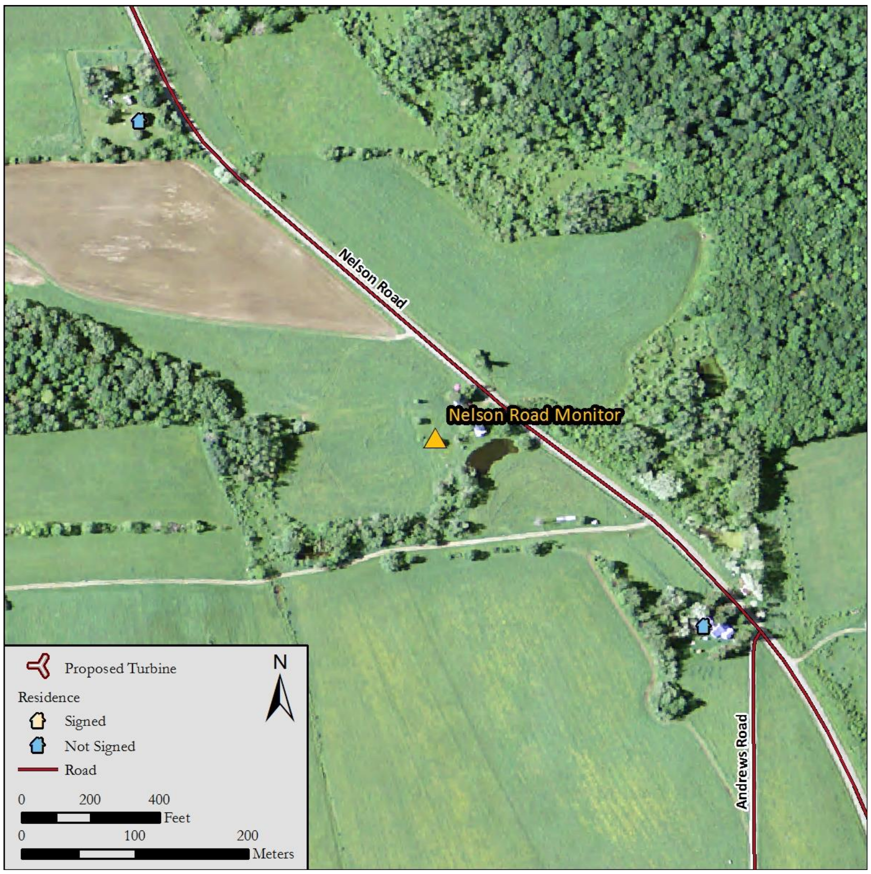


**FIGURE 15: LOCATION OF "NELSON ROAD" MONITOR**

FIGURE 16: PHOTOGRAPH OF "NELSON ROAD" SITE, WINTER, LOOKING NORTHEAST

FIGURE 17: PHOTOGRAPH OF "NELSON ROAD" SITE, SUMMER, LOOKING NORTHEAST

## MONITOR 5: PICKUP HILL

The “Pickup Hill” monitor was located at 6281 Pickup Hill Road in Cherry Creek, New York. The monitor was sited behind the house situated there, approximately 40 m (131 ft) from the road and 9 m (29.5 ft) from the house. An aerial view of the monitoring location is shown on the map in Figure 18. Although Pickup Hill includes an active dairy operation across the road, the house shielded the monitor from its higher sound levels. Thus, it is representative of a rural residential homestead adjacent to an active dairy farm.

Figure 19 shows a picture of the winter monitor installation. An anemometer, temperature gauge, and rain gauge were also included in the installation. Figure 20 shows a photograph of the summer installation looking east toward the house.

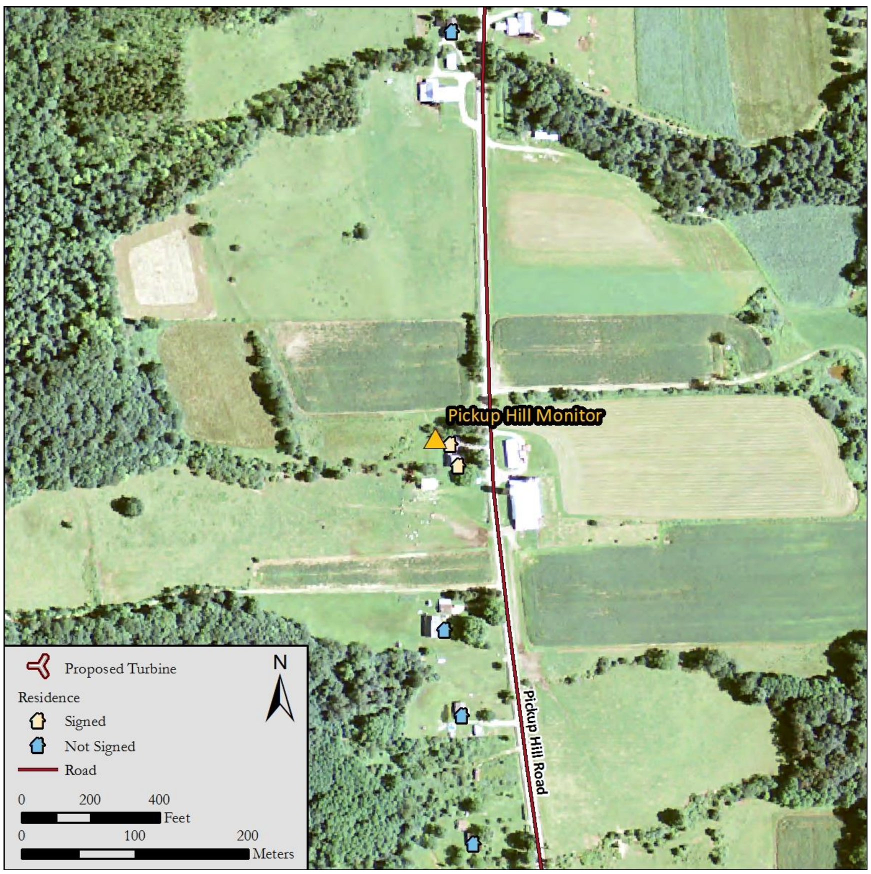


FIGURE 18: LOCATION OF "PICKUP HILL" MONITOR

**FIGURE 19: PHOTOGRAPH OF "PICKUP HILL" LOCATION, WINTER, LOOKING SOUTHEAST.**

**FIGURE 20: PHOTOGRAPH OF "PICKUP HILL" LOCATION, SUMMER, LOOKING NORTHWEST.**

## MONITOR 6: WOODED AREA

The "Wooded Area" monitor was located approximately 775 m (2,543 ft) south of Cassadaga Road and approximately 708 m (2,323 ft) west of North Hill Road in Cassadaga, New York. The installation was well into the woods, approximately 100 m (328 ft) from each of two open fields bordering the woods. The surrounding fields were not being cultivated; the monitoring location is representative of a remote location adjacent to low traffic roads with logging traffic. An aerial view of the monitoring location is provided in Figure 21. Figure 22 shows a photograph of the installation looking toward the southwest. Figure 23 shows a photograph of the summer installation looking toward the southwest.

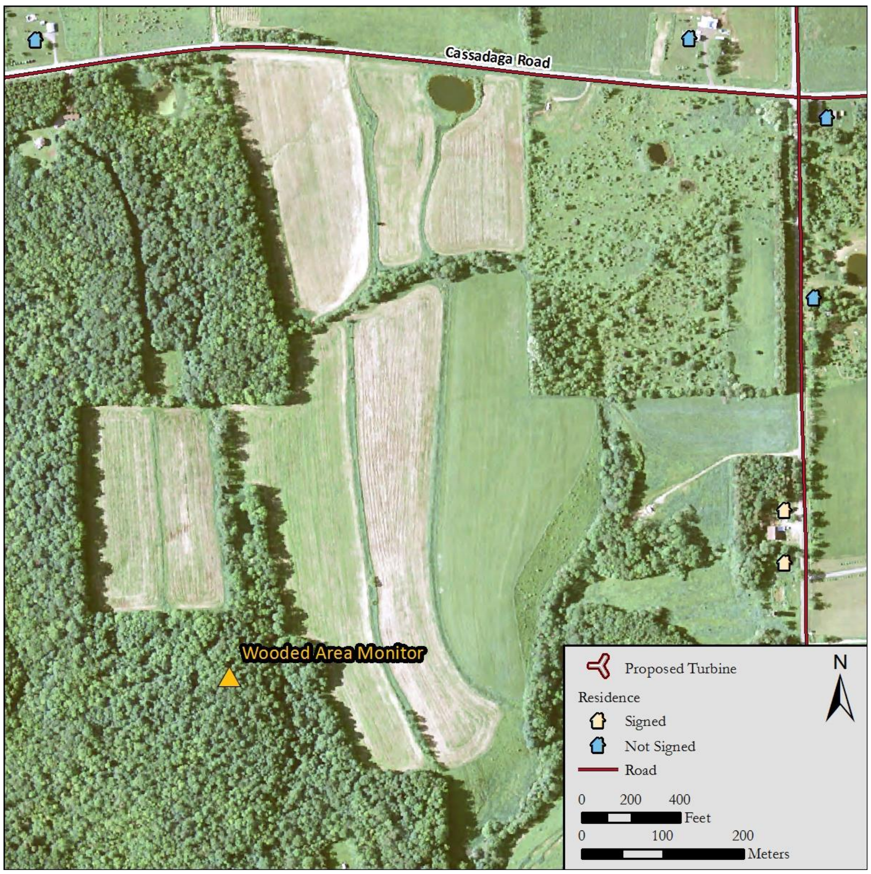


FIGURE 21: LOCATION OF "WOODED AREA" MONITOR

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**FIGURE 22: PHOTOGRAPH OF "WOODED AREA" MONITOR, WINTER, LOOKING SOUTHWEST**

**FIGURE 23: PHOTOGRAPH OF "WOODED AREA" MONITOR, SUMMER, LOOKING SOUTHWEST**

# 6.0 BACKGROUND SOUND LEVEL MONITORING

As described in Section 2, background sound level monitoring was carried out at six locations during the winter of 2014 and the summer of 2015.

Winter monitoring took place from December 15/16, 2014, through December 30, 2014.

Summer monitoring took place from June 25, 2015, through July 14, 2015.

Infrasound monitoring at the Boutwell Hill location took place from March 20, 2016 through March 28, 2016.

In total, the monitors were deployed for over one month.

## 6.1 | SOUND LEVEL METERS

Sound level data were collected using Cesva SC310 and Svantek 979 ANSI/IEC Type I sound level meters.[45] Frequency range and settings for each sound level meter that was used during monitoring is shown in Table 7. Each sound level meter's microphone was mounted on a wooden stake at a height of approximately 1.2 m (4 ft) and protected by an ACO-Pacific hydrophobic windscreen 17 cm (7 in) in diameter. Before and after measurement periods, sound level meters were calibrated with Cesva CB-5, Brüel and Kjær Type 4231, or Larson Davis CAL200 calibrators.

**TABLE 7: SOUND LEVEL METER FREQUENCY RESPONSE AND SETTINGS**

| Winter | | | | |
|---|---|---|---|---|
| Monitor Location | Sound Level Meter Model | Serial Number | Frequency Range | Settings |
| Agricultural | Cesva SC-310 | T220294 | 20 Hz to 10 kHz | 1/3 Octaves |
| Boutwell Hill | Cesva SC-310 | T231914 | 20 Hz to 10 kHz | 1/3 Octaves |
| Charlotte Cemetery | Cesva SC-310 | T221731 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Nelson Road | Cesva SC-310 | T235260 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Pickup Hill | Cesva SC-310 | T224253 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Wooded Area | Svantek SV979 | 34091 | 20 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq |
| Summer | | | | |
| Agricultural | Cesva SC-310 | T235260 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Boutwell Hill | Cesva SC-310 | T231914 | 20 Hz to 10 kHz | 1/3 Octaves |
| Charlotte Cemetery | Cesva SC-310 | T220294 | 20 Hz to 10 kHz | 1/3 Octaves |
| Nelson Road | Cesva SC-310 | T224789 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Pickup Hill | Cesva SC-310 | T221731 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |
| Wooded Area | Cesva SC-310 | T224253 | 10 Hz to 20 kHz | 1/3 Octaves, LZeq, LAeq, LCeq, LAI, LAfmax, LAsmax, LAImax |

The meters continuously logged overall and 1/3-octave band sound levels once each second. Audio signals from each microphone were recorded continuously throughout the monitoring period to aid in source identification. The Cesva SC310 sound level meters were connected to Roland R-05 digital sound recorders. The Svantek 979 meter recorded digital audio internally.

Sound level data from each monitor were averaged into sequential 10-minute periods and summarized over the entire monitoring period. Data were excluded from averaging under the following conditions:

[45] These are Type 1 Sound Level Meters in conformance with standards ANSI S1.4-1983 and IEC 61672-1 (2002-05).

- Rain and thunderstorm events;
- Wind gust speeds above 5 m/s (11.2 mph); [46]
- Temperatures below -10° C (14° F);[47]
- Intermittent noise not characteristic of the area; and
- During site setup, servicing, and microphone calibration.

Particularly during summer monitoring, biogenic sounds including insects, frogs, and birds, were present. These are considered "seasonal" sounds. Under Article X, these are required to be filtered out of the reported sound levels. To exclude these sounds, the "Ai" frequency-weighting network was applied to all logged data for which bird and insect sound was found. If tones[48] above 1.25 kHz were detected, then the A-weighted sound level was recalculated by summing 1/3 octave bands from 20 Hz to 1.25 kHz. This effectively removes the high-frequency portion of the sound.

This filtering method was also applied to the winter monitoring period. However, during wintertime monitoring, birdcalls were rare or none-existent and thus had no impact on the averaging. One exception occurred when a flock of geese surrounded a monitor for several minutes, honking loudly, which was excluded from the data.

Periods that were not excluded from averaging are referred to in this report as "valid periods."

## 6.2 | METEOROLOGICAL INSTRUMENTS

Meteorological stations were co-located with selected monitors in the field.

Wind speeds were logged at three of the six monitoring locations (Cemetery, Pickup Hill, and Boutwell Hill), while air temperature and precipitation were logged at one of the locations (Pickup Hill). Wind speeds were collected every three seconds and the maximum for each one-minute period was logged. All other meteorological data was logged every one minute.

The four monitoring locations in the western portion of the study area (Wooded Area, Cemetery, Nelson Road, and Agricultural) use the wind data measured at Charlotte Cemetery to determine what periods of time were invalid due to high winds. The two sites in the eastern

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[46] Wind "gusts" are the highest 1 second wind speed in any 1-minute averaging period. Elimination of data due to wind is to prevent inclusion of wind-caused pseudo-noise, caused by pressure fluctuations caused by air flow over the microphone. Elimination of wind periods led to removal of 12 days of data. Some of this data would have included periods with higher sound levels due to wind-caused sounds such as wind passing through the trees. As a consequence, monitored sound level results presented here may be lower than if data during high wind speeds were included, even if pseudo-sound were avoided.

[47] No such exclusions occurred during the monitoring periods.

[48] Sounds considered tonal that get the Ai weight applied are those for which a prominent discrete high frequency (>1.25 kHz) tone is found using either of the two methods:

1. If a 1/3 octave band exceeds the neighboring 1/3 octave band on either side by more than 5 dB (as in ANSI S12.9 Part 3 Annex B), or
2. If a 1/3 octave band exceeds the average of the two neighboring lower and two neighboring upper 1/3 octave bands on each side by more than 5 dB.

The latter method is used to capture complex bird harmonic sounds that would not be considered tonal under the first method.

portion of the study area (Pickup Hill and Boutwell Hill) were both equipped with anemometers for summer monitoring. Wind data from Pickup Hill were used to determine non-valid periods due to high winds for both monitoring locations for winter.

The rain and temperature gauges at Pickup Hill were used to eliminate rain events and temperatures outside of equipment thresholds in the determination of valid monitoring periods.

The anemometer at Charlotte Cemetery did not function properly during a storm from December 17 to 18, 2014. Likewise, it froze after December 28. Therefore, no wind data are shown for those periods.

## 6.3 | INFRASOUND MONITORING

### INFRASOUND EQUIPMENT

Infrasound measurements were performed using a Svantek SV979 ANSI/IEC Type 1 sound level meter, equipped with a Svantek SV17 preamplifier and a Brüel and Kjær 4964 infrasound microphone. The microphone was mounted on a metal tripod at a height of 1.5 meters (5 feet) and covered with a custom-made infrasound windscreen, designed and constructed by Sanchez Industrial Design (SID). The windscreen is a diameter of 71 cm (28 in). The measurement system was calibrated before and after the measurement period with a Brüel and Kjær 4231 calibrator.

The sound level meter was set to log sound levels once each 10 seconds. Parameters recorded included, $LG_{EQ}$, $LC_{EQ}$, $LA_{EQ}$, and $LG_{peak}$ overall sound levels, as well as 1/3 octave band sound levels over the range from 0.8 Hz to 20 kHz. Audio was also recorded by the sound level meter to aid in sound source identification.

### INFRASOUND MONITOR NOISE FLOOR

To test the noise floor of the Svantek sound level meter, a "dummy" microphone was installed in place of the installed mic. The dummy mic has the same impedance as a real mic, but with no microphone diaphragm to react to sound. Results from this test are shown in Figure 24. As shown, the measurement system has a very low internal noise level, below 10 dB in all 1/3 octave bands and below 0 dB between 12.5 Hz and 5 kHz. The noise floor is lower than the ISO 399-7 human audibility thresholds, except between 3.15 kHz and 5 kHz.

A second noise floor test was conducted, where the sound level meter (with microphone) was installed in a basement sound isolation room[49] over a 20-hour period. The minimum 10-second 1/3-octave band sound levels during this period are also shown in Figure 24. From 0.8 to 160 Hz, the minimum sound levels are more than 5 dB higher than the dummy mic noise floor, indicating the presence of inaudible low-frequency sound and infrasound, even in that quiet environment.

[49] Duncan, E. et al "Design of a small reverberation room for use in ANR and other testing," Proceedings of Inter-Noise 2006, 2006

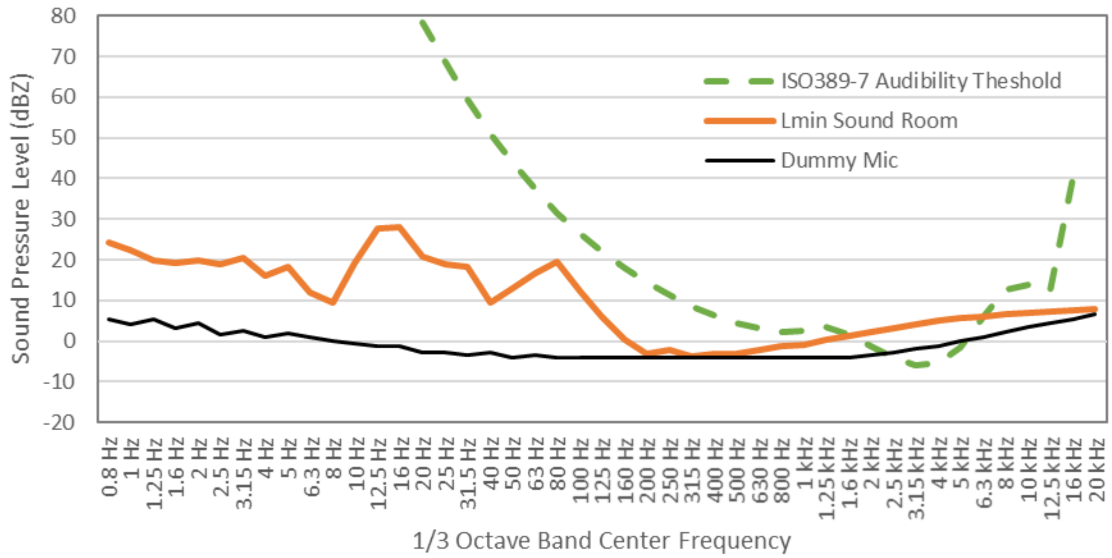


**FIGURE 24: NOISE FLOOR TEST RESULTS FOR SVANTEK SV979 SOUND LEVEL METER**

## MET STATION

A meteorological station was co-located with the sound level meter. The station was a HOBOware unit, with wind speed, wind direction, temperature, and rainfall sensors. This data was used to determine periods that fell outside of the equipment operational ranges. The weather station was set to log data at one minute intervals. Humidity data was obtained from the Chautauqua County-Jamestown Airport

## DATA PROCESSING

During analysis of the data collected at Boutwell Hill, the 10-second raw data was summarized into 10-minute periods Data were excluded from the averaging under the following conditions:

- Rain and thunderstorm events;
- Wind gust speeds above 5 m/s (11.2 mph);
- Temperatures below -10° C (14° F);[50]
- Relative humidity above 90 percent;[50]
- Intermittent noise not characteristic of the area; and
- During site setup, servicing, and microphone calibration.

Some seasonal biogenic sounds were present, such as birds and frogs. These were removed from the data set using the "Smart Ai" filter described above, which only eliminated high frequency sound when high frequency tones are present. In any event, the filtered bird, frog, and insect sound do not extend into or affect the results from the infrasonic region.

[50] No such exclusions occurred during the monitoring periods.

# 7.0 FORMAT OF MONITORING RESULTS

Over 4,000 hours of sound level data were collected for this project. The data were analyzed and are reproduced in this report in both temporal and spectral formats. This section describes how the background sound level results are presented for each monitor over both seasons of monitoring. Following this section, the actual results are presented.

## 7.1 | TIME HISTORY GRAPHICS

For each monitoring location, results are presented as graphs of sound level and maximum wind gust speed as a function of time throughout the monitoring period in Section 5. Each point on the graph represents data summarized for a single 10-minute interval. Equivalent continuous sound levels ($L_{EQ}$) are the energy-average level over 10 minutes.[51] 10$^{th}$-percentile sound levels ($L_{90}$) are the statistical value above which 90% of the sound levels occurred during 10 minutes. The data from periods which were excluded from processing are included in the graphs but shown in lighter colors. The bands at the bottom of the graph indicates that data were excluded in the particular 10-minute period; the color designates the reason that data were excluded.

Wind speed data came from the three anemometers and were paired with monitoring locations as discussed in Section 3.2. Wind data are presented as the maximum gust speed occurring at any time during the 10-minute interval; they are not averaged.

## 7.2 | ONE-THIRD OCTAVE BAND SUMMARIES

Plots of the overall unweighted spectral levels for all valid periods are provided for each monitoring site. Each point on the plot represents the average statistical level of the respective one-third octave band for the specified period. Four sets of $L_{50}$s are presented in each plot: day and night for winter and summer monitoring periods.

## 7.3 | TONALITY PLOTS

Tonal prominence of one-third octave bands were quantified for all valid periods for each monitor in each season. Tonality is defined by S12.9-2013 Part 3 – Annex B, which sets a frequency dependent quantity, $K_T$, to indicate if a one-third octave band is tonal or not. A particular one-third octave band is considered tonal if it exceeds the level of the adjacent one-third octave by the prescribed limit. The tonality limits, $K_T$, are listed in Table 8. Every second of monitor data was analyzed for tonality, which is expressed as seconds of tonality per 10-minute period (up to 600 seconds).

[51] All averages of sound pressure levels presented in this report are equivalent continuous averages, as opposed to arithmetic averages. See Appendix A for definitions.

**TABLE 8. LIMITS FOR ONE-THIRD OCTAVE BAND TONALITY DESIGNATION**

| One-Third Octave Bands | $K_T$ |
|---|---|
| 25 to 125 Hz | 15 dB |
| 160 to 400 Hz | 8 dB |
| 500 Hz to 10 kHz | 5 dB |

# 8.0 MONITORING RESULTS AT EACH SITE

The results for both seasons of monitoring are presented for each individual monitoring location in this section. Observations and discussion are provided regarding the time history plots, tonality charts, and traces of one-third octave band averages. Overall sound levels will be presented for all monitoring locations in Section 6.

## 8.1 | MONITOR 1: AGRICULTURAL

### WINTER MONITORING

The long-term sound level results for the winter monitoring period at the Agricultural location are plotted as time history graphs in Figure 25, Figure 26, and Figure 27, along with the maximum wind speed (measured at Charlotte Cemetery). This monitor was set up on the morning of December 16.

The soundscape captured by the Agricultural monitor in the winter was dominated by farm activities, traffic on adjacent roads, and weather patterns. Residual sound levels, revealed by the $L_{90}$ time histories, were lower during the daytime as compared with the nighttime, which is not typical. Generally, ambient sound levels are lower at night. In this case, higher nighttime levels were due to the operation of a blower providing heat to the dairy barn during the night.

The data show the twice-daily milking operations, during which large pumps were operating. During milking, sound levels at the monitor would increase to between 48 and 53 dB, which is seen to begin between 06:00 and 7:00 in the morning and 18:00 and 19:00 in the evening every day. Each session lasted between two and three hours. Individual spikes in sound levels remaining after processing were due to other equipment operations, vehicle and truck passbys on the adjacent roads, and aircraft flyovers.

Data from the tonal analysis, plotted in Figure 28, reveals a prominent source in the 63 Hz one-third octave band, which is the milk pump used twice per day for milking operations. Other milking equipment or harmonics of the milk pump likely contributed to the presence of intermittent tones in the 125, 250, 630, 800, and 2,000 Hz one-third octave bands.

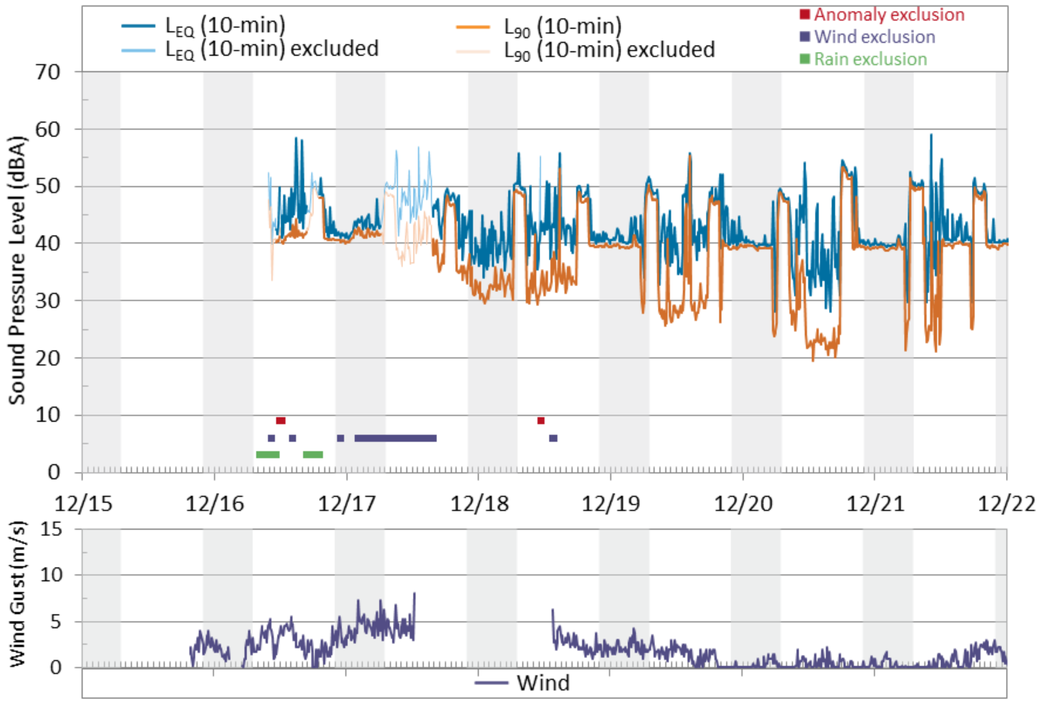


**FIGURE 25: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 16 TO 21 DECEMBER 2014**

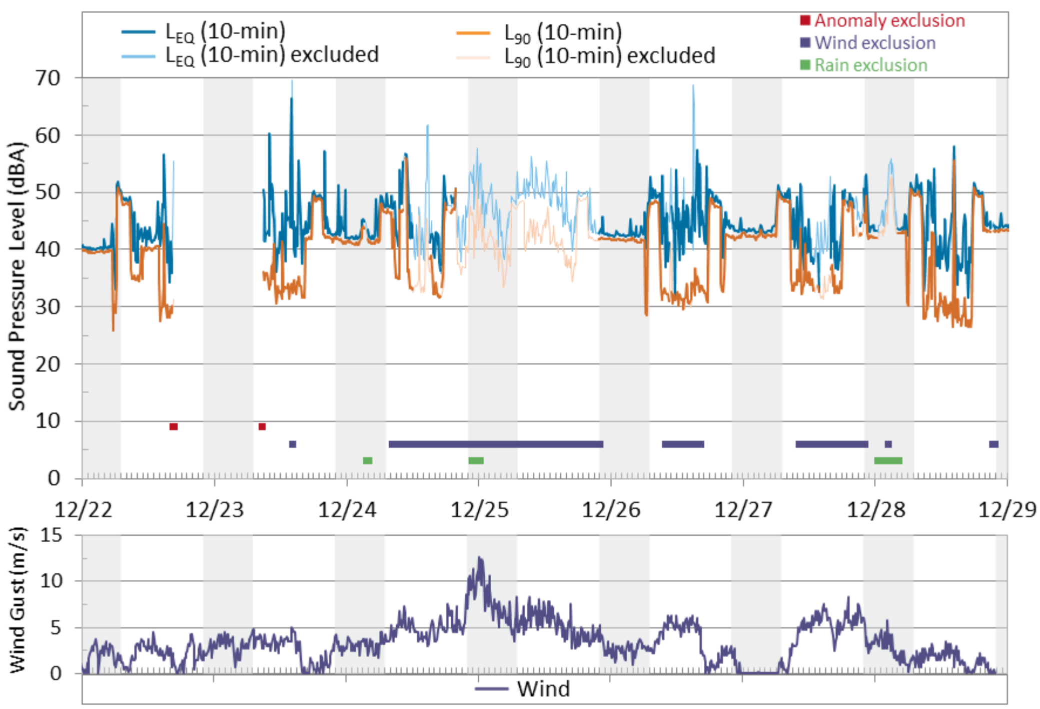


**FIGURE 26: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 22 TO 28 DECEMBER 2014**

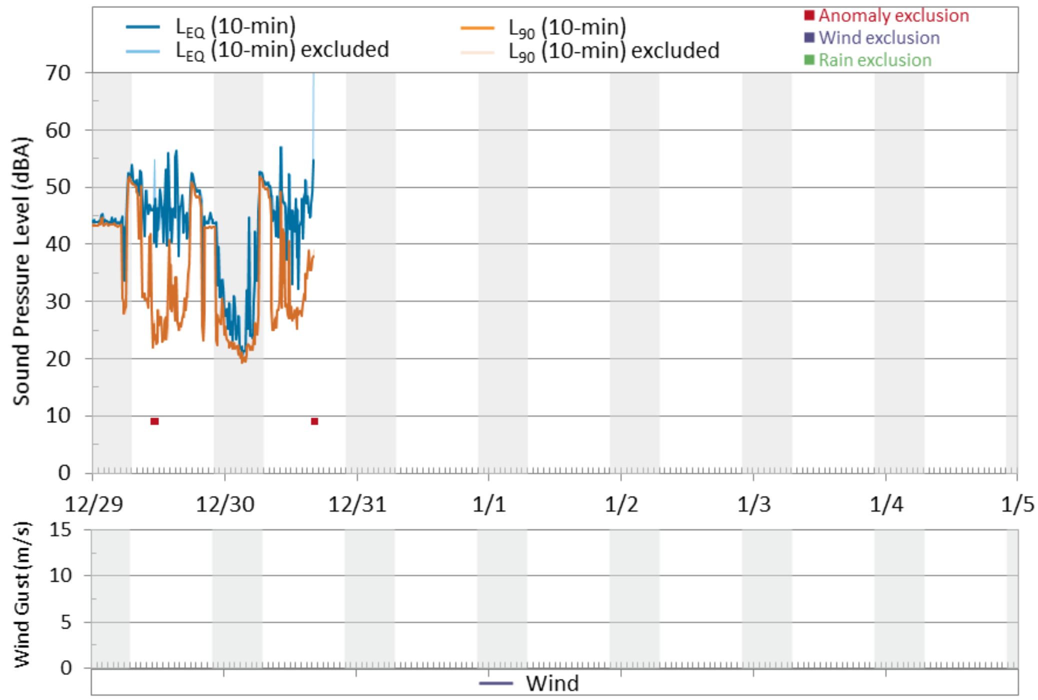


**FIGURE 27: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 29 TO 30 DECEMBER 2014**

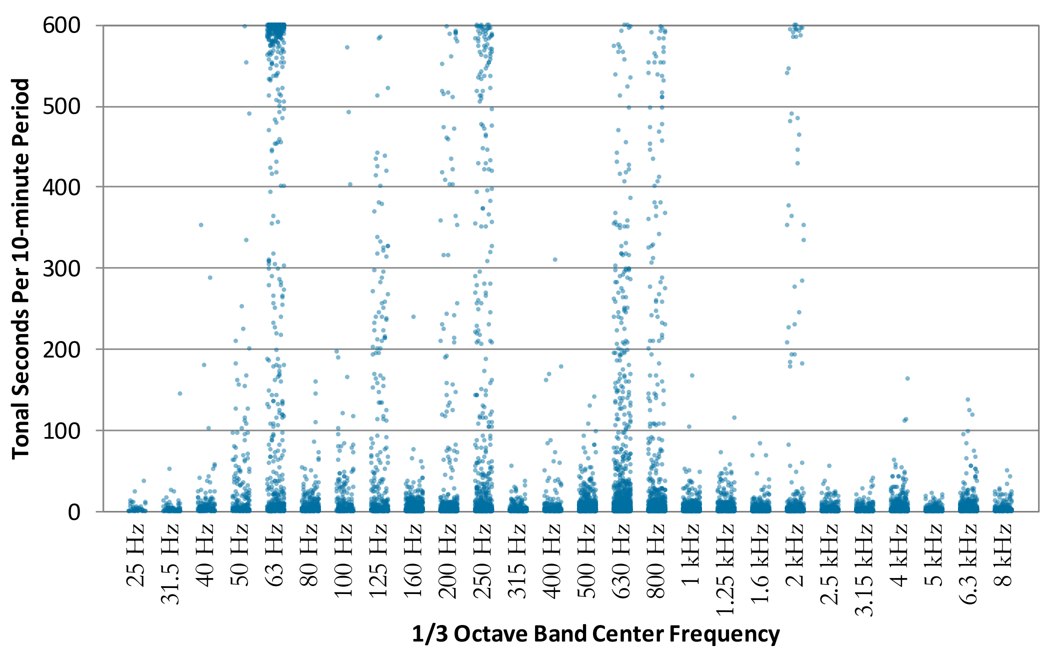


**FIGURE 28: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. AGRICULTURAL MONITOR, WINTER.**

## SUMMER MONITORING

Sound level data for the summer monitoring period at the Agricultural location ($L_{EQ}$ and $L_{90}$) are plotted in time history graphs, spanning one week each, in Figure 29, Figure 30, and Figure 31. The sound level data is accompanied by maximum wind speed measured at Charlotte Cemetery. The sound level data in the plots has been Ai-weighted to exclude seasonal biogenic noise.

The dairy operation was the dominant source of sound at this site but traffic passbys also contributed to the measured levels. The $L_{EQ}$ reveals a clear diurnal pattern, as there were fewer traffic passbys on Thornton Road during the nighttime hours. Tractor operations were also typical during the day between milking operations. The milking operation is most evident in the $L_{90}$ sound level trace, as the milk pump was a steady source.

During the summer, a typical day of work at the Agricultural facility began in the nighttime hours, with 30 minutes of tractor work between the hours of 4:00 and 5:00 AM and the milk pump turning on before 7:00 AM. Afternoon milking sessions were always completed prior to nighttime hours. Lower nighttime levels were observed during the summer than in the winter because the dairy operation was not operating the heater, allowing nighttime levels during the calmest periods to approach 20 dBAi.

Events that were excluded from the averaging of sound level data included two instances of a fire siren passing the farm, birds interacting with the monitors, fireworks on the nights of July 3,4, and 11, and “four-wheelers” doing laps around the microphone.

The tonality chart in Figure 32 reveals fewer one-third octave bands containing tones than the winter monitoring. The major tones are located in the 63, 125, and 630 Hz octave bands. Tonal activity at 2,500 Hz and above was generated by biogenic sources and was not included in the processing of summer monitoring data by way of Ai-weighting.

Figure 33 depicts the average unweighted sound pressure level of all one-third octave bands measured at each monitoring location for each season. All traces exhibit a peak in the 63 Hz one-third octave band, as the milking pump was operated during both seasons in daytime and nighttime hours. Other human activities, such as cars and truck passbys, attributed to elevated levels below 200 Hz. The nighttime levels for both seasons mirror the curve of the daytime levels, with about a five decibel spread in the winter and eight decibels in the summer. Summer data show elevated levels at 2,000 Hz, attributed to biogenic noise sources. Over both seasons, the sound levels decline at almost five decibels per octave.

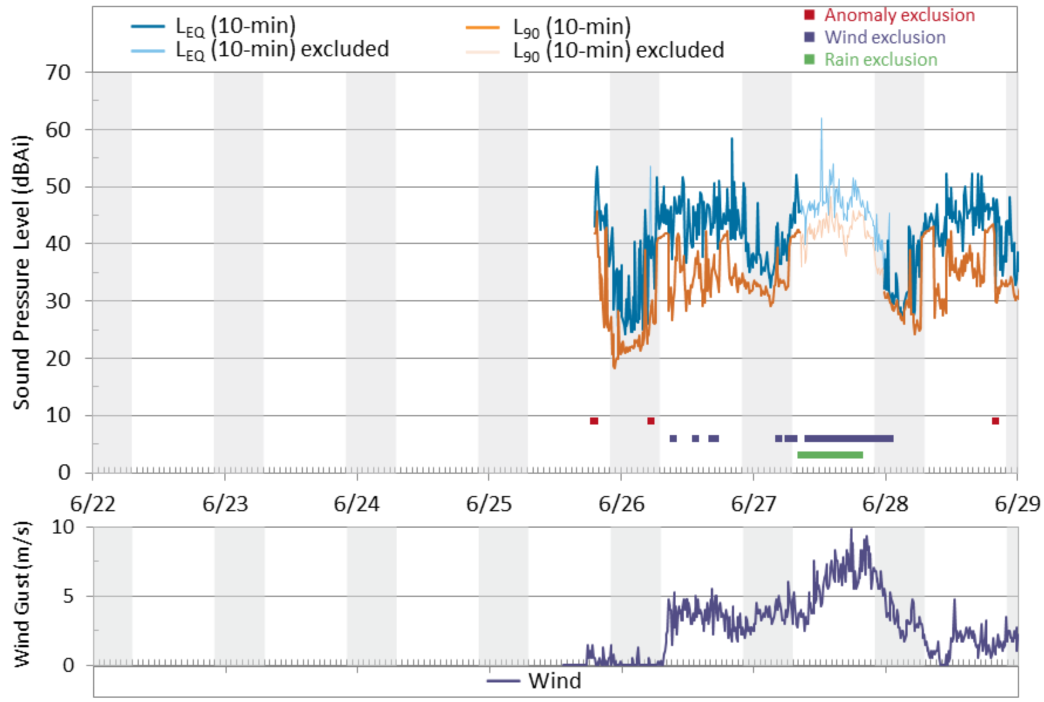


**FIGURE 29: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 22 TO 29, 2015**

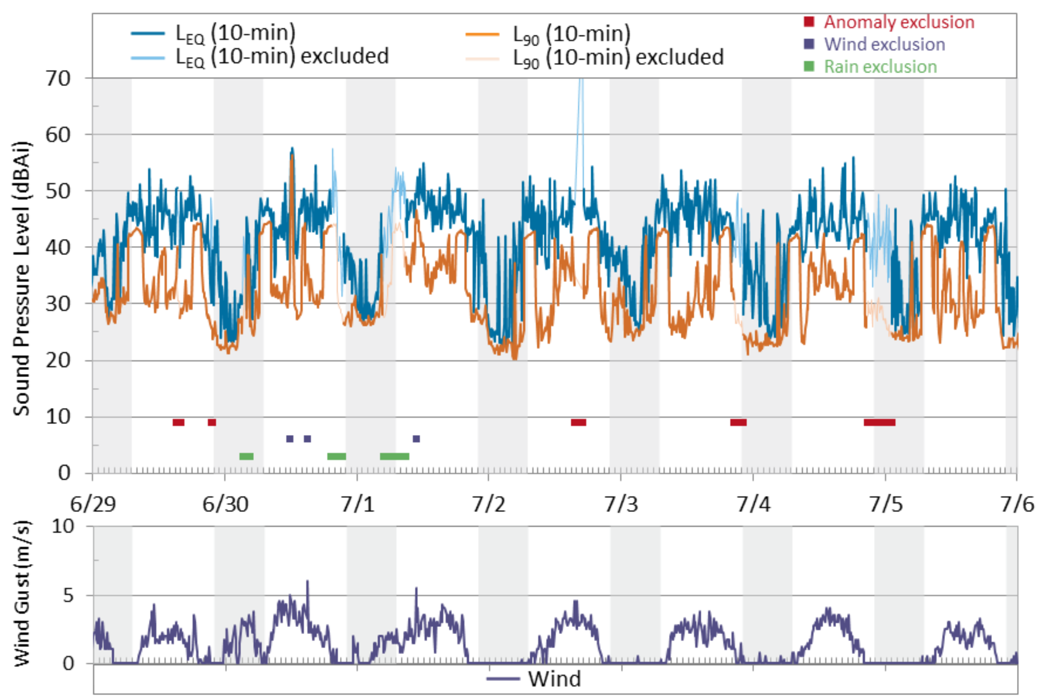


**FIGURE 30: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 29 TO JULY 6, 2015**

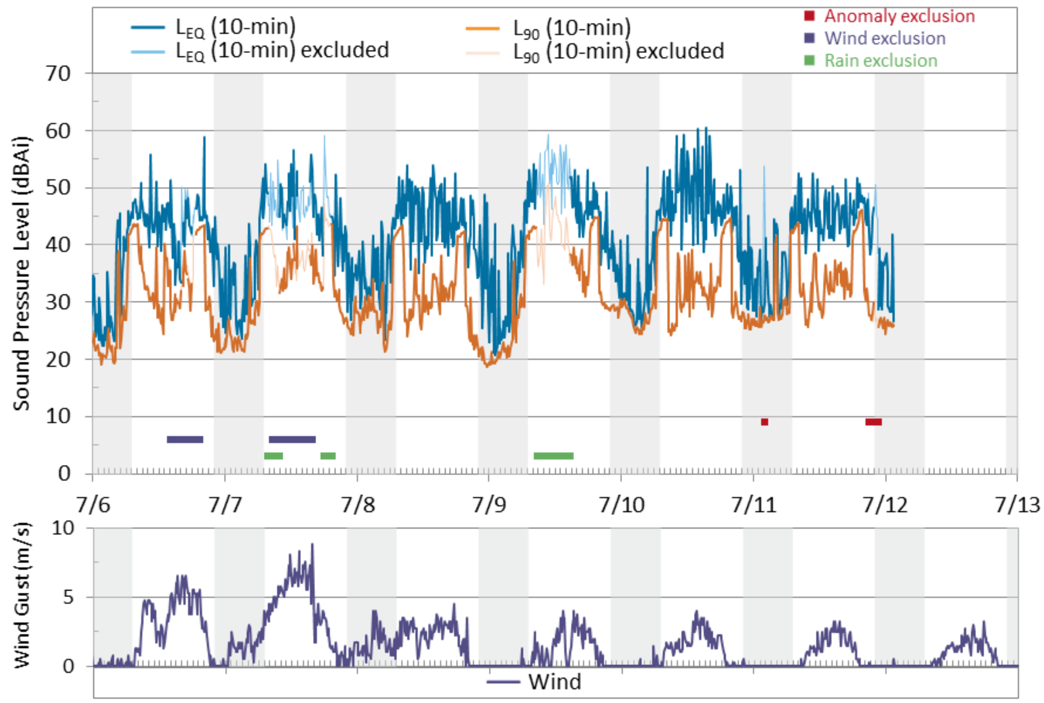


**FIGURE 31: AGRICULTURAL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JULY 6 TO JULY 13, 2015**

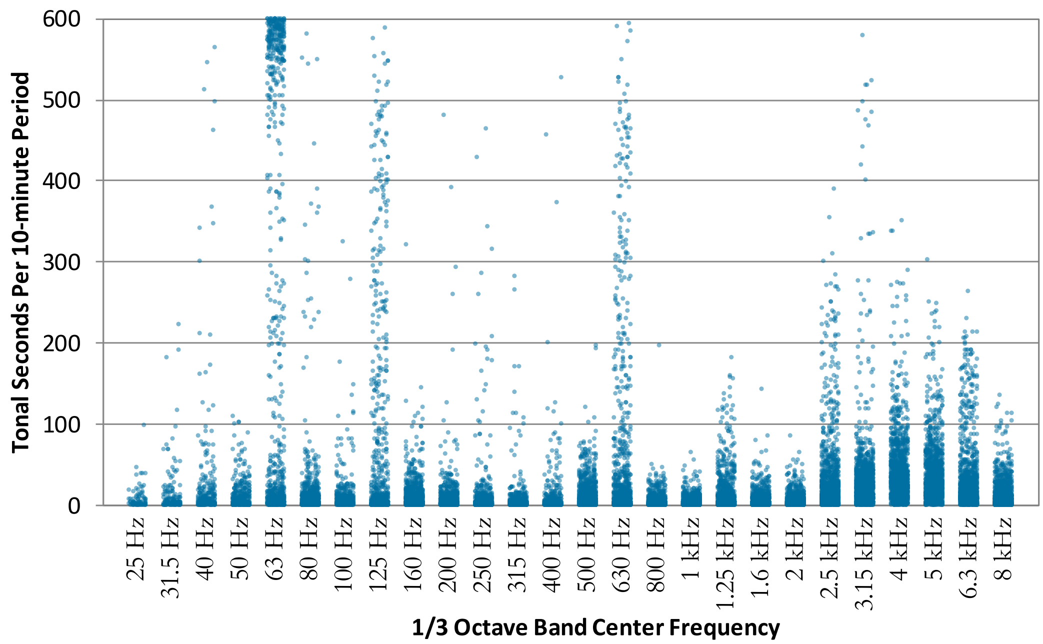


**FIGURE 32: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. AGRICULTURAL MONITOR, SUMMER.**

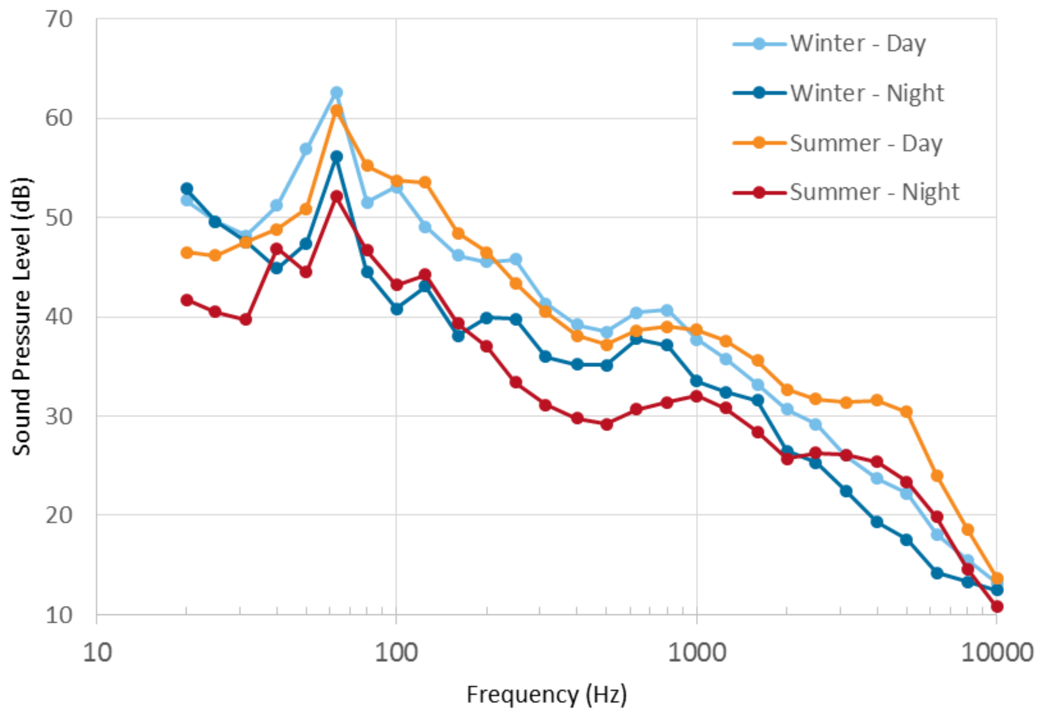


**FIGURE 33. AGRICULTURAL MONITOR ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

## 8.2 | MONITOR 2: BOUTWELL HILL

### WINTER MONITORING

The long-term sound level data for winter monitoring at Boutwell Hill are plotted as weekly time history graphs in Figure 34, Figure 35, and Figure 36. This monitor was set up on the morning of December 16.

Unfortunately, the anemometer at this location malfunctioned during the monitoring period. It was not used in processing this data and is not shown in the figure. Rather, data from Pickup Hill is plotted with the sound pressure levels and was used for wind gust exclusions in processing.

Background levels throughout the period are controlled primarily by wind blowing through the surrounding trees. Many of the spikes visible throughout the $L_{EQ}$, but especially from December 19 through 21, are due to jet aircraft flyovers at cruise altitude. A few of the higher sound level spikes are attributed to vehicle passbys on Housington Road. In particular, logging trucks running up the hill (northbound) tend to be louder events. Except for these transient events and wind noise in the trees, Boutwell Hill is a quieter site typical of remote forested areas.

Figure 37 reveals very little tonal sound at this site.

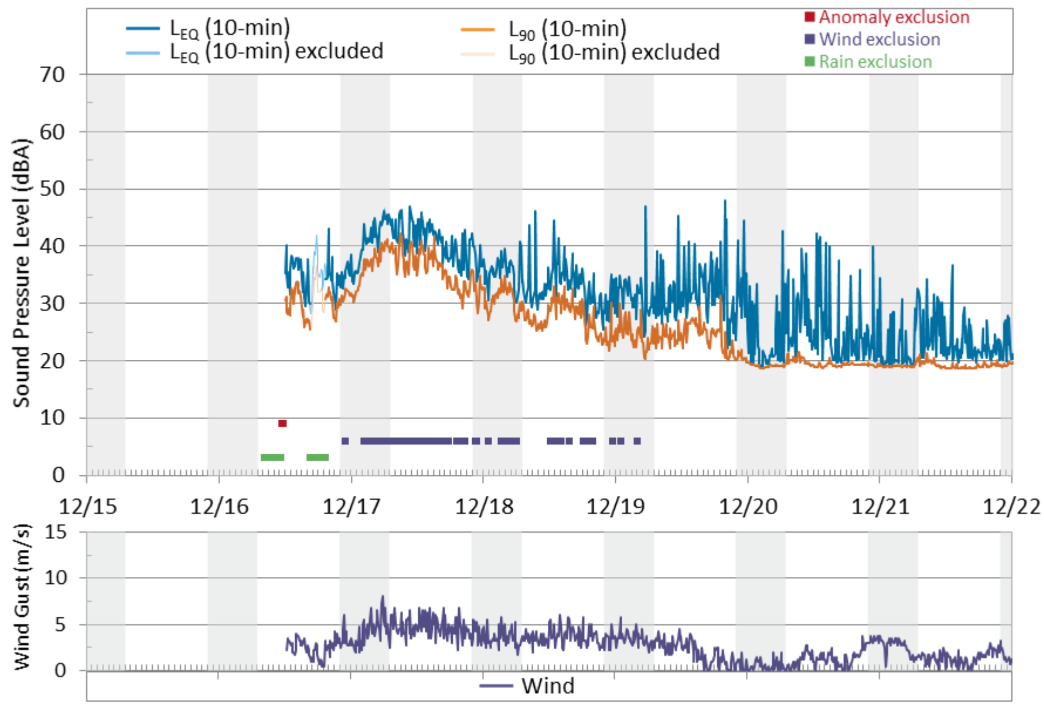


FIGURE 34: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 16 TO 21 DECEMBER 2014

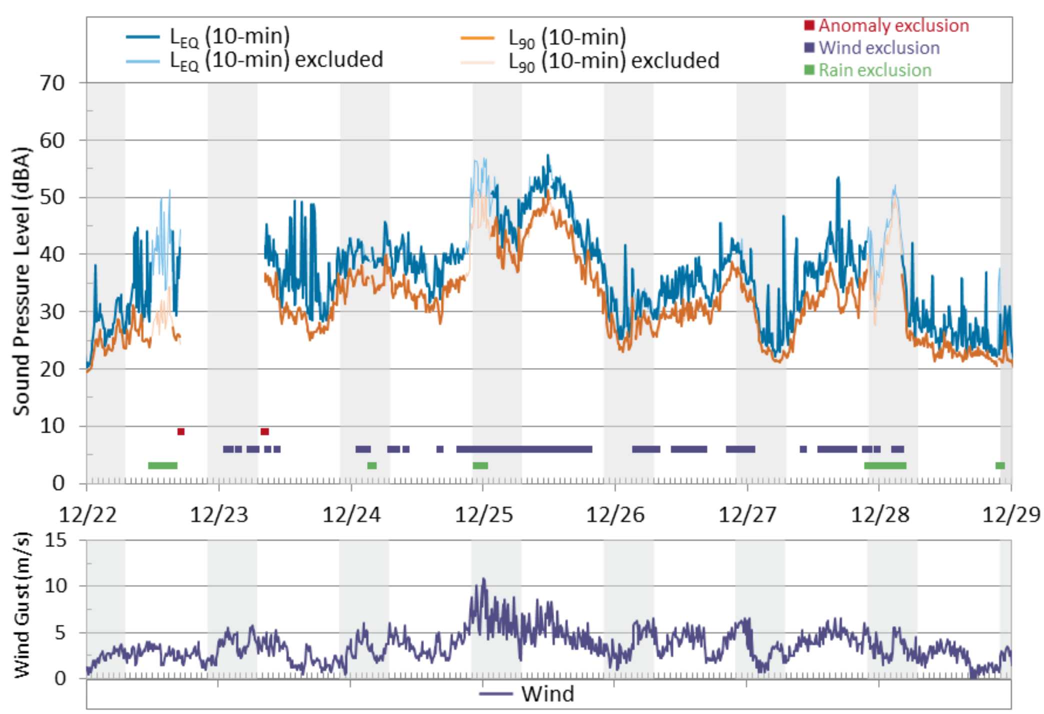


FIGURE 35: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 22 TO 28 DECEMBER 2014

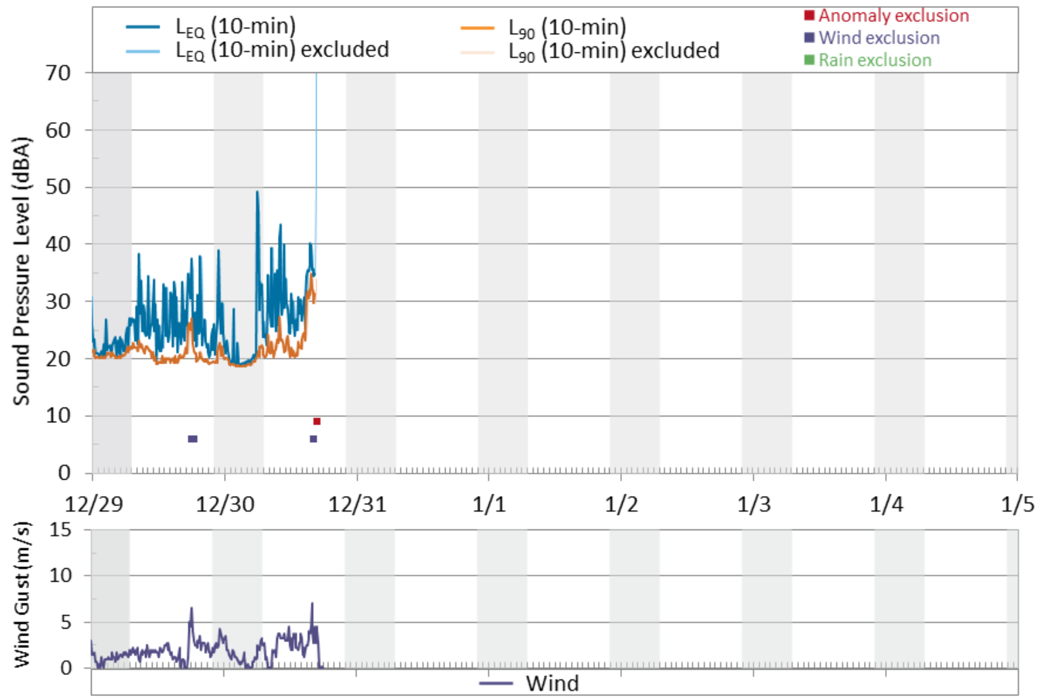


**FIGURE 36: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 29 TO 30 DECEMBER 2014**

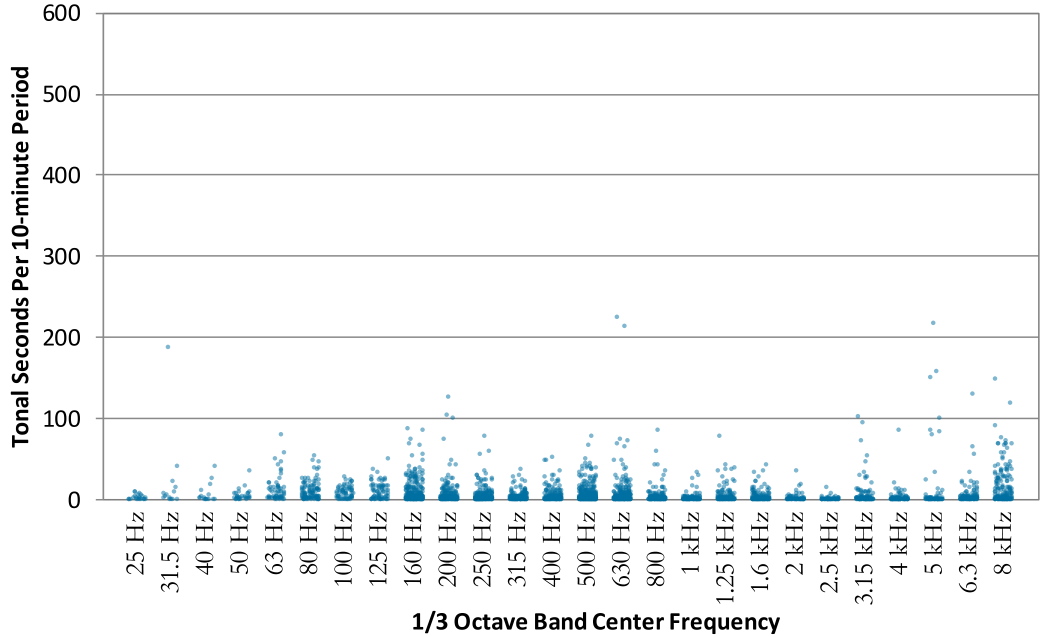


**FIGURE 37: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. BOUTWELL HILL, WINTER.**

## SUMMER MONITORING

The sound level data ($L_{EQ}$ and $L_{90}$) for summer monitoring at Boutwell Hill are plotted as time history graphs in Figure 38, Figure 39, Figure 40, and Figure 41.

Background levels throughout the period were dominated primarily by wind blowing through the surrounding trees, vehicle passbys on Housington Road, lawn equipment, and aircraft overflights. Additionally, gunshots were observed on two occasions. Lawn equipment operated on the properties to the north of the monitoring location on fourteen days during the monitoring period. Besides the transient events, Boutwell Hill is a quieter site typical of forested areas.

The monitoring location was sheltered within a Hemlock-dominated forest; noise from wind blowing through the trees, as opposed to directly over the microphone, was a common source of sound at this site. The wind at the monitor never exceeded 5 m/s (11 mph) and no data were invalidated due to high wind speeds. However, the rumble generated by several passing thunderstorms were excluded from the averaging of data. Also, fireworks and interactions with the monitor were excluded from averaging sound levels.

Most of the tonal events at this site, summarized in Figure 42, were generated by insects, frogs, or birds, and were not included in the statistical analysis of sound levels, as they were excluded by Ai-weighting.

The energy-averaged one-third octave band data collected during both seasons at Boutwell Hill is shown in Figure 43. The sound pressure levels in the figure are unweighted. The plot reveals that winter levels were higher than summer levels, except at high frequencies and centered around 80 Hz. Overall, levels were seen to roll-off at about three decibels per octave. Daytime truck traffic in the winter on Housington Road produced a peak in the 63 Hz one-third octave band. The elevated one-third octave bands between 63 Hz and 250 Hz observed in the summer were a result of the increased outdoor human activity, particularly the operation of lawn equipment. Nighttime levels in the winter were only about one decibel below daytime levels. Below 2,000 Hz in the summer, most nighttime one-third octave band levels were about five decibels below daytime levels. Above 2,000 Hz, biogenic noise was persistent both day and night in the summer, as seen by the increase in levels over winter.

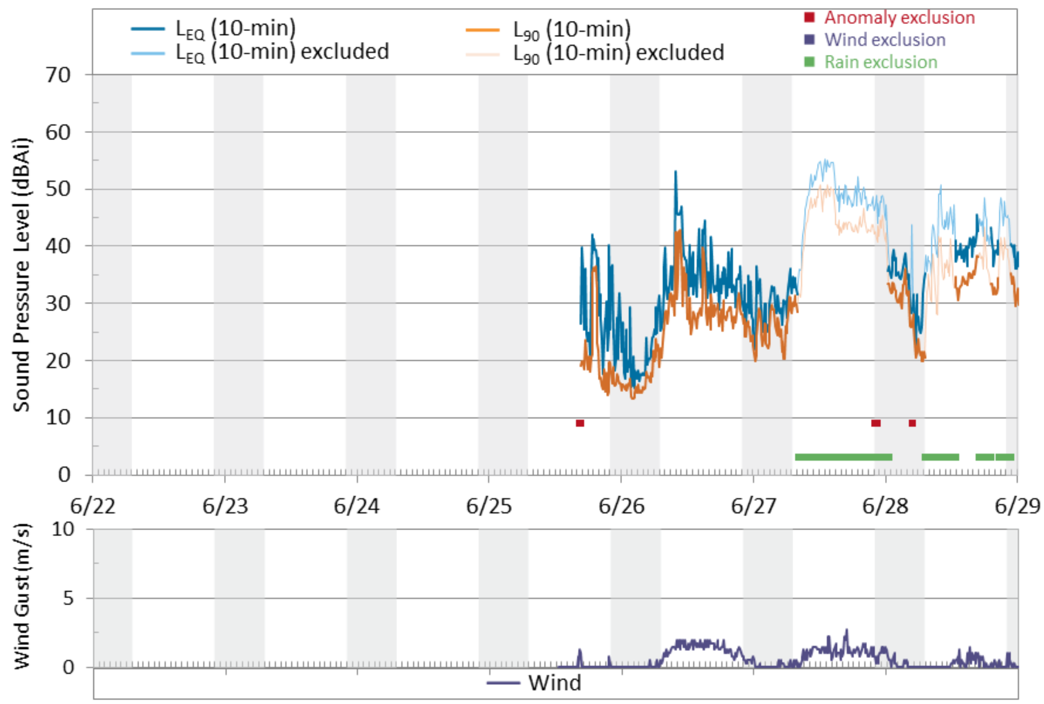


**FIGURE 38: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 22 TO 29, 2015**

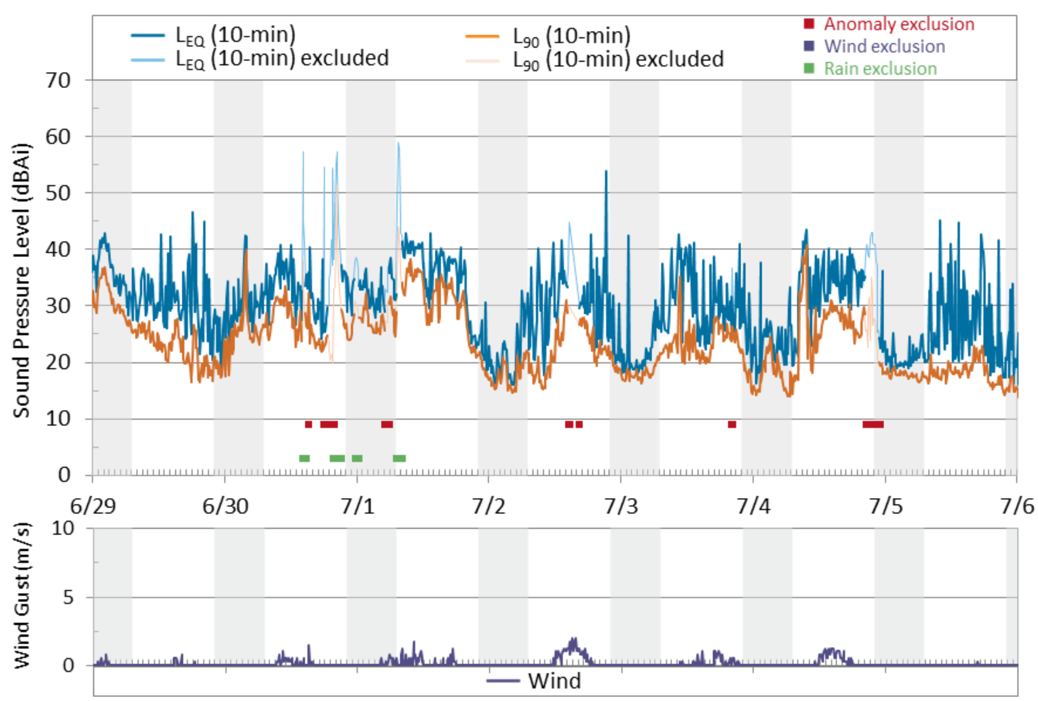


**FIGURE 39: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 29 TO JULY 6, 2015**

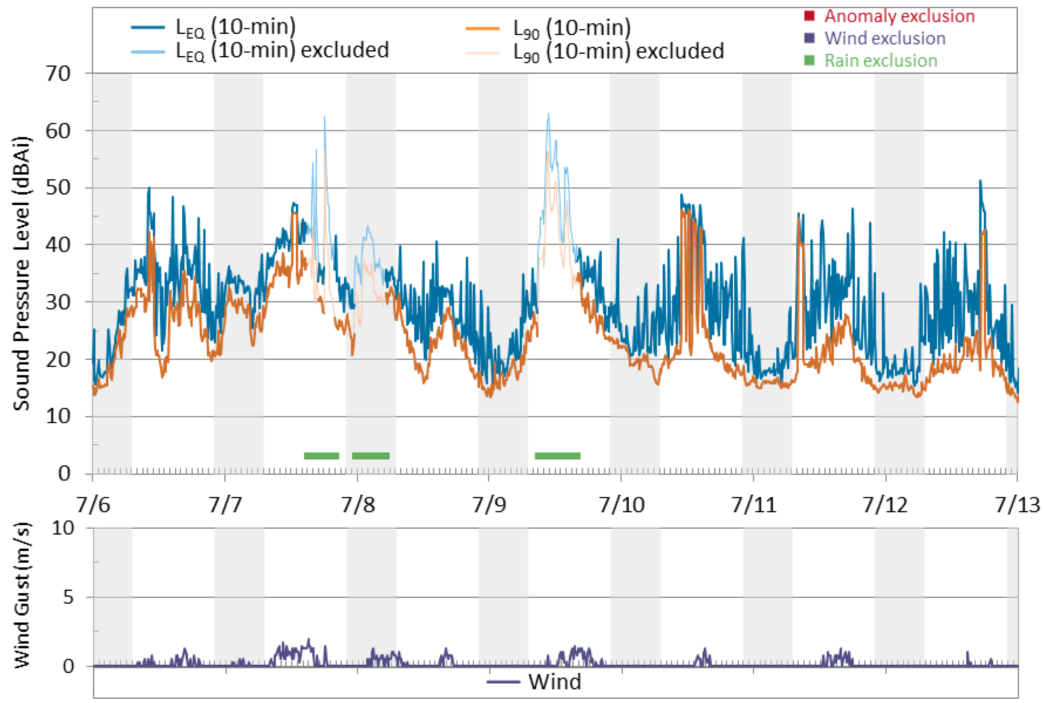


FIGURE 40: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JULY 6 TO 13, 2015

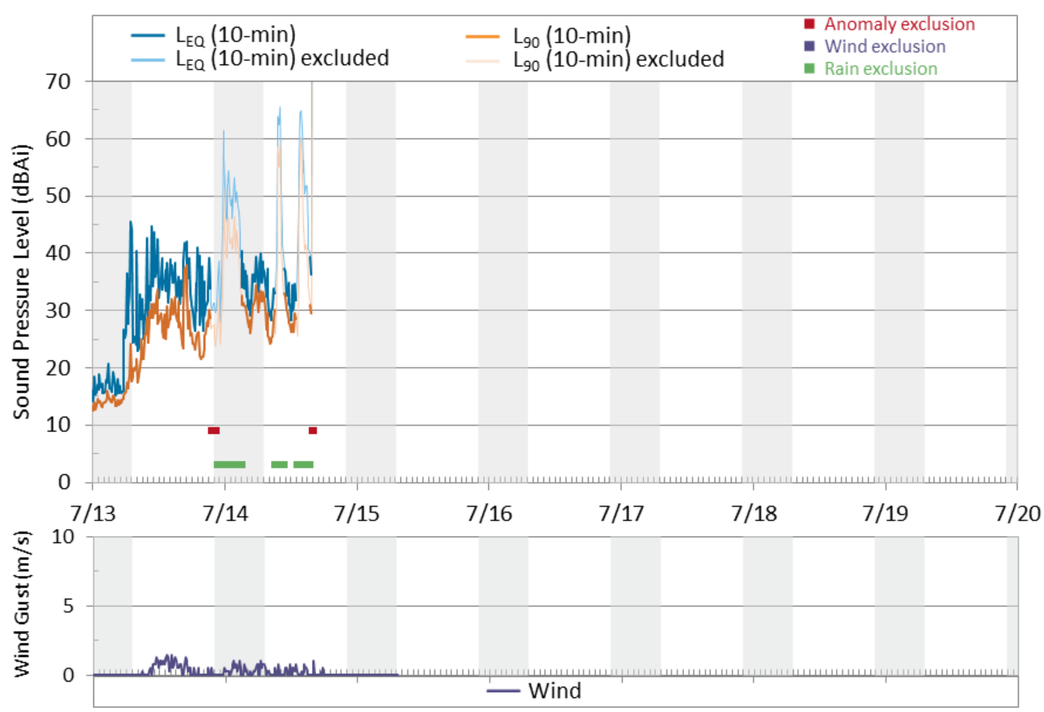


FIGURE 41: BOUTWELL HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JULY 13 TO 20, 2015

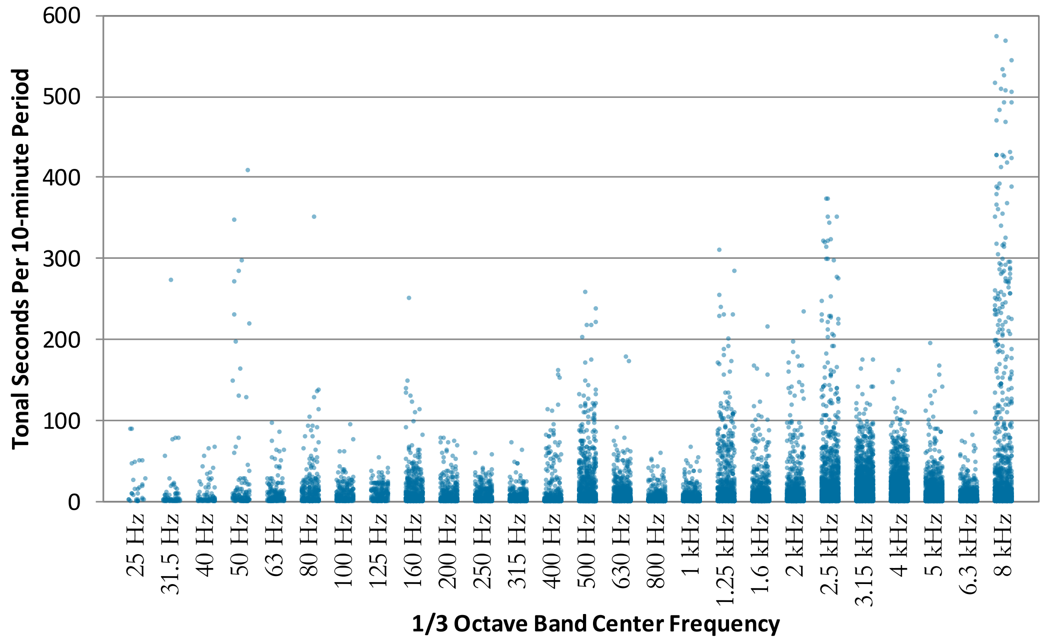


**FIGURE 42: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. BOUTWELL HILL, SUMMER.**

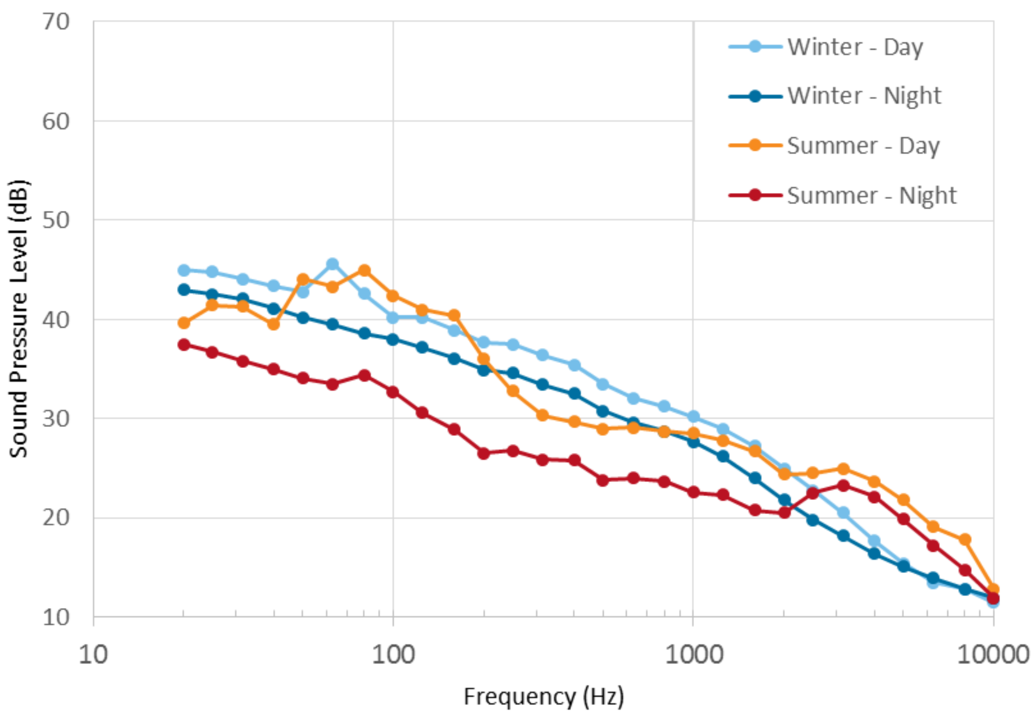


**FIGURE 43: BOUTWELL HILL MONITOR ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

## INFRASOUND MONITORING

The sound level data (10-minute $L_{EQ}$ and $L_{90}$) for infrasound monitoring at Boutwell Hill are plotted as time history graphs in Figure 44 and Figure 45 respectively.

Background sources throughout the period were are mixture of those measured during winter and summer monitoring periods. There was some biogenic noise due to birds, frogs and insects, but lawn equipment and other human-caused warm-weather sounds were absent. An exception was the operation of an ATV on one occasion. There was direct wind-induced noise at this location, as the monitor was located in an open area. In general, as noted above, Boutwell Hill is a quieter site typical of forested areas.

The unweighted one-third octave band data collected during the period is shown in Figure 46. The $L_{10}$ infrasound levels are up to 20 dB higher than the $L_{90}$ levels and the $L_{EQ}$ infrasound levels are higher than the $L_{10}$ levels. This indicates that high levels of infrasound are generated by infrequent events, such as windy periods. Other sound sources that resulted in elevated infrasound levels included aircraft overflights, and thunder. The $L_{10}$ 1/3-octave bands in the infrasonic region are below human perception thresholds.

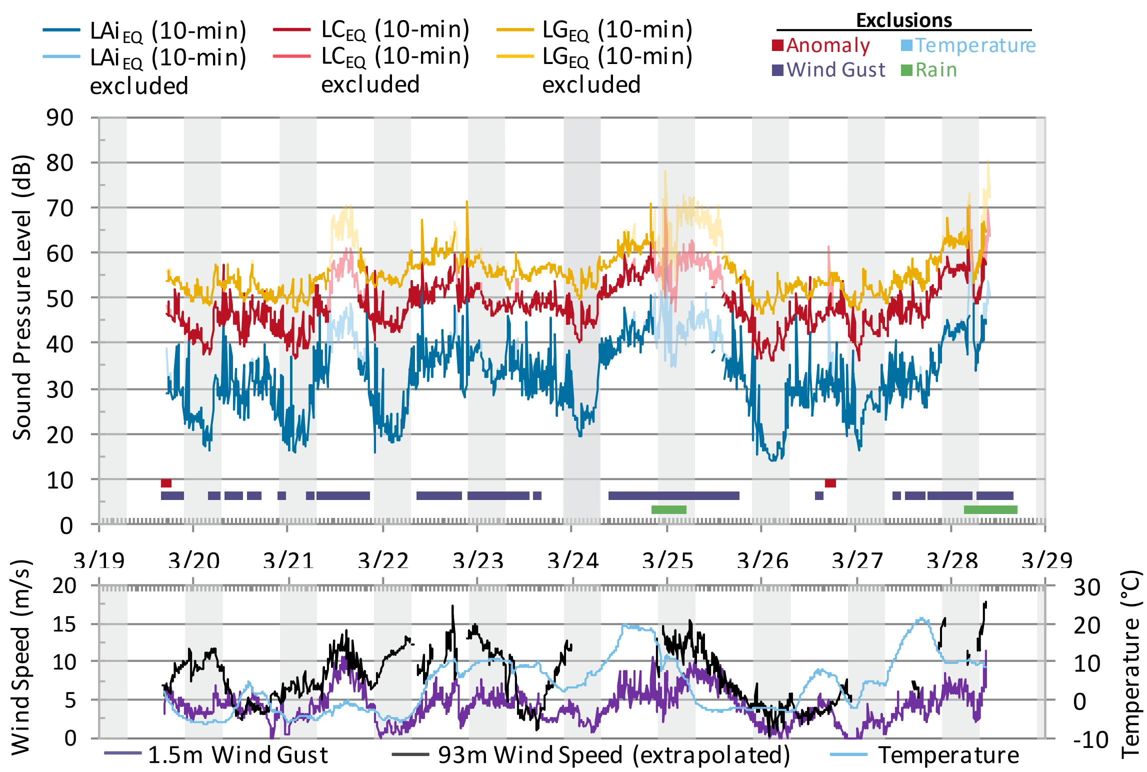


**FIGURE 44: BOUTWELL HILL INFRASOUND MONITOR - EQUIVALENT SOUND LEVELS AND WIND SPEEDS**

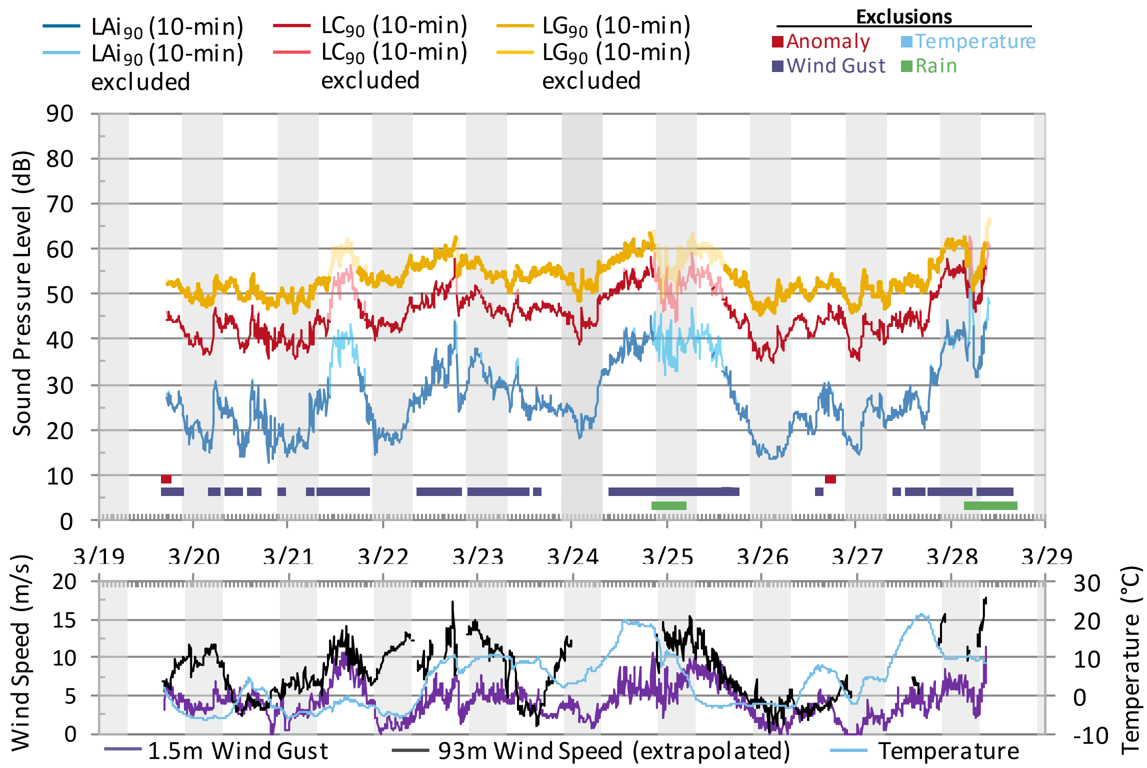


**FIGURE 45: BOUTWELL HILL INFRASOUND MONITOR – 90TH PERCENTILE SOUND LEVELS AND WIND SPEEDS**

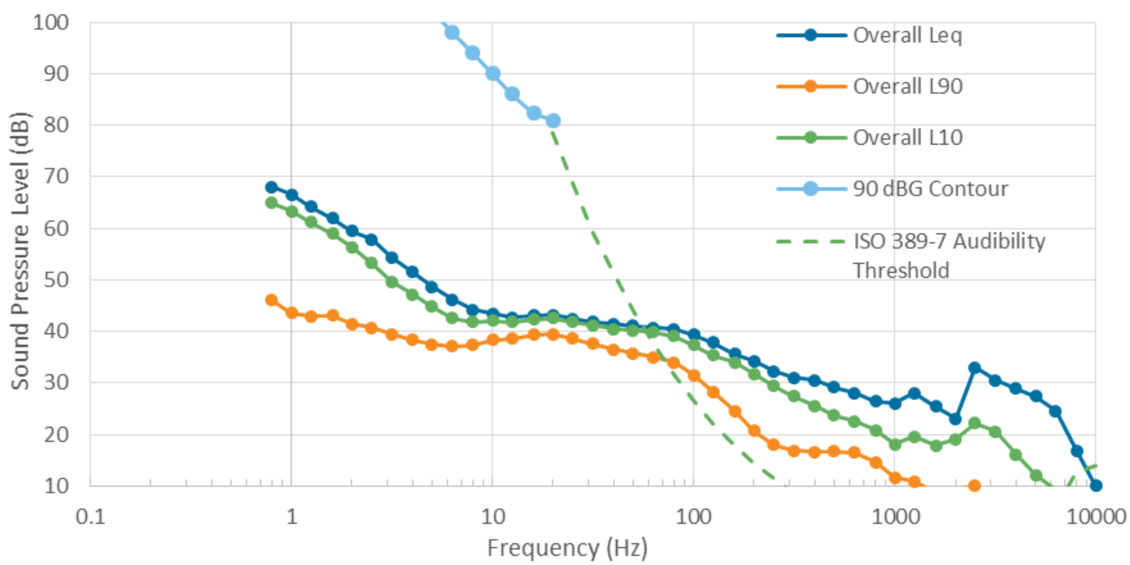


**FIGURE 46: BOUTWELL HILL INFRASOUND MONITOR ONE-THIRD OCTAVE BAND SOUND LEVELS**

## 8.3 | MONITOR 3: CHARLOTTE CEMETERY

### WINTER MONITORING

The sound level data from winter monitoring at Charlotte Cemetery are plotted as time history graphs in Figure 47, Figure 48, and Figure 49.

Sound levels at the monitoring location do not show a clear diurnal pattern. However, the average levels do show more activity during the day, as expected. Sound levels tend to be dominated by wind blowing through nearby trees and traffic passing on Charlotte Center Road. After two rain events on December 16, the microphone suffered from excess moisture for most of December 17 and part of the day on December 18, which caused intermittent signal dropouts and overloads. These technical difficulties were excluded from the processing as anomalies.

As shown in Figure 50, there were no notable tonal sources at this site in the winter.

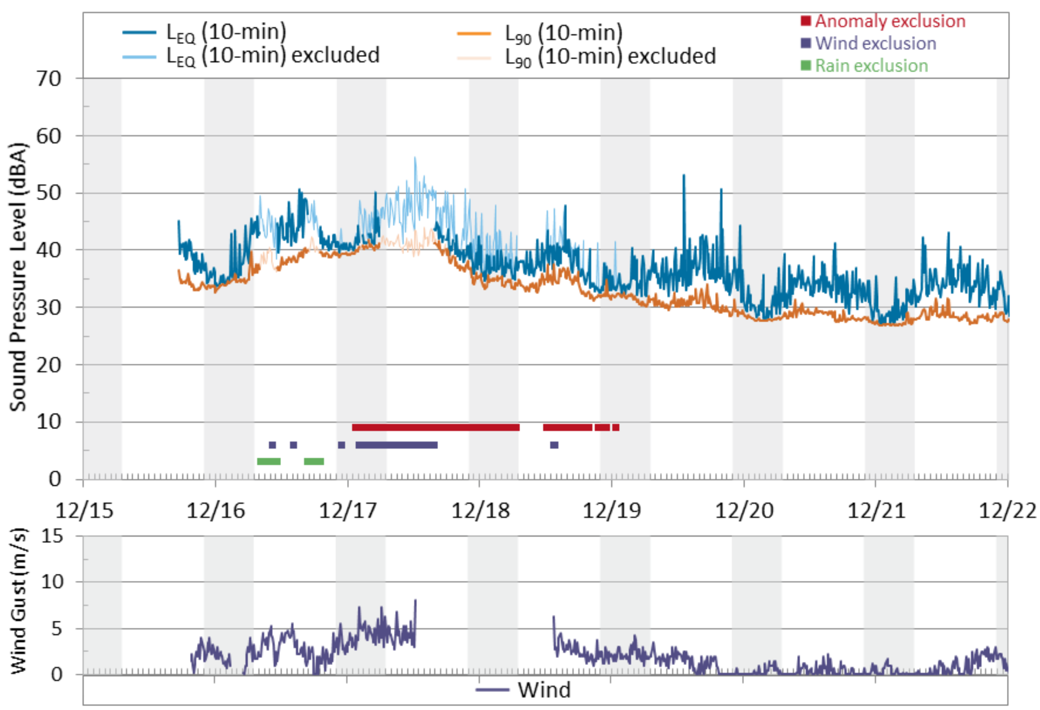


**FIGURE 47: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 15-21 DECEMBER 2014**

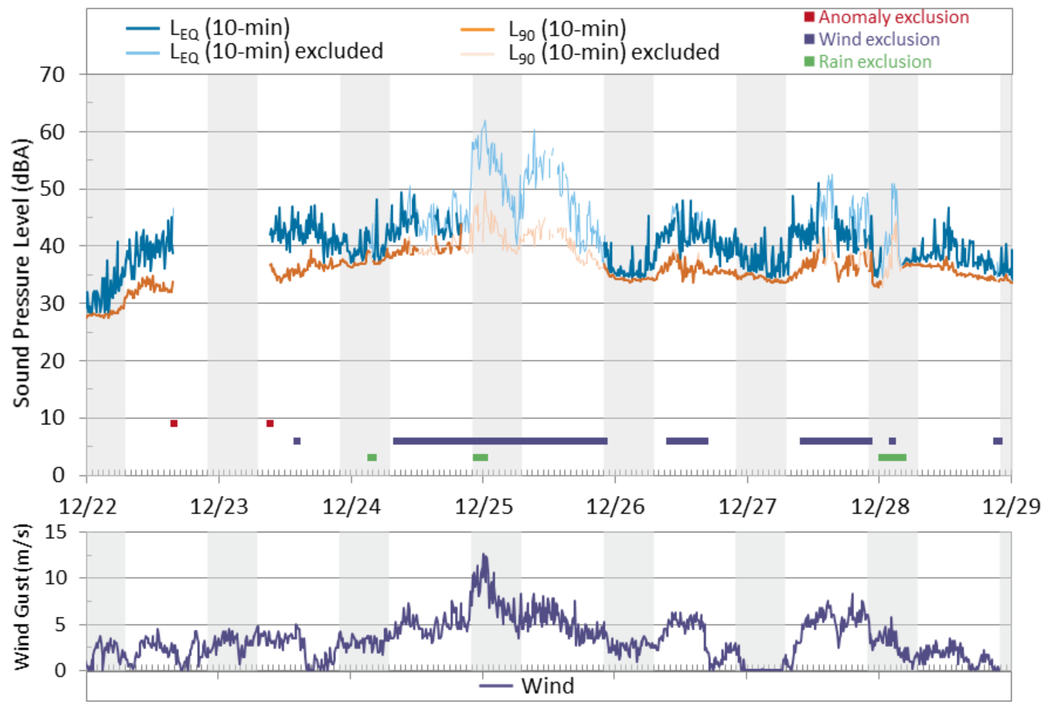


**FIGURE 48: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 22 TO 28 DECEMBER 2014**

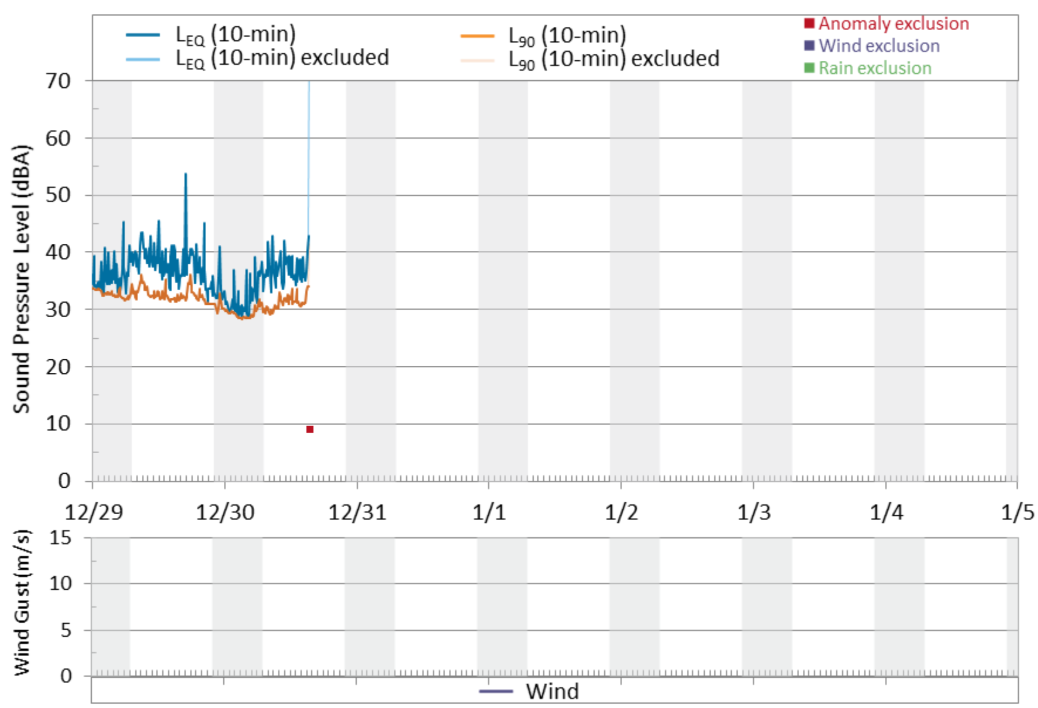


**FIGURE 49: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 29 TO 30 DECEMBER 2014**

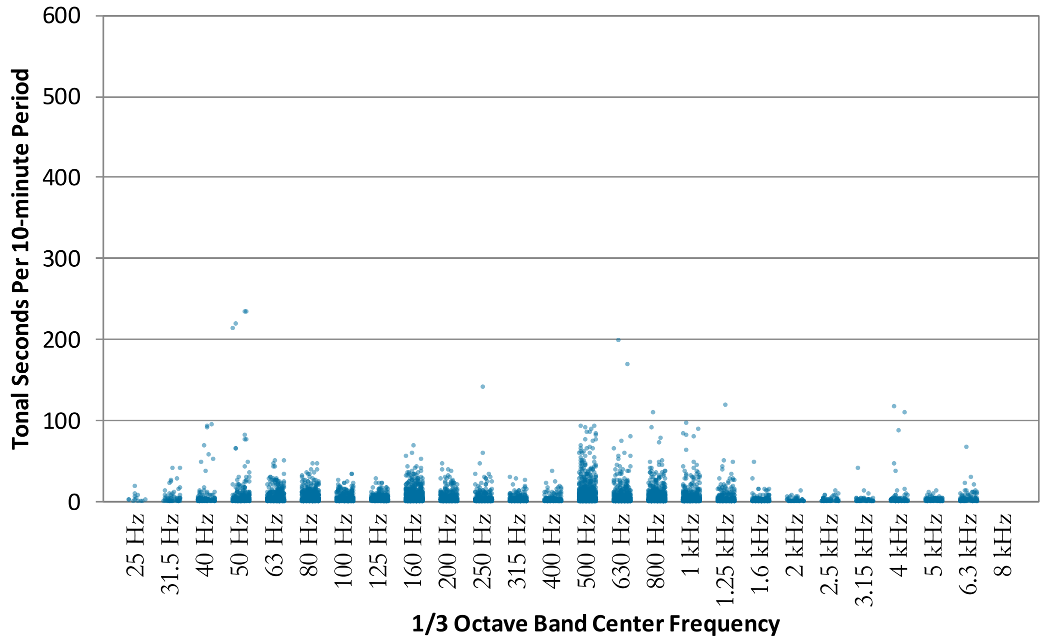


**FIGURE 50: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. CEMETERY MONITOR, WINTER.**

## SUMMER MONITORING

The sound level data ($L_{EQ}$ and $L_{90}$) from summer monitoring at Charlotte Cemetery are plotted as time history graphs in Figure 51, Figure 52, Figure 53, and Figure 54.

Sound levels tend to be dominated by traffic passing on Charlotte Center Road and grass cutting operations. Since the monitor was set back from the road, passenger car passbys were not a significant source of sound at the monitor. However, passbys from large trucks and motorcycles were common and noticeable in the data. Wind through the leaves of the trees surrounding the cemetery was also a source of sound during the summer.

The grass at the cemetery was mowed several times over the course of the monitoring period, sometimes generating very high levels when the machines passed by the monitor. Neighboring parcels also generated significant noise from mowing and haying operations.

Fireworks on the nights of July 3 and 4 were excluded from averaging as well as two periods of thunder. Also, construction equipment operating by the road on July 12 was excluded from averaging.

Almost all of the tonal activity at the site, plotted in Figure 55, was from biogenic sources, which were excluded from the sound level averaging by Ai-weighting.

Figure 56 shows the energy-averaged one-third octave bands measured at Charlotte Cemetery. The levels presented are unweighted 50th-percentile levels. Elevated low frequency levels (< 200 Hz) for both seasons are the result of outdoor activity, particularly car and truck traffic around the cemetery, as this area was more densely populated and experienced higher traffic than most other monitoring locations. Daytime summer levels are higher than other periods mostly due to grass mowing at the cemetery and tractors operating in adjacent fields. High frequency content above 1.6 kHz from the summer was a result of biogenic noise. The one-third octave bands show a reduction of about four decibels per octave.

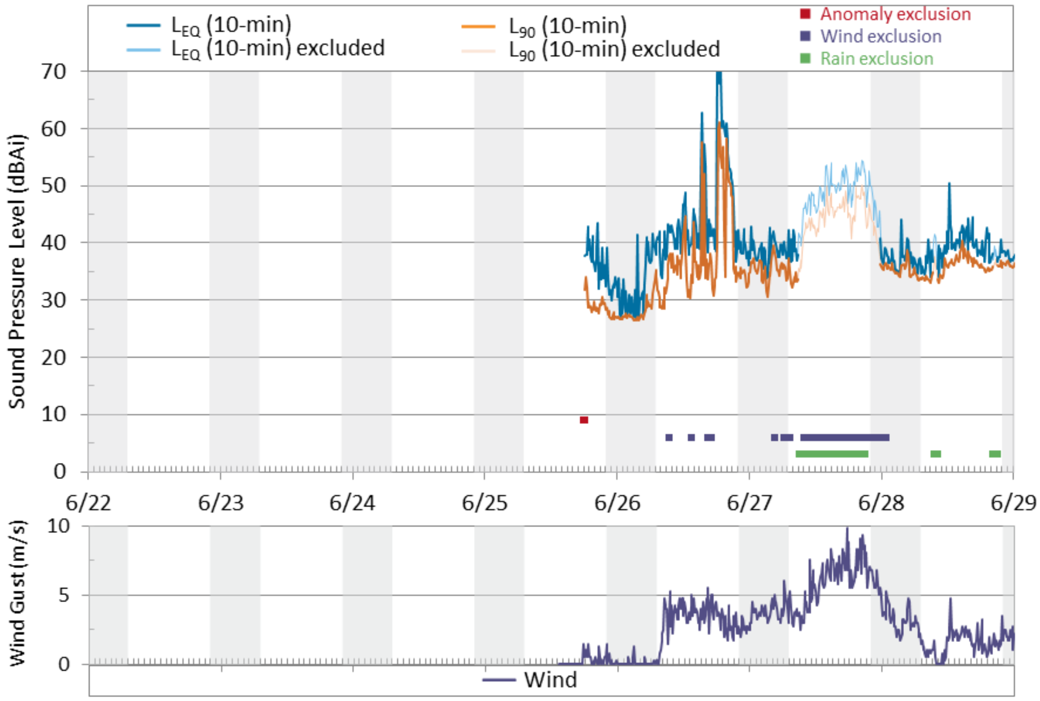


**FIGURE 51: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JUNE 22 TO 29, 2015**

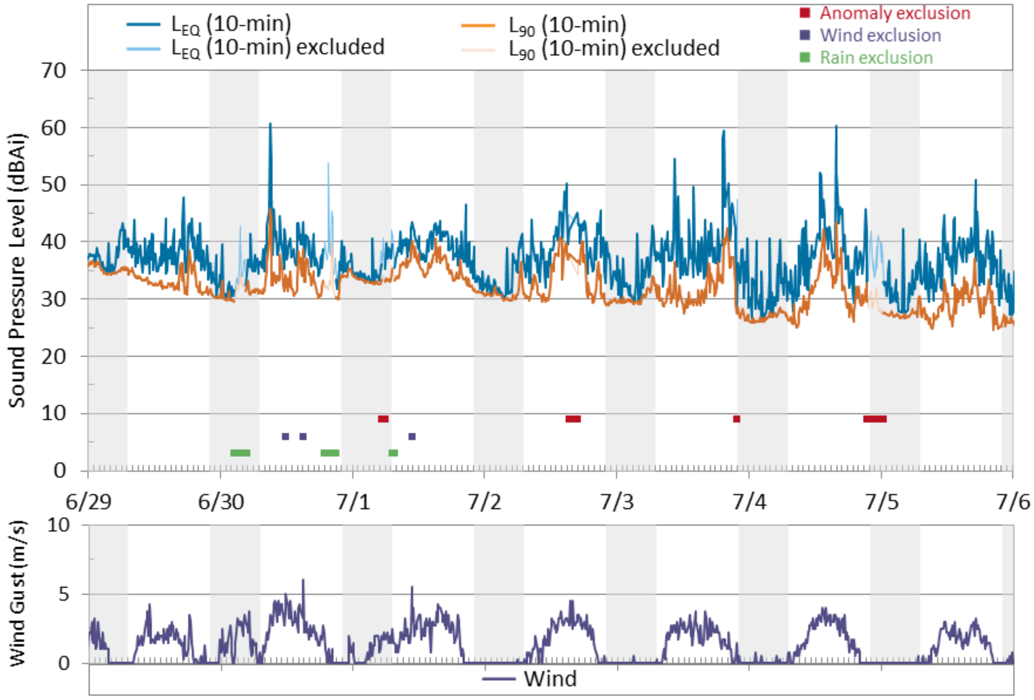


**FIGURE 52: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JUNE 29 TO JULY 6, 2015**

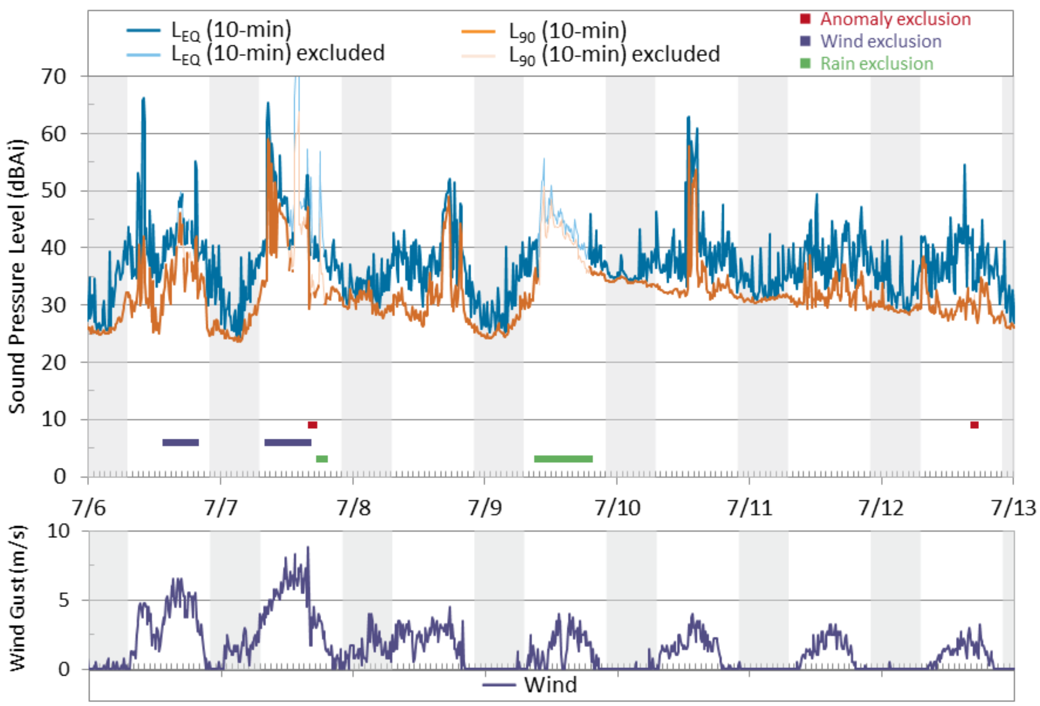


**FIGURE 53: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JULY 6 TO 13, 2015**

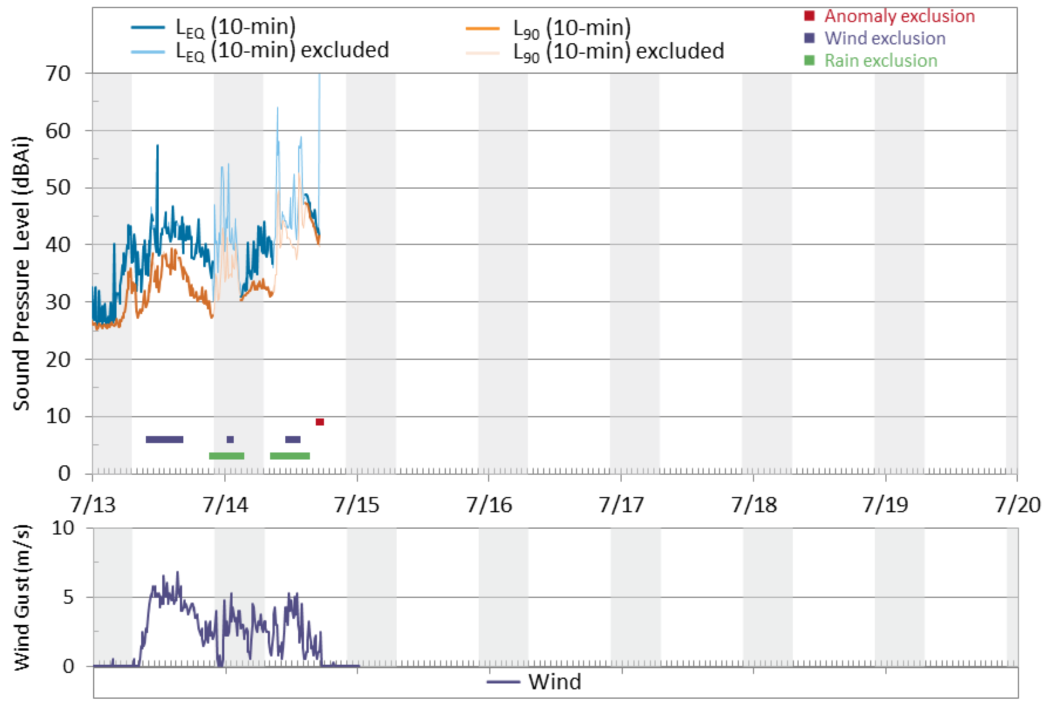


**FIGURE 54: CEMETERY MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JULY 13 TO 20, 2015**

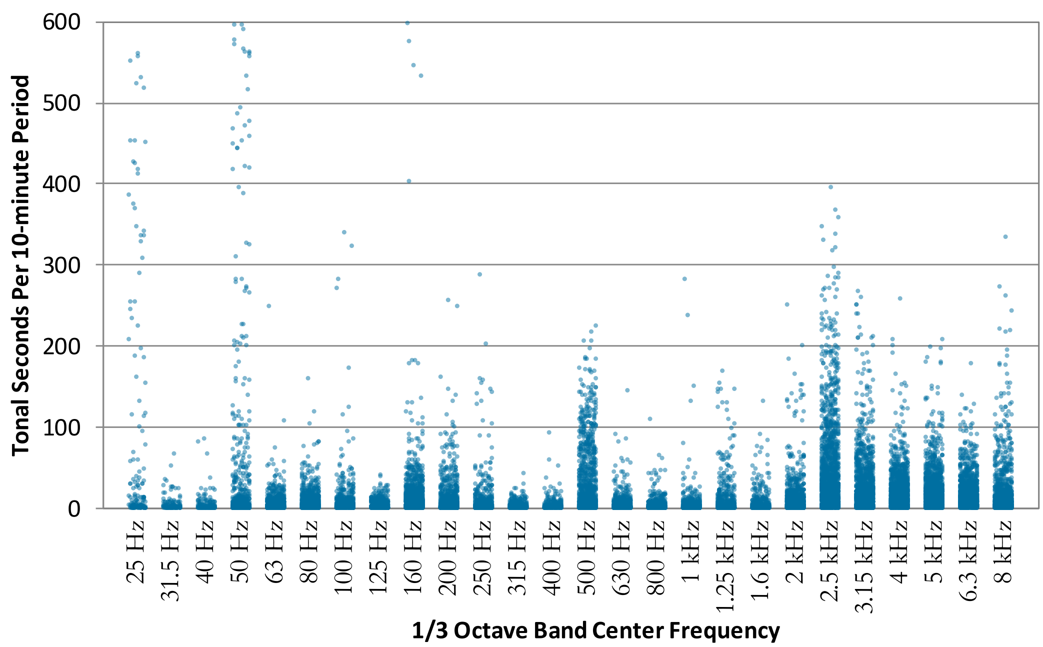


**FIGURE 55: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. CEMETERY MONITOR, SUMMER.**

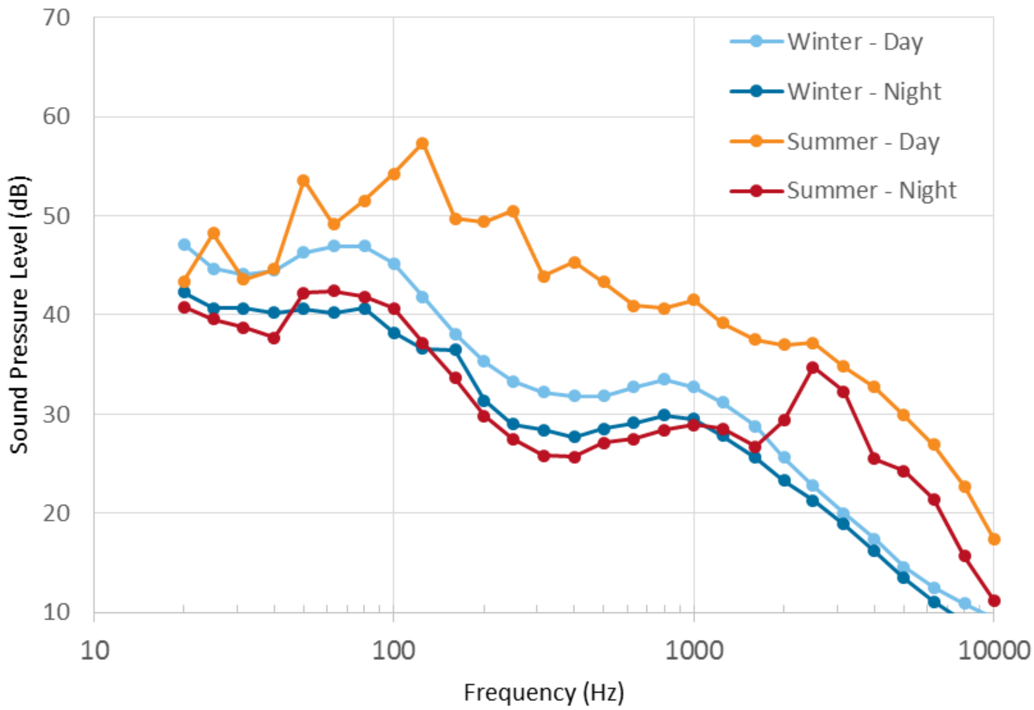


**FIGURE 56: CEMETERY MONITOR ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

## 8.4 | MONITOR 4: NELSON ROAD

### WINTER MONITORING

The sound level data ($L_{EQ}$ and $L_{90}$) from winter monitoring at the Nelson Road monitoring location are plotted as time history graphs in Figure 57, Figure 58, and Figure 59. This monitor was setup on the morning of December 16.

Like Charlotte Cemetery, the background was dominated by wind and to a lesser extent by passing traffic. There were also a fair number of aircraft flyover events; many of those were masked by the sound generated by moderate winds. To the extent that a diurnal pattern appears (often masked by stormy weather), it was largely due to the reduction in both vehicular and aircraft traffic during the night.

Events whose levels were excluded from the processing included banging snowplows and a siren passing the monitoring location on Nelson Road.

As is evident from Figure 60, there were very few tonal sources present at the site.

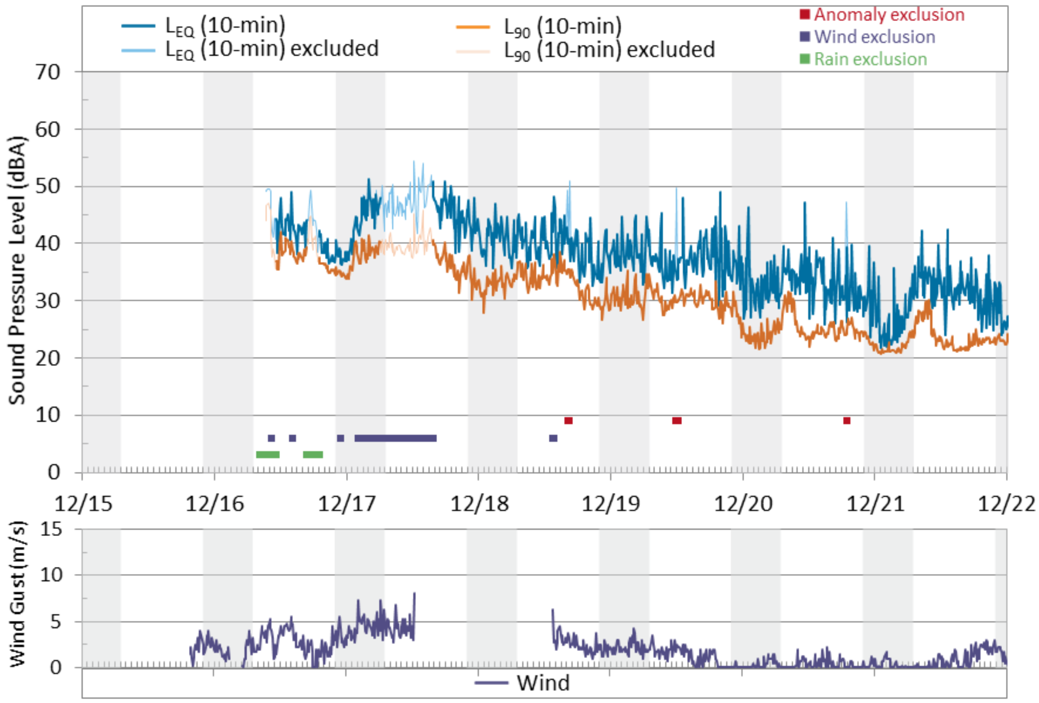


**FIGURE 57: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 16 TO 21 DECEMBER 2014**

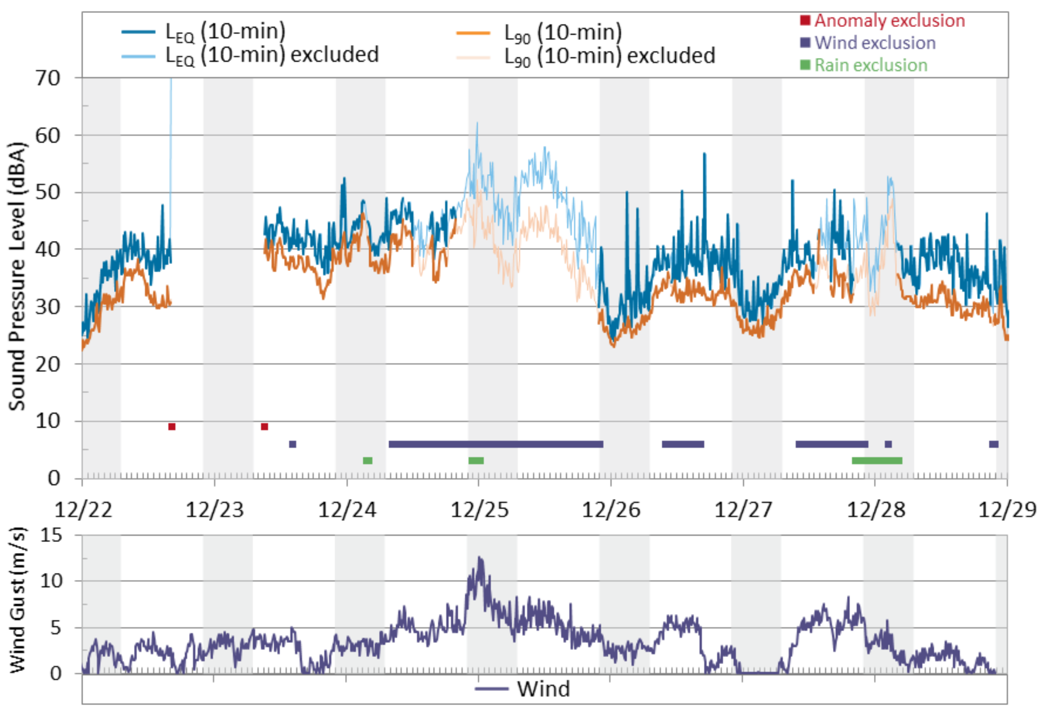


**FIGURE 58: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 22 TO 28 DECEMBER 2014**

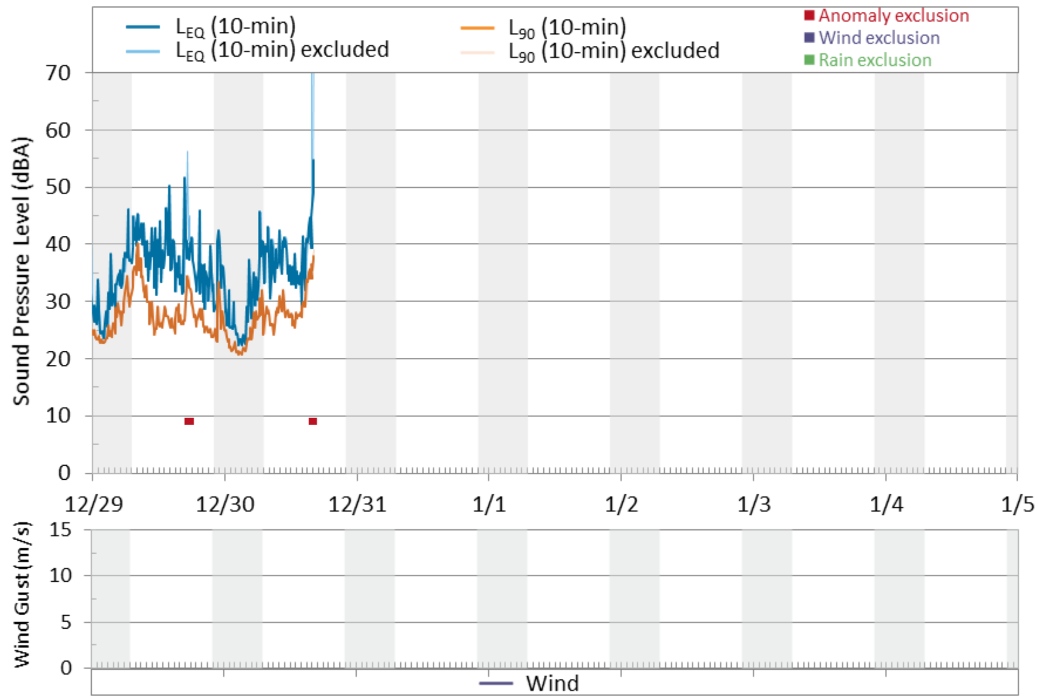


FIGURE 59: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 29 TO 30 DECEMBER 2014

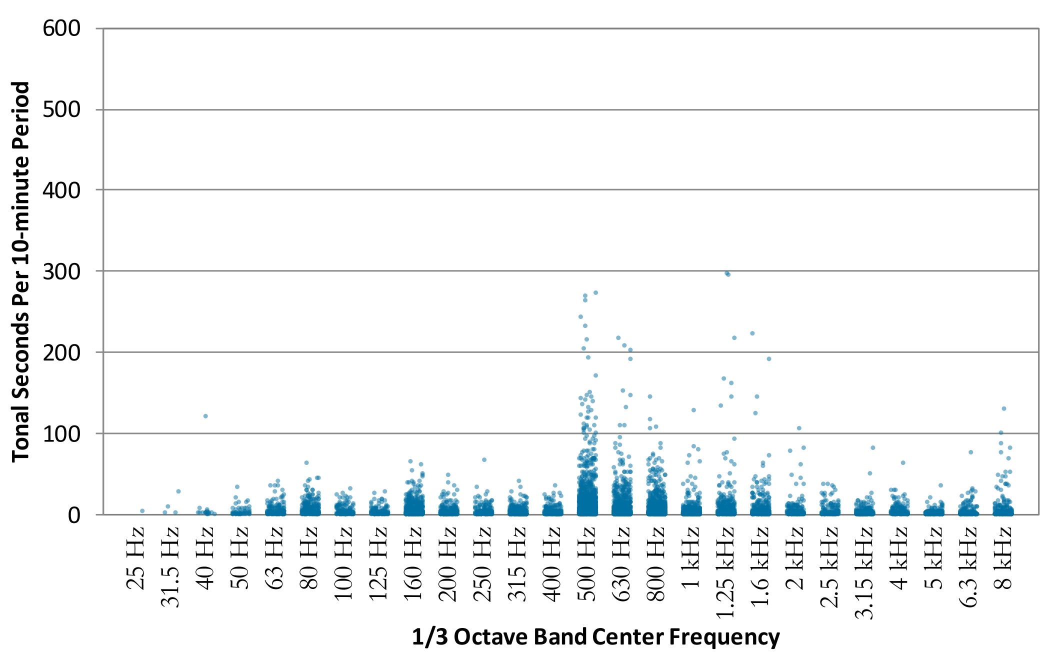


FIGURE 60: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. NELSON ROAD, WINTER.

## SUMMER MONITORING

The sound level data ($L_{EQ}$ and $L_{90}$) measured at Nelson Road in the summer are plotted as time history graphs in Figure 61, Figure 62, and Figure 63. The background sound levels were dominated by wind, passing traffic, outdoor activities on neighboring properties, and aircraft flyover events. The reduction of levels at night were due to diminishing human activity, particularly the decreased frequency of vehicle passbys and aircraft flyovers. However, truck passbys in the nighttime hours had an influence on the nighttime $L_{EQ}$.

Events whose levels were excluded from processing included thunder, two occasions of fireworks, a siren, and birds interacting with the microphone.

The existence of tones at the site, depicted in Figure 64, was limited to biogenic noise at higher frequencies and a persistent bullfrog in the 315 Hz one-third octave band.

Figure 65 shows the energy-averaged one-third octave band data collected at Nelson Road. The sound pressure levels are expressed as 50$^{th}$-percentile levels and are unweighted. Elevated one-third octave bands throughout the year centered around 80 Hz were generated by high-speed traffic on Nelson Road. Above 2,000 Hz, biogenic noise was persistent in the summer, as seen by the increase in levels over winter. The source of increased low frequency during winter monitoring is unknown. One-third octave band levels at the site declined by about four decibels per octave.

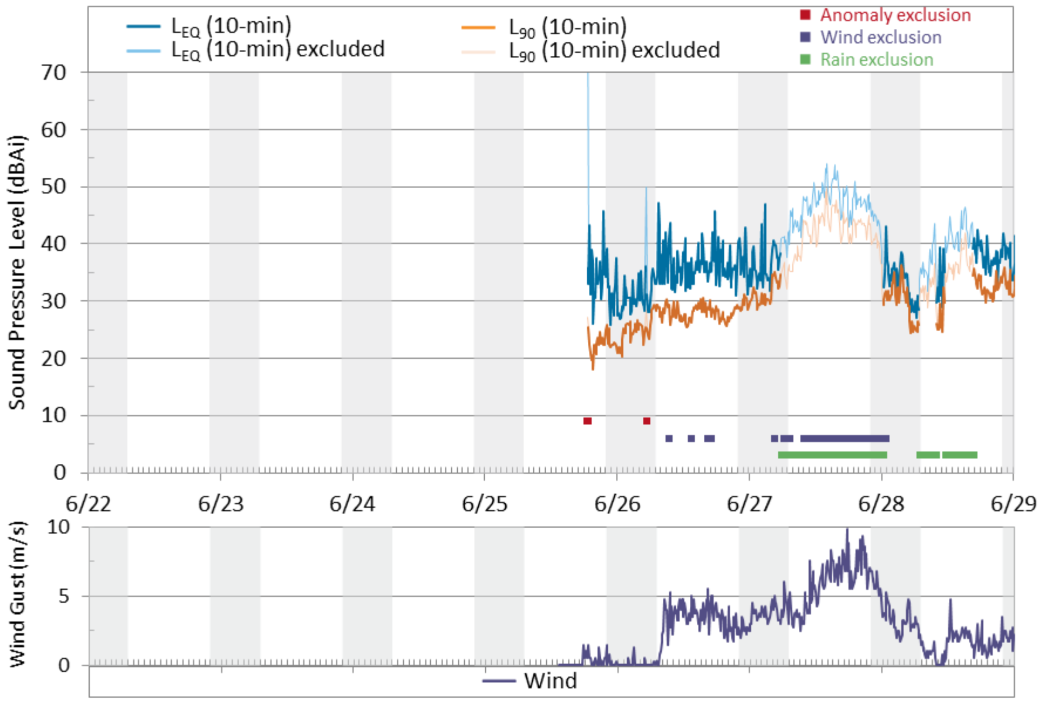


**FIGURE 61: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER,JUNE 22 TO 29, 2015**

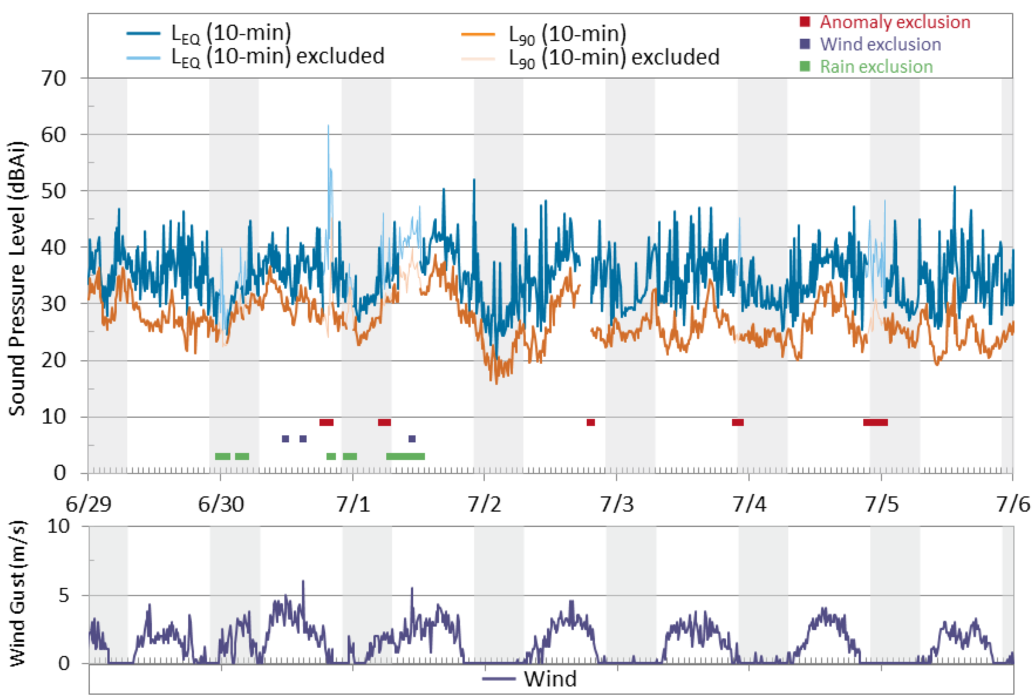


**FIGURE 62: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 29 TO JULY 6, 2015**

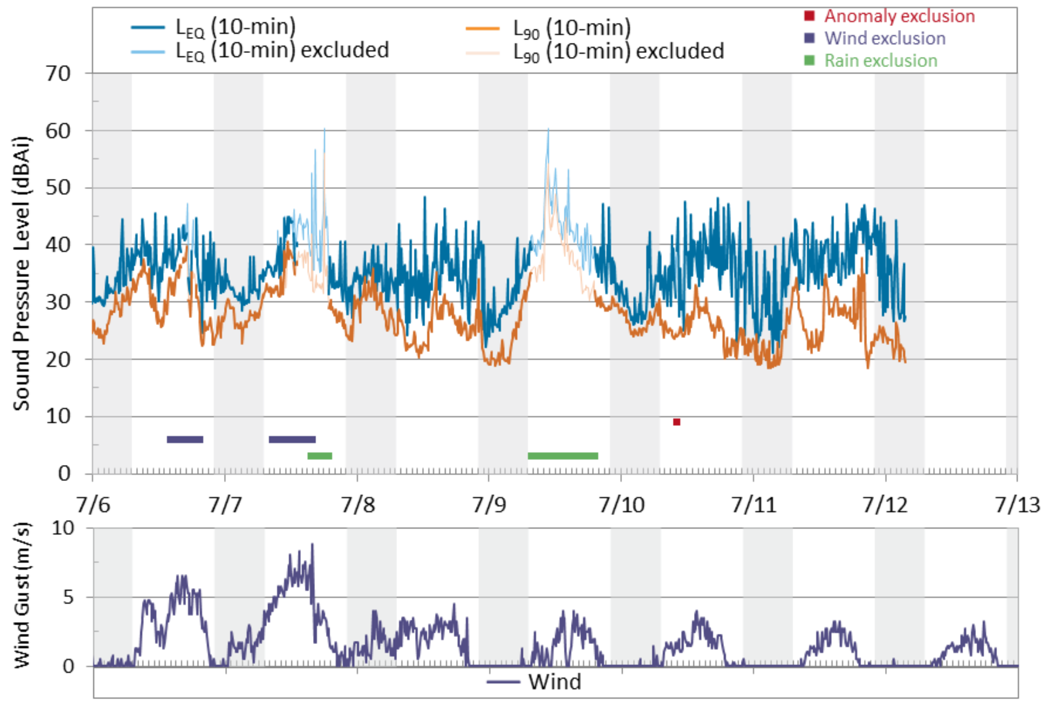


**FIGURE 63: NELSON ROAD MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JULY 6 TO JULY 13, 2015**

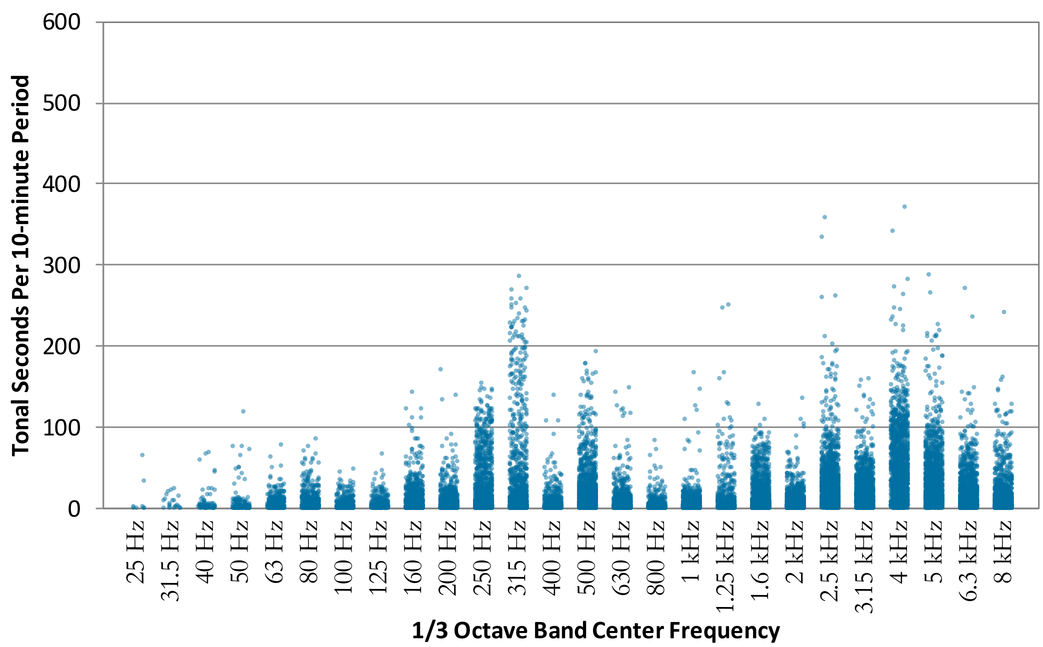


**FIGURE 64: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. NELSON ROAD, SUMMER.**

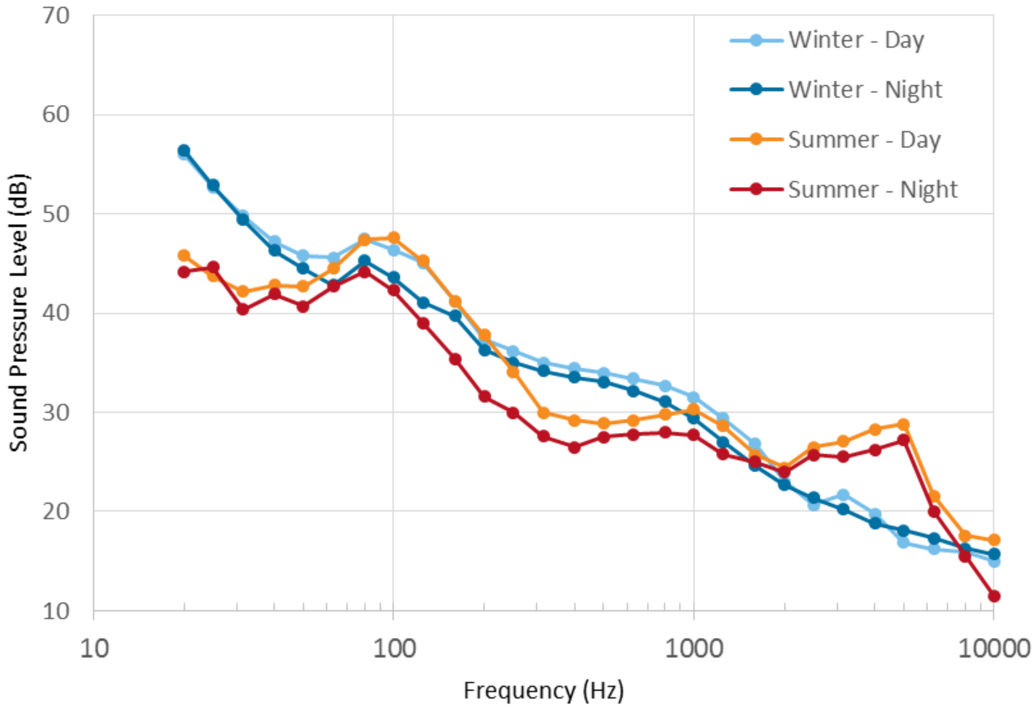


**FIGURE 65: NELSON ROAD MONITOR ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

## 8.5 | MONITOR 5: PICKUP HILL

### WINTER MONITORING

The sound level data measured at Pickup Hill in the winter are plotted as time history graphs in Figure 66, Figure 67, and Figure 68.

Although much of the sound from the dairy operation across the street was shaded by the house, the twice-daily milking operations are clearly visible in the intermittent increases in the residual sound levels ($L_{90}$). Other diary-related operations and passing traffic are dominant throughout the monitoring period, along with wind-generated noise and frequent aircraft flyovers.

The presence of the dairy operation is evident in the tonality chart in Figure 69. The most prominent tones at the site were in the 160, 250, and 1,250 Hz one-third octave bands.

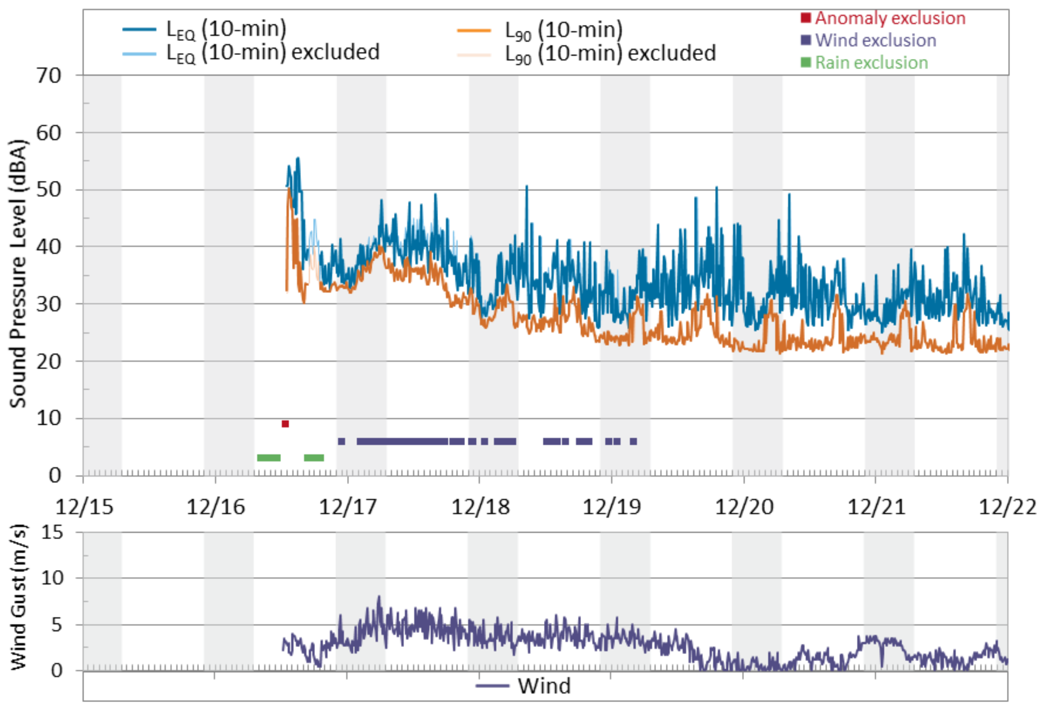


FIGURE 66: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. 16-21 DECEMBER 2014

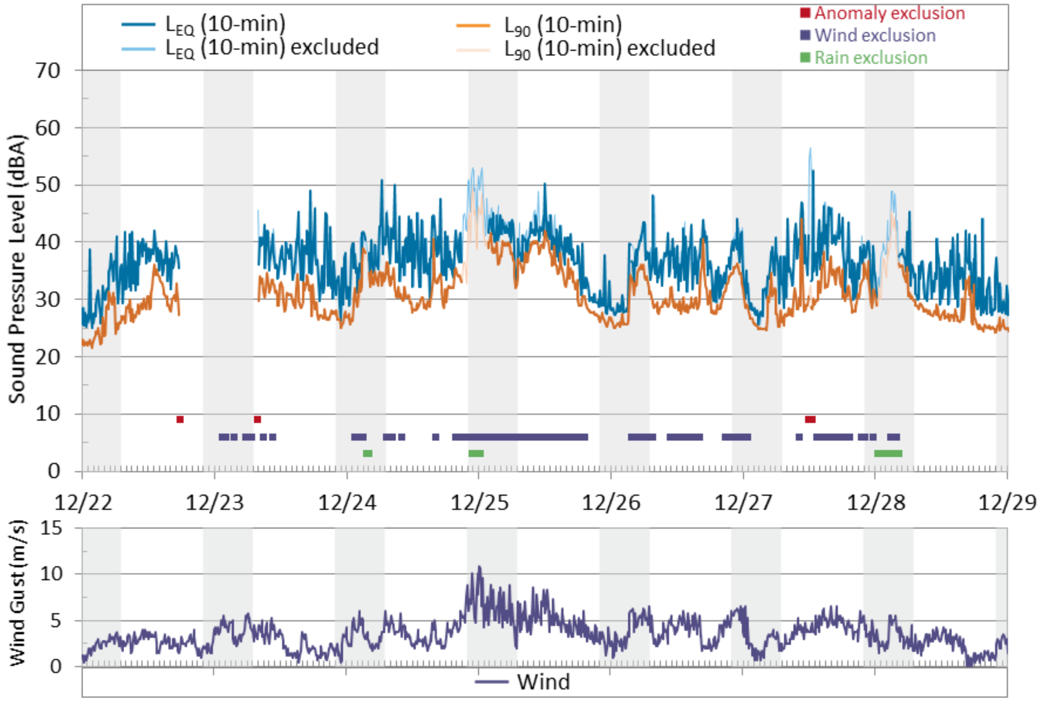


**FIGURE 67: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. 22-28 DECEMBER 2014**

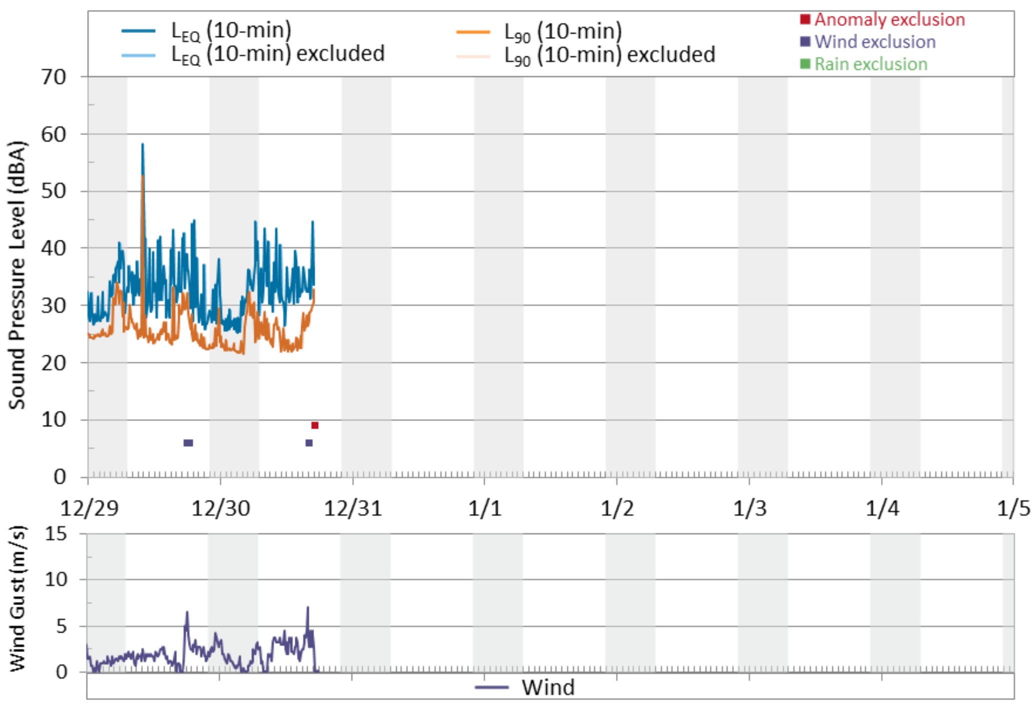


**FIGURE 68: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. 29-30 DECEMBER 2014**

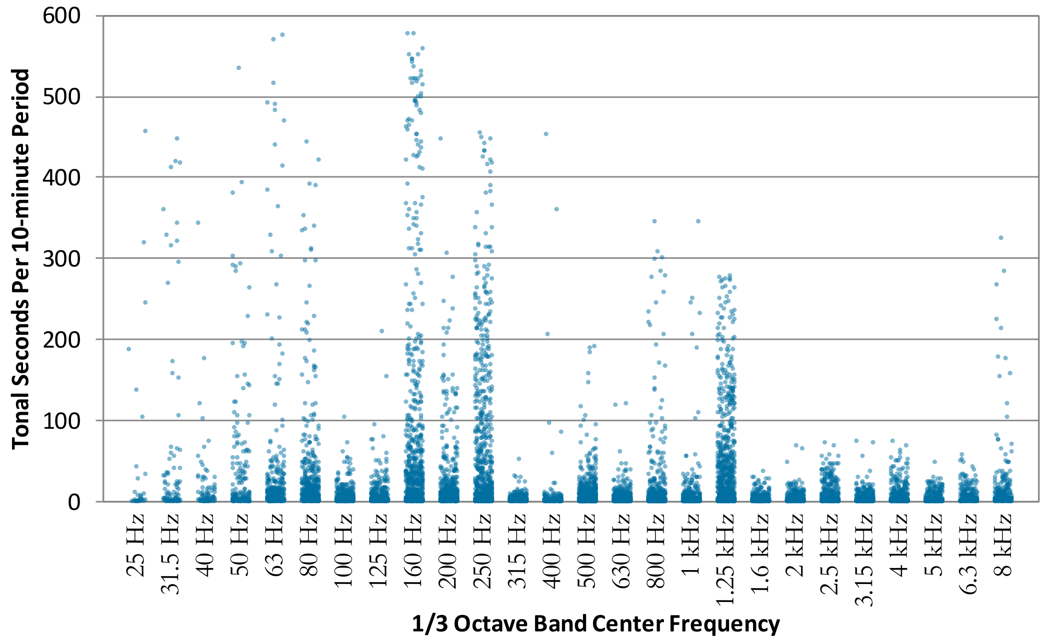


**FIGURE 69: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD BY ONE-THIRD OCTAVE BAND. PICKUP HILL, WINTER.**

## SUMMER MONITORING

The sound level data measured in the summer at Pickup Hill are plotted as time history graphs in Figure 70, Figure 71, and Figure 72.

Most of the dominant sources during the summer monitoring period were equivalent to the winter monitoring period. Seasonal tractor operations took place around the property and were excluded from the statistical calculations.

One significant change at the Pickup Hill site between the winter and summer monitoring periods was the addition of a latticed tower and a 10 kW BWC Excel wind turbine on the property, about 110 m (360 ft) southwest of the monitor. The sound from the small wind turbine and its tower were not quantified but appeared to be masked by local wind.

Exclusions of time periods for sound level averaging included dropouts and overloads caused by moisture in the microphone's preamplifier, a cow interacting with the monitor, thunder, and fireworks.

The tonality chart in Figure 73 reveals a tone in the 80 Hz one-third octave band, with a harmonic in the 160 Hz one-third octave band that is generated by the milking operation across the street. Biogenic noise above 1,000 Hz was also responsible for most of the prominent tones at the monitoring location.

Figure 74 depicts the average unweighted statistical level ($L_{50}$) of all one-third octave bands measured at each monitoring location for each season. All traces exhibit elevated low frequency energy between 40 and 200 Hz, attributable to the milking operation across the street. The nighttime one-third octave band levels for winter mirror those of the daytime levels, only about two decibels lower. Summer levels were much higher than all other periods due to lawn equipment operating on the property and in surrounding fields. Summer data show elevated levels at 2 kHz, attributed to biogenic noise sources. One third octave bands at the Pickup Hill monitoring location rolled-off at about four decibels per octave.

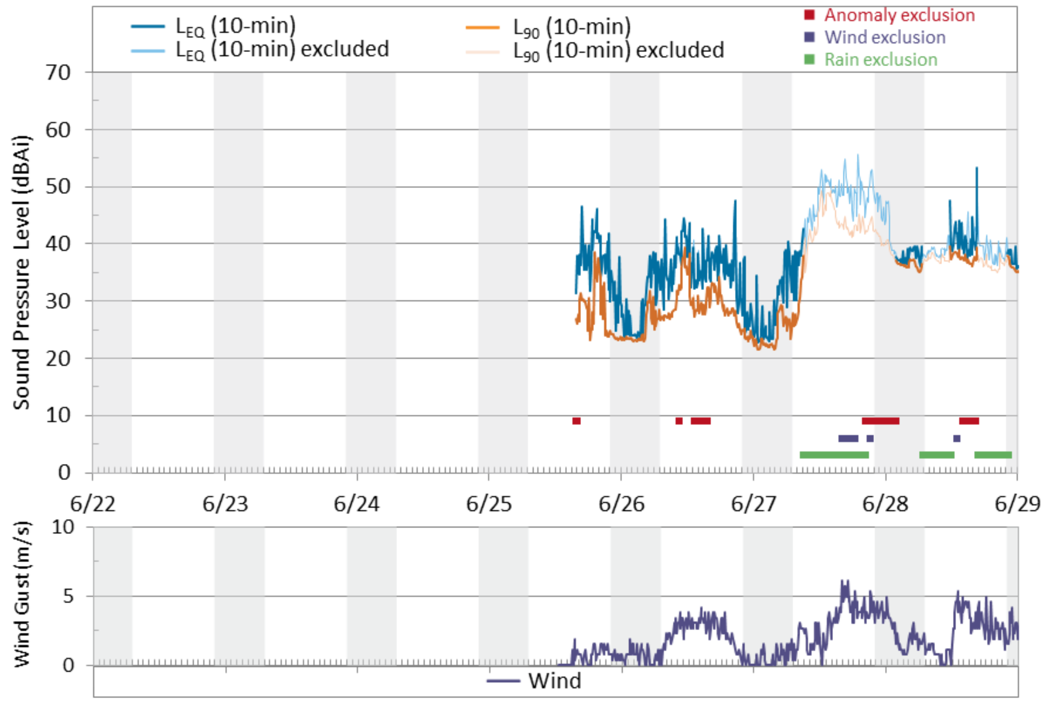


**FIGURE 70: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 22 TO 29, 2015**

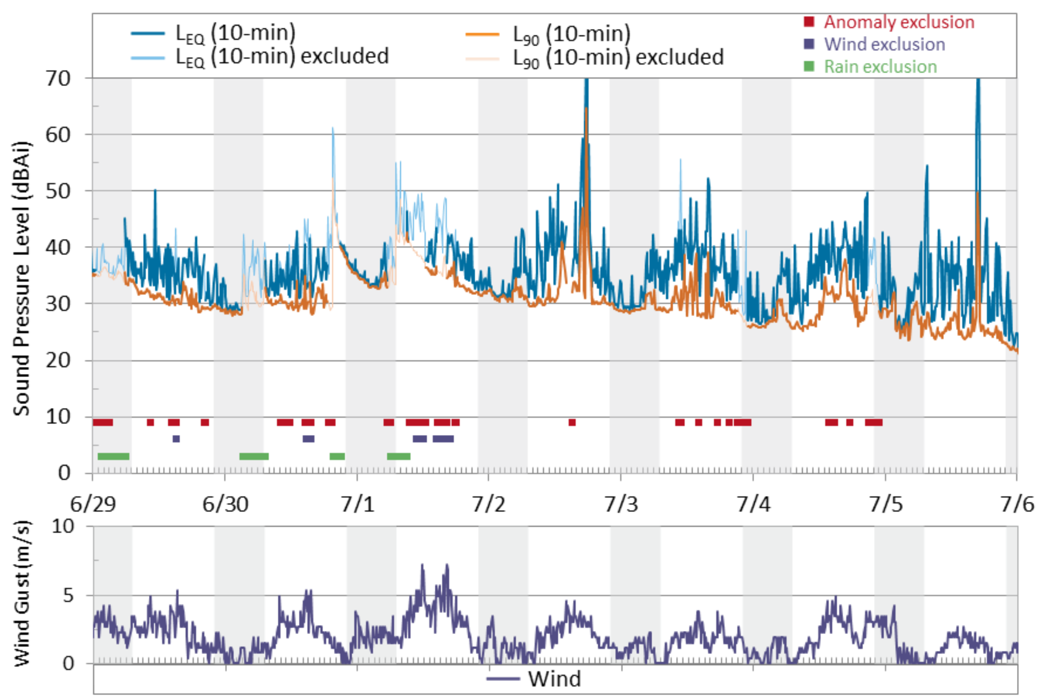


**FIGURE 71: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JUNE 29 TO JULY 6, 2015**

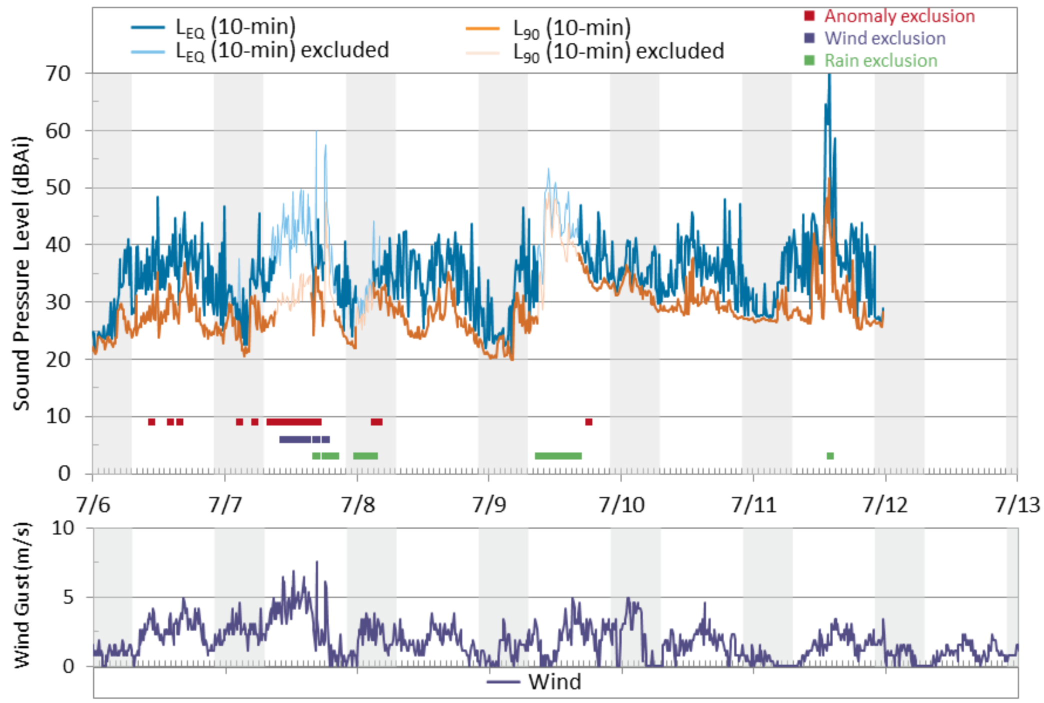


**FIGURE 72: PICKUP HILL MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. SUMMER, JULY 6 TO 13, 2015**

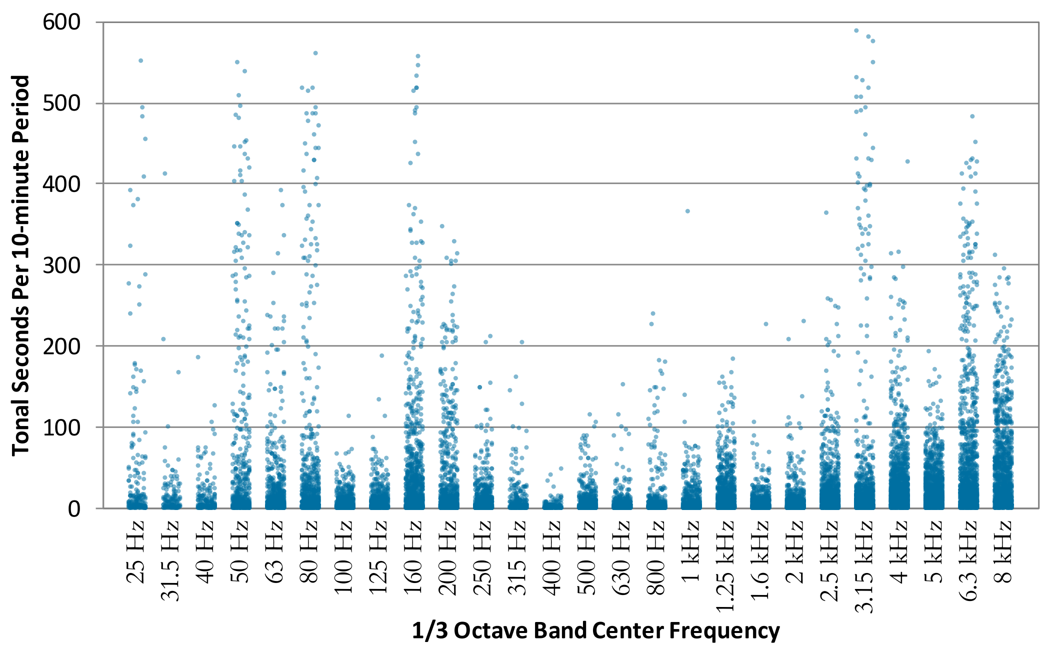


**FIGURE 73: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD, BY ONE-THIRD OCTAVE BAND. PICKUP HILL, SUMMER.**

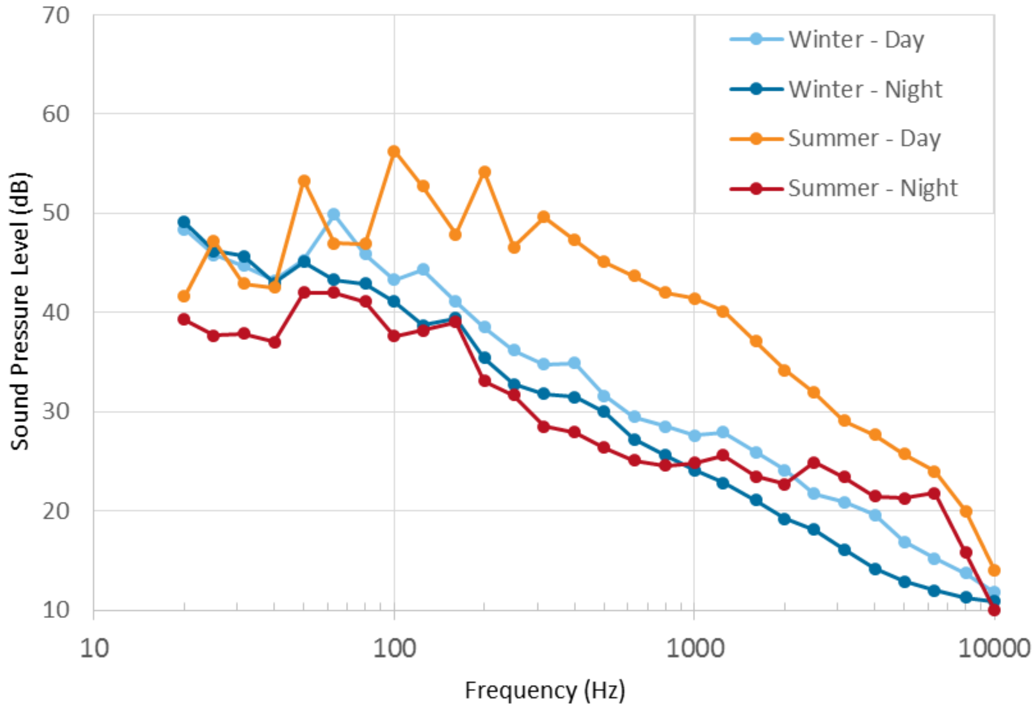


**FIGURE 74: PICKUP HILL MONITOR ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

## 8.6 | MONITOR 6: WOODED AREA

### WINTER MONITORING

The sound level data measured at the Wooded Area monitoring location in the winter are plotted as time history graphs in Figure 75, Figure 76, and Figure 77.

Almost all dominant sounds were due to winds blowing through the trees and aircraft flyovers. Very little traffic-related noise was observed at the monitoring location. The background sound levels at this monitoring location were lower, relative to other sites, at times, with the $L_{EQ}$ dropping below 20 dBA on one night.

The tonality chart in Figure 78 indicates the presence of a tone in the 500 Hz one-third octave band, whose source is unknown.

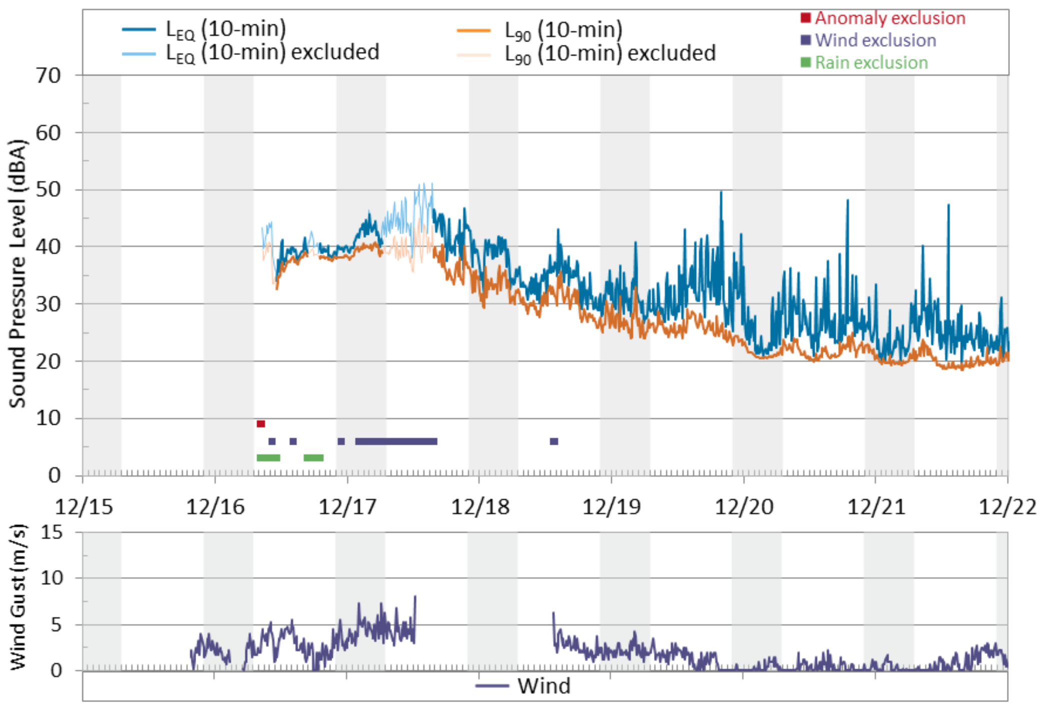


**FIGURE 75: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 16 TO 21 DECEMBER 2014**

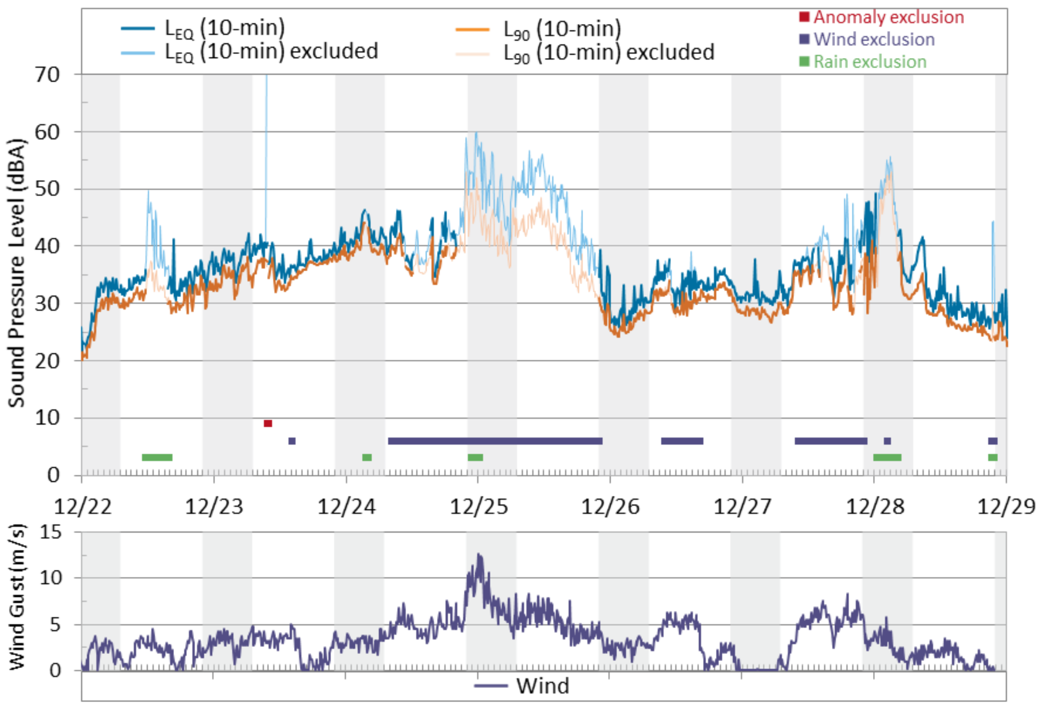


**FIGURE 76: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 22 TO 28 DECEMBER 2014**

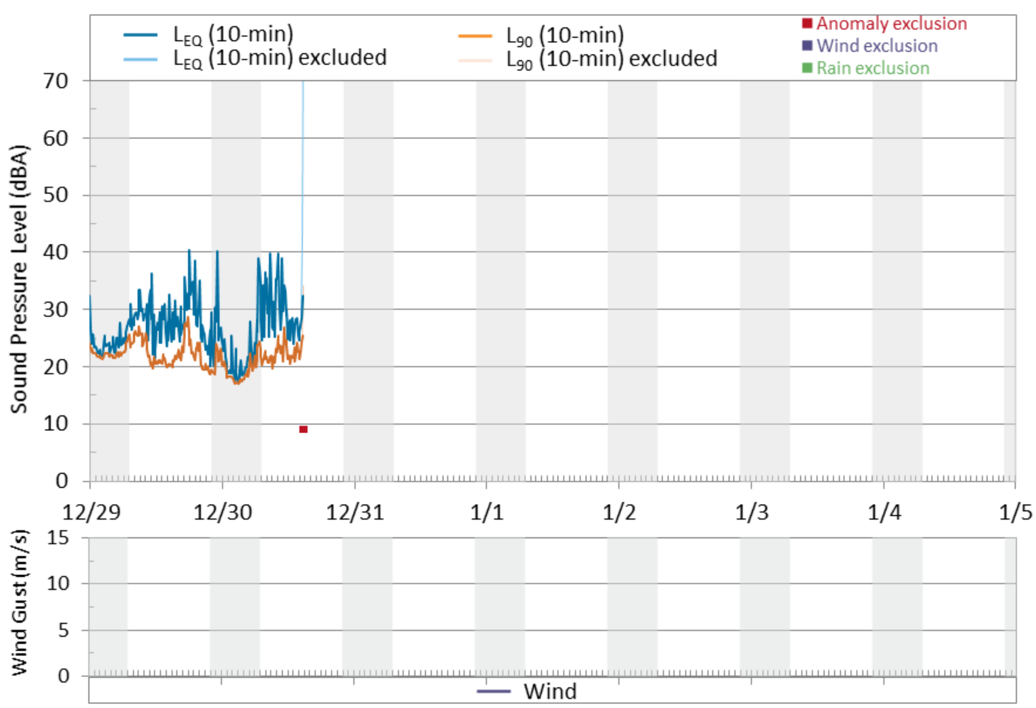


**FIGURE 77: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. WINTER, 29 TO 30 DECEMBER 2014**

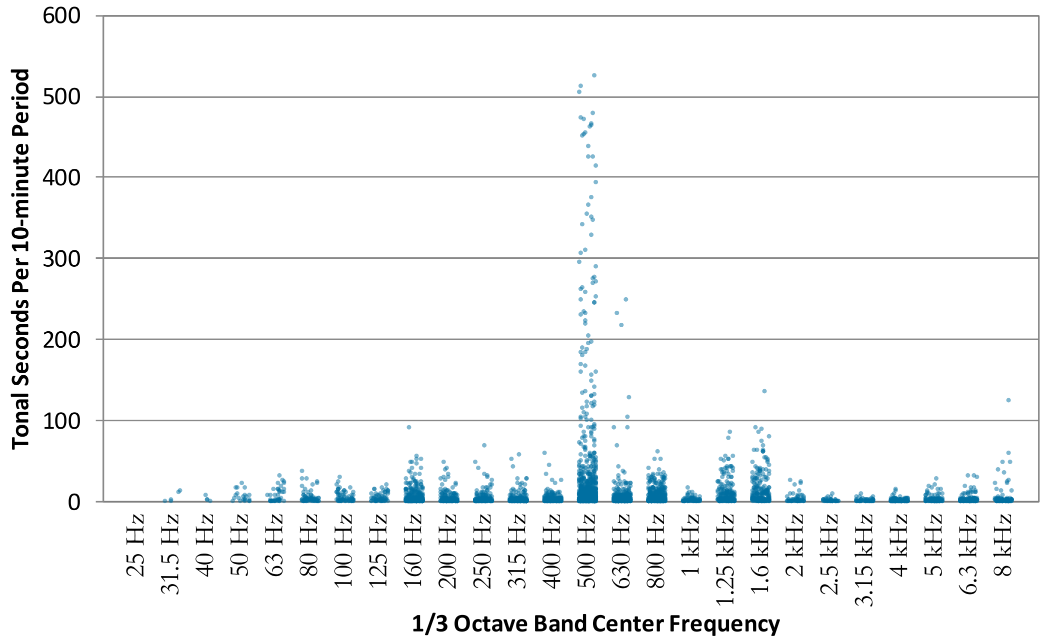


**FIGURE 78: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD, BY ONE-THIRD OCTAVE BAND. WOODED AREA MONITOR, WINTER.**

## SUMMER MONITORING

The sound level data measured at the Wooded Area during the summer are plotted as time history graphs in Figure 79, Figure 80, and Figure 81.

An apparent diurnal pattern in the sound level data was caused by a diurnal pattern in wind gust speed. The sound levels at this monitoring location declined when there was no wind in the trees, with the $L_{EQ}$ dropping below 20 dBAi on several occasions. Almost all dominant sounds were due to wind blowing through the trees and aircraft flyovers. Only haul truck traffic on Cassadaga Road and North Hill Road was audible at the monitor. The surrounding fields were not being cultivated.

Equipment servicing, fireworks and thunder were the only non-meteorological events excluded from sound level averaging.

The tonality chart in Figure 82 shows evidence of biogenic noise above 1,000 Hz at the monitor, as well as the existence of some unidentified tonal elements between 200 and 500 Hz.

The energy-averaged one-third octave band data collected at the Wooded Area monitor is shown in Figure 83. The sound pressure levels are expressed as $50^{th}$-percentile statistical levels and are unweighted. The plot reveals that winter levels were higher than summer levels, except at 80 Hz and above 2,000 Hz. Biogenic noise in the summer was persistent night and day, as the levels about 2,000 Hz were nearly identical. One-third octave band levels declined at just over three decibels per octave.

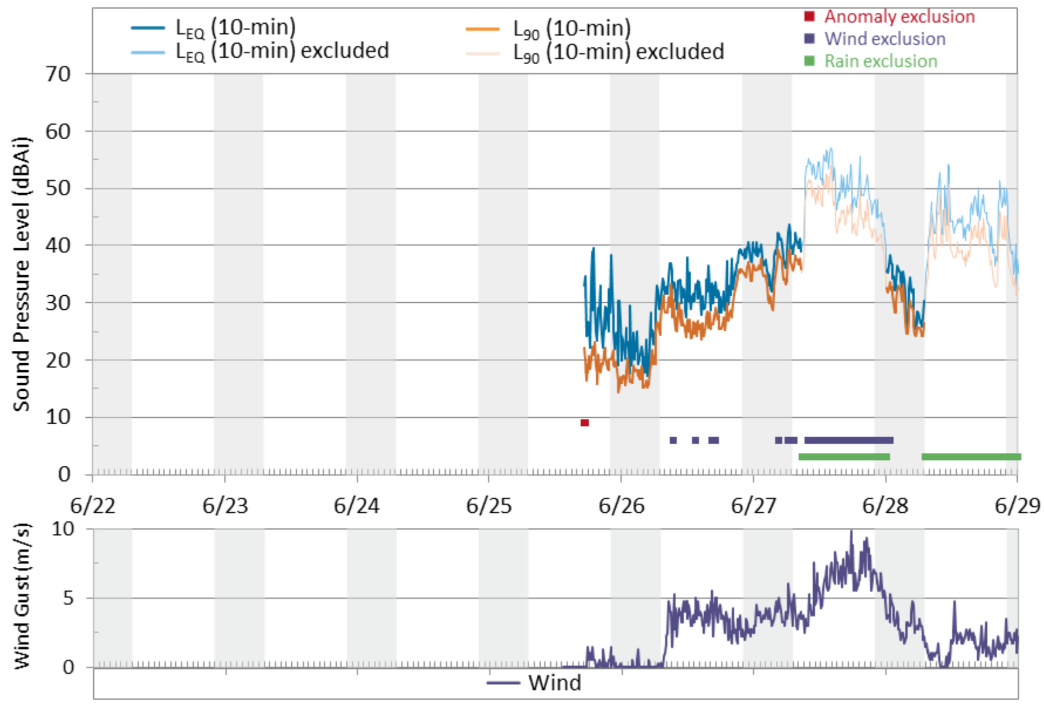


**FIGURE 79: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JUNE 22 – 29, 2015**

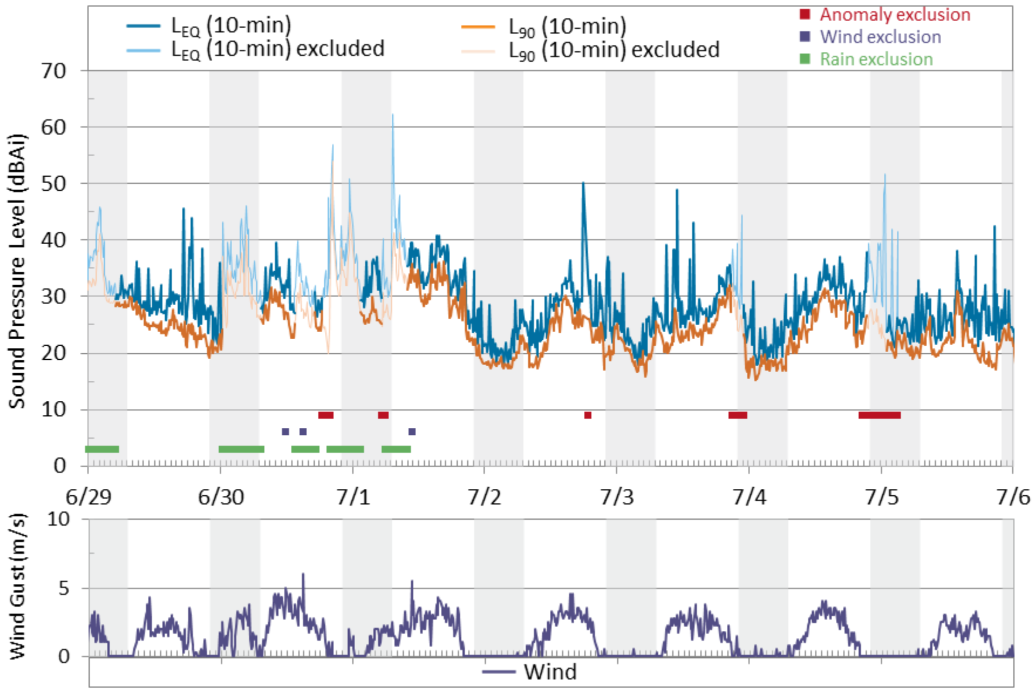


**FIGURE 80: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JUNE 29 – JULY 6, 2015**

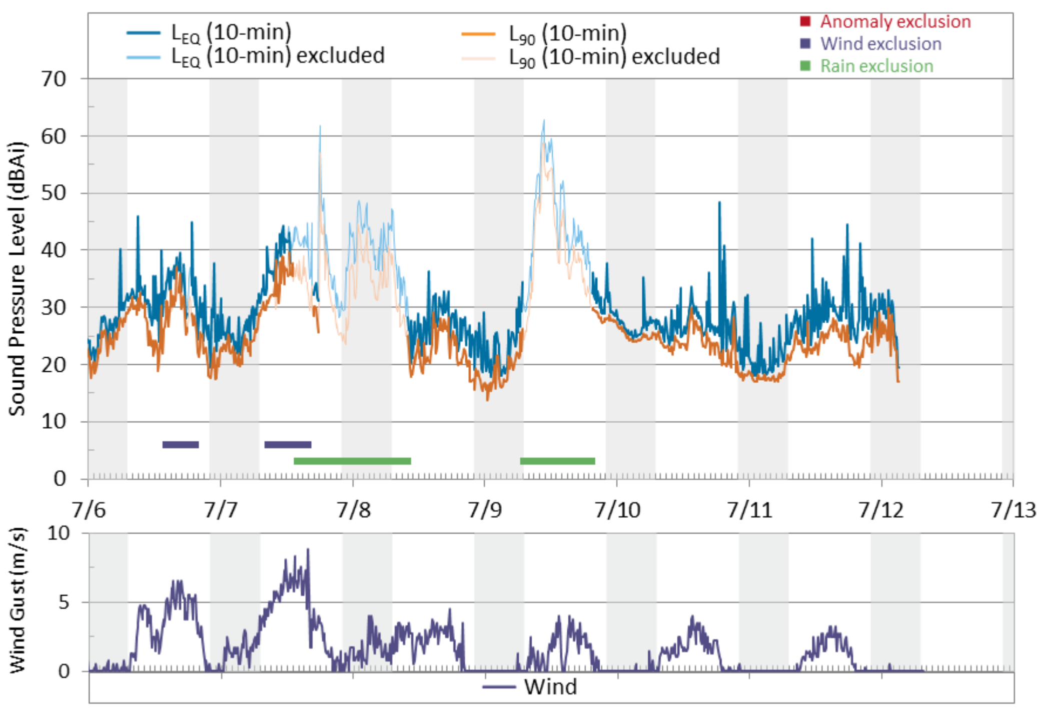


**FIGURE 81: WOODED AREA MONITOR SOUND LEVELS, WIND SPEED, AND EXCLUSIONS. JULY 6 – 13, 2015**

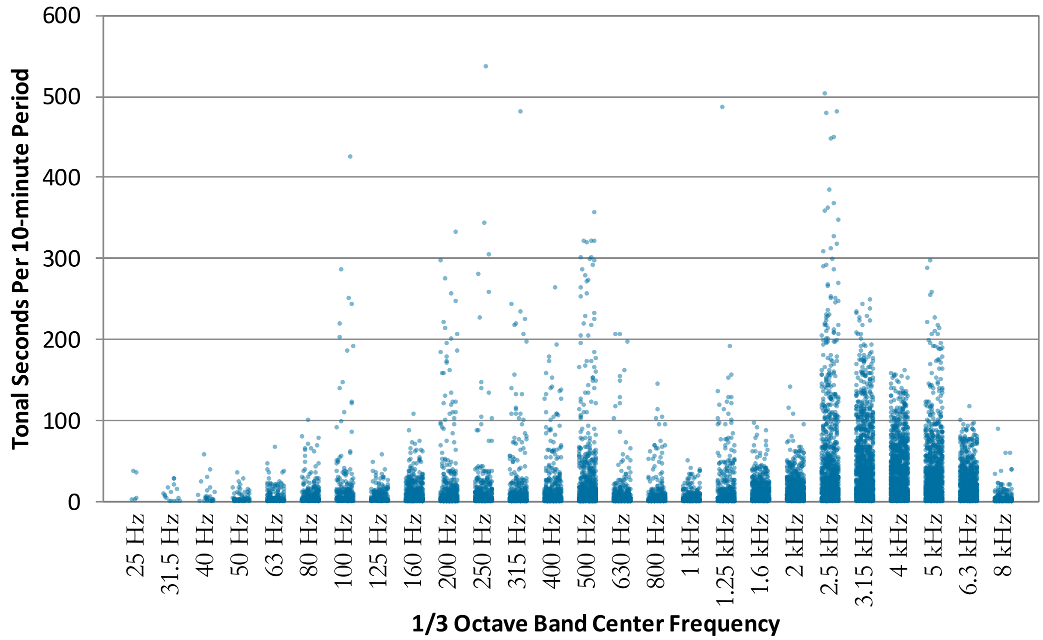


**FIGURE 82: NUMBER OF TONAL SECONDS IN EACH 10-MINUTE PERIOD, BY ONE-THIRD OCTAVE BAND. WOODED AREA MONITOR, SUMMER.**

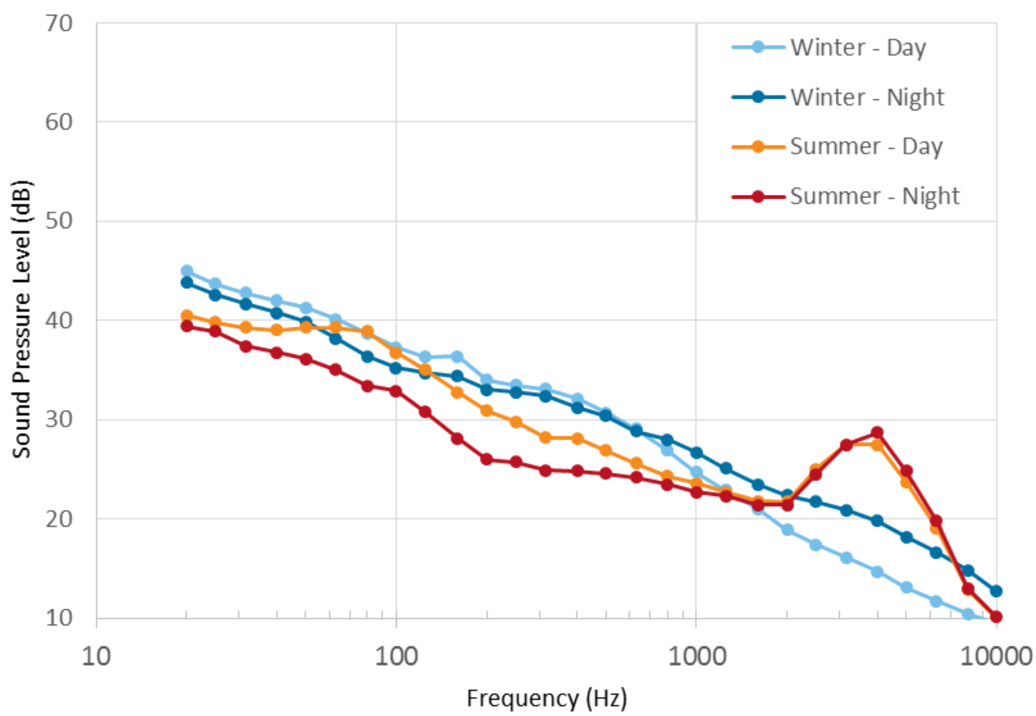


**FIGURE 83: WOODED AREA ONE-THIRD OCTAVE BAND AVERAGE SOUND PRESSURE LEVEL, $L_{50}$**

# 9.0 OVERALL MONITORING RESULTS

## 9.1 | METEOROLOGICAL DATA

Winds varied among the three monitor sites instrumented to measure them. Wind and gust speeds measured during the winter were higher in the winter were stronger than those measured during the summer. Also, the time and duration of precipitation events varied by site. The exact rain periods and thunder events were determined from audio recordings at each site. Thunder was also determined from the audio recordings at each site and excluded from the data.

### WINTER MONITORING PERIOD

Temperatures during the monitoring period ranged from a low of -8° C (18° F) to a high of 11° C (52° F). Measurable precipitation in the form of rain fell on December 16, 24, 25, 27, and 28, 2014. The duration of precipitation varied by site. An additional "rain" period was identified at the Wooded Area monitor on December 22, 2014; following an ice storm, temperatures rose above freezing, causing melting ice on tree branches surrounding the monitor to fall like rain. Maximum wind speed and gusts are tabulated in Table 9.

**TABLE 9: MAXIMUM MEASURED WIND SPEEDS BY SITE, WINTER**

| Source Site | Max Wind Speed | | Max Gust Speed | |
|---|---|---|---|---|
| | m/s | mph | m/s | mph |
| Cemetery | 8 | 17 | 13 | 28 |
| Pickup Hill | 5 | 11 | 11 | 24 |

### SUMMER MONITORING PERIOD

Temperatures during the monitoring period ranged from a low of 9° C (49° F) to a high of 29° C (85° F). Precipitation in the form of rain fell on during portions of June 27- through 30, as well as July 1, 7, 9, 13, and 14. The maximum wind speeds and gusts recorded at each site are shown in Table 10. The Cemetery consistently experienced the most wind. The Boutwell Hill monitor was sheltered in a hemlock forest and never experienced gusts over 3 m/s (6 mph). Wind speeds were generally lower during the summer than during the winter.

**TABLE 10: MAXIMUM MEASURED WIND SPEEDS BY SITE, SUMMER**

| Source Site | Max Wind Speed | | Max Gust Speed | |
|---|---|---|---|---|
| | m/s | mph | m/s | mph |
| Boutwell Hill | 2 | 3 | 3 | 6 |
| Cemetery | 6 | 14 | 10 | 22 |
| Pickup Hill | 3 | 8 | 8 | 17 |

### INFRASOUND MONITORING PERIOD

Temperatures during the infrasound measurement period ranged from a low of -6° C (21° F) to a high of 21° C (71° F). Precipitation fell in the form of rain on March 19, March 24, March 25, and March 28. Maximum wind speeds and gusts recorded are shown in Table 11. Wind speeds were overall higher than during the regular monitoring period, due to the more exposed monitor position.

**TABLE 11: MAXIMUM MEASURED WIND SPEED - INFRASOUND MONITORING PERIOD**

| Source Site | Max Wind Speed | | Gust Wind Speed | |
|---|---|---|---|---|
| | m/s | mph | m/s | mph |
| Boutwell Hill Infrasound | 7 | 15 | 14 | 32 |

## 9.2 | SOUND LEVELS

### SUMMARY OF SEASONAL SOUND LEVELS

The sound levels measured for each monitoring period are summarized for the winter and summer seasons at all six monitoring locations in Table 12 and Table 13, respectively.

Typically, the equivalent continuous sound levels ($L_{EQ}$) at night are less than those measured during the daytime, which was true for most monitoring locations in this study. At some of the more remote sites, dominant sources of sound from human activity were not observed (other than aircraft flyovers) and levels during the day and at night were comparable. These sites also had overall lower sound levels at night, at times dropping down below 20 dBA during calm periods. Sound levels are generally higher during the summer than the winter, large due to biogenic sound sources, even in spite of higher overall winter wind speeds.

The distribution of monitoring locations throughout the project region provided a variety of soundscapes. Table 14 summarize the combined monitoring period, in which statistical averages were calculated for the entire data set. The divergence of overall equivalent continuous levels, $90^{th}$-percentile ($L_{10}$) and $10^{th}$-percentile levels ($L_{90}$) at the monitoring locations indicates that the soundscapes were dominated by transient or intermittent sounds (such as aircraft overflights or passing automobiles). Statistical nighttime levels were higher at the Agricultural site because work started before daytime hours every day and a barn heater ran through the night during the winter. In the summer, the highest nighttime $L_{90}$ was observed at the Cemetery monitor due to increased human activity in temperate months around a relatively populated area. The average of all sites for both periods is a logarithmic average and will more closely reflect sites with higher overall sound levels.

### TABLE 12: PRECONSTRUCTION MONITORING SUMMARY, WINTER 2014

| Location | Average Sound Pressure Level (dBA)[52] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| Agricultural | 47 | 31 | 41 | 49 | 48 | 30 | 41 | 49 | 44 | 32 | 41 | 44 |
| Boutwell Hill | 40 | 20 | 30 | 41 | 41 | 21 | 31 | 42 | 38 | 19 | 28 | 40 |
| Cemetery | 40 | 29 | 35 | 42 | 41 | 30 | 36 | 43 | 37 | 28 | 34 | 40 |
| Nelson Road | 41 | 25 | 34 | 43 | 41 | 27 | 35 | 43 | 40 | 24 | 32 | 42 |
| Pickup Hill | 39 | 25 | 31 | 39 | 40 | 25 | 32 | 40 | 36 | 24 | 30 | 39 |
| Wooded Area | 37 | 22 | 31 | 40 | 36 | 22 | 31 | 39 | 37 | 21 | 30 | 41 |
| **Season Average** | **42** | **27** | **36** | **44** | **43** | **27** | **36** | **44** | **40** | **27** | **35** | **41** |

### TABLE 13: PRECONSTRUCTION MONITORING SUMMARY, SUMMER 2015

| Location | Average Sound Pressure Level (dBA) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| Agricultural | 46 | 27 | 37 | 47 | 48 | 31 | 42 | 49 | 40 | 25 | 30 | 42 |
| Boutwell Hill | 37 | 21 | 29 | 39 | 39 | 23 | 31 | 41 | 33 | 20 | 25 | 36 |
| Cemetery | 49 | 30 | 37 | 44 | 51 | 32 | 38 | 46 | 38 | 29 | 34 | 40 |
| Nelson Road | 39 | 26 | 32 | 40 | 40 | 27 | 33 | 42 | 37 | 25 | 31 | 38 |
| Pickup Hill | 50 | 27 | 33 | 40 | 52 | 28 | 34 | 42 | 36 | 25 | 31 | 38 |
| Wooded Area | 34 | 22 | 28 | 37 | 35 | 23 | 29 | 37 | 33 | 21 | 26 | 36 |
| **Season Average** | **46** | **26** | **34** | **42** | **48** | **29** | **37** | **44** | **37** | **25** | **31** | **39** |

### TABLE 14: PRECONSTRUCTION MONITORING SUMMARY, OVERALL

| Location | Average Sound Pressure Level (dBA) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| Agricultural | 46 | 28 | 40 | 49 | 48 | 31 | 42 | 50 | 42 | 25 | 36 | 44 |
| Boutwell Hill | 40 | 21 | 30 | 41 | 40 | 22 | 31 | 42 | 39 | 20 | 26 | 40 |
| Cemetery | 47 | 30 | 36 | 42 | 49 | 31 | 37 | 45 | 38 | 29 | 34 | 40 |
| Nelson Road | 40 | 26 | 33 | 42 | 40 | 27 | 34 | 42 | 38 | 25 | 31 | 40 |
| Pickup Hill | 47 | 26 | 32 | 40 | 49 | 27 | 33 | 41 | 36 | 25 | 31 | 38 |
| Wooded Area | 36 | 22 | 29 | 39 | 36 | 23 | 30 | 39 | 35 | 21 | 28 | 40 |
| **Overall Average** | **45** | **26** | **35** | **44** | **46** | **28** | **36** | **45** | **39** | **25** | **32** | **41** |

[52] As discussed above, the "Ai" filter was used to eliminate sounds above 1.25 kHz when bird and insect tones were detected.

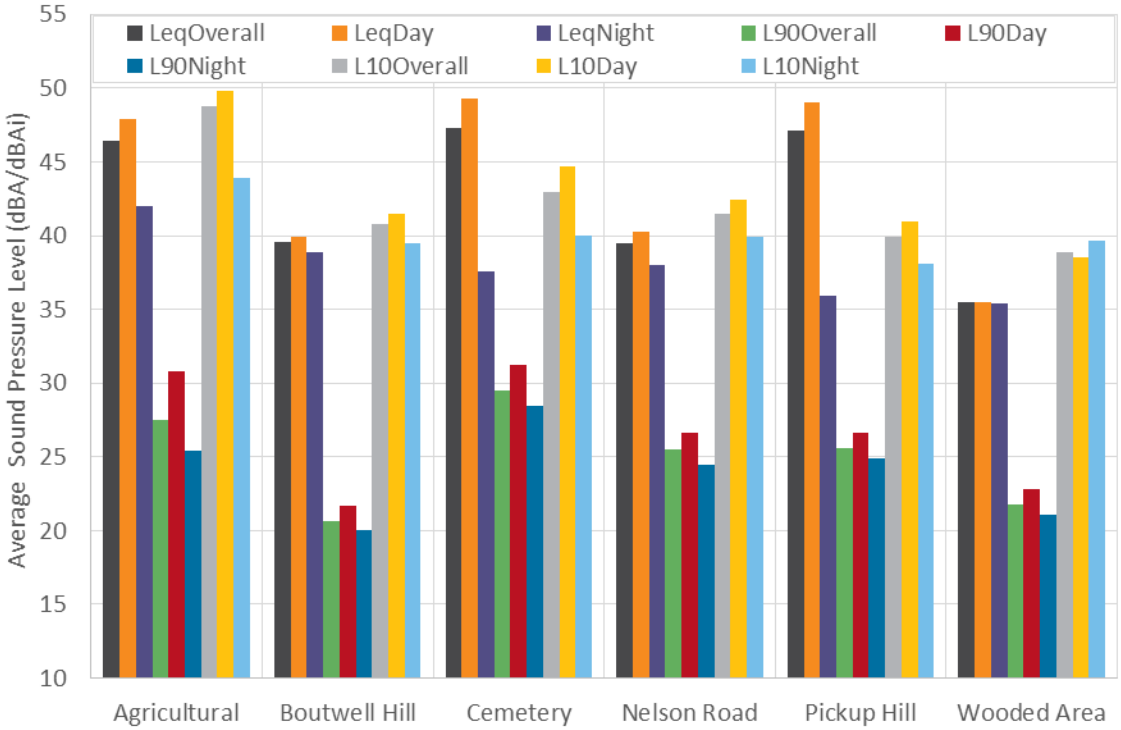


**FIGURE 84: SUMMARY OF $L_{EQ}$ AND $L_{90}$, AVERAGED OVER ENTIRE MONITORING PERIOD**

## DAY-NIGHT AVERAGE AND COMMUNITY NOISE EQUIVALENT LEVEL

Table 15 presents a summary of the calculated combined monitoring period metrics of Day-Night Level ($L_{DN}$) and Community Noise Equivalent Level (CNEL). The Day-Night Level assigns a penalty of 10 dB to sounds that occur in the nighttime hours (22:00 to 7:00)[53]. The CNEL noise metric applies the same 10 dB penalty to nighttime levels and also adds an additional 5 dB to levels during evening hours (19:00 to 22:00).

**TABLE 15: DAY-NIGHT AND COMMUNITY NOISE EQUIVALENT LEVEL SUMMARY**

| Location | $L_{DN}$ (dBA) | | CNEL (dBA) | |
|---|---|---|---|---|
| | Winter | Summer | Winter | Summer |
| *Agricultural* | 51 | 49 | 52 | 50 |
| *Boutwell Hill* | 48 | 41 | 49 | 42 |
| *Cemetery* | 45 | 50 | 46 | 51 |
| *Nelson Road* | 47 | 43 | 48 | 44 |
| *Pickup Hill* | 43 | 50 | 44 | 50 |
| *Wooded Area* | 43 | 40 | 45 | 39 |

[53] U.S. agencies use a nighttime period of 23:00 to 7:00 for the $L_{DN}$. We use 22:00 to 7:00 in this report for consistency with the Article X definition of nighttime.

## SOUND LEVEL BY SOUNDSCAPE

The variety of monitoring locations provides the opportunity to classify three representative site types that characterize the area: Rural Agricultural, Rural Residential, and Remote. Each site type is characterized by its defining sources. Table 16 summarizes the corresponding characteristics of each site type classification. The logarithmic averages calculated from these site type groups are shown in Table 17.

Project-wide arithmetic (not geometric or logarithmic) averages of the overall levels calculated at each monitoring location are given in Table 18.

### TABLE 16. SUMMARY OF SITE TYPE CLASSIFICATIONS

| | Rural Agricultural | Rural Residential | Remote |
|---|---|---|---|
| ***Soundscape Description*** | Dominated by activities of an adjacent industry | Defined by human activities in a rural community | Area separated from significant human activity |
| ***Typical Sources*** | Industry specific equipment, vehicular passbys | Vehicle passbys, outdoor human activities/hobbies, aircraft overflights | Wind through the trees, Distant vehicular traffic, aircraft overflights |
| ***Examples*** | Dairy barn | Rural residences | State Forest |
| ***Sites Included*** | Agricultural, Pickup Hill | Cemetery, Nelson Road | Boutwell Hill, Wooded Area |

### TABLE 17: PRECONSTRUCTION MONITORING SUMMARY BY SITE TYPE, OVERALL

| Location | Average Sound Pressure Level (dBA) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| *Rural Agricultural* | 47 | 27 | 38 | 46 | 48 | 29 | 39 | 47 | 40 | 25 | 34 | 42 |
| *Rural Residential* | 45 | 28 | 35 | 42 | 47 | 29 | 36 | 44 | 38 | 27 | 33 | 40 |
| *Remote* | 38 | 21 | 29 | 40 | 38 | 22 | 30 | 40 | 37 | 21 | 27 | 40 |

### TABLE 18. PROJECT-WIDE MEAN SOUND LEVELS OVER ALL MONITORING LOCATIONS

| | Mean Sound Level (dBA) | | |
|---|---|---|---|
| *Metric* | Overall | Day | Night |
| $L_{EQ}$ | 43 | 44 | 38 |
| $L_{90}$ | 25 | 27 | 24 |
| $L_{10}$ | 42 | 43 | 40 |

## COMPARISON OF SOUND LEVELS TO WIND SPEED

The hub height wind speed as measured at a project meteorological tower (Met 1) are shown in relation to $L_{EQ}$ and $L_{90}$ are shown plotted against the hub height (93 meter or 305 feet) wind speed in Figure 85 and Figure 86, respectively. The purple area indicates the 80$^{th}$ percentile sound level, with the middle grey line indicating the median sound level. Wind speeds below 4 m/s, the wind turbine cut-in speed, were omitted. There is a correlation between sound level and hub-height wind speed, with the correlation improving as wind speeds increase. There is also a better correlation between the $L_{90}$ sound level than the $L_{EQ}$, since the $L_{90}$ will filter out intermittent anthropogenic sounds such as car passbys.

Figure 87 and Figure 88 show the hub height wind speed compared to the 10-minute sound level ($L_{EQ}$ and $L_{90}$ respectively) for each individual 10-minute period. As with the middle 80 percent data, this indicates that the correlation between sound level and wind speed improves with increasing wind speed and there is a higher correlation between the $L_{90}$ and wind speed than the $L_{EQ}$. For the $L_{90}$, the correlation is higher during the day than at night, but for the $L_{EQ}$ the correlation is higher at night. Note that while there is a correlation between sound level and hub height wind speed, there is still considerable variability in sound level at a given wind speed. Even at 15 m/s the 80 percent sound level ($L_{90}$) range is from 35 to 44 dBA, a 9 dB spread. At 4 m/s, the spread is 12 dB for the $L_{90}$ and 17 dB for the $L_{EQ}$. In other words, wind speed is not the sole determinant of the background sound level.

Figure 89 shows microphone height wind speed compared with monitored 10-minute $L_{90}$ sound levels. There is a correlation between wind speed and sound level, particularly at night. What is interesting is that the correlation between sound level and microphone height wind speed is lower than the correlation between sound level and hub height wind speed. The likely reason for this is that the Boutwell Hill monitor, for which the data was analyzed, is below a tall tree canopy. This generally shields the microphone and anemometer from wind. Wind in the tree canopy above can also be a major sound source during some periods. Consequently winds aloft, within the tree canopy, have a greater influence on sound levels.

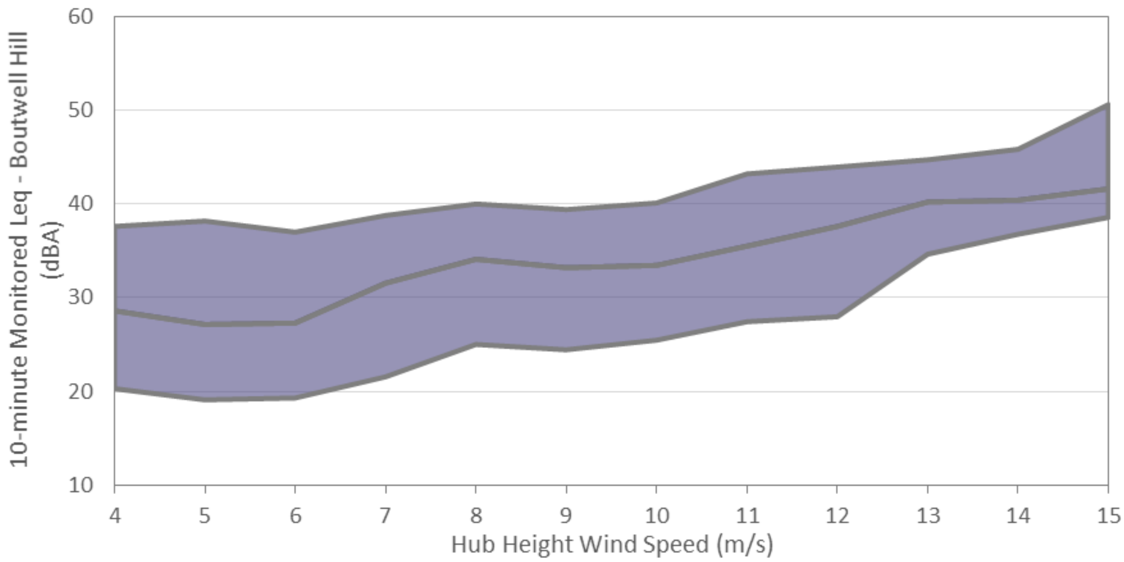


**FIGURE 85: MEASURED 10-MINUTE $L_{EQ}$ AT THE BOUTWELL HILL MONITOR BY HUB HEIGHT WIND SPEED FROM MET TOWER 1**

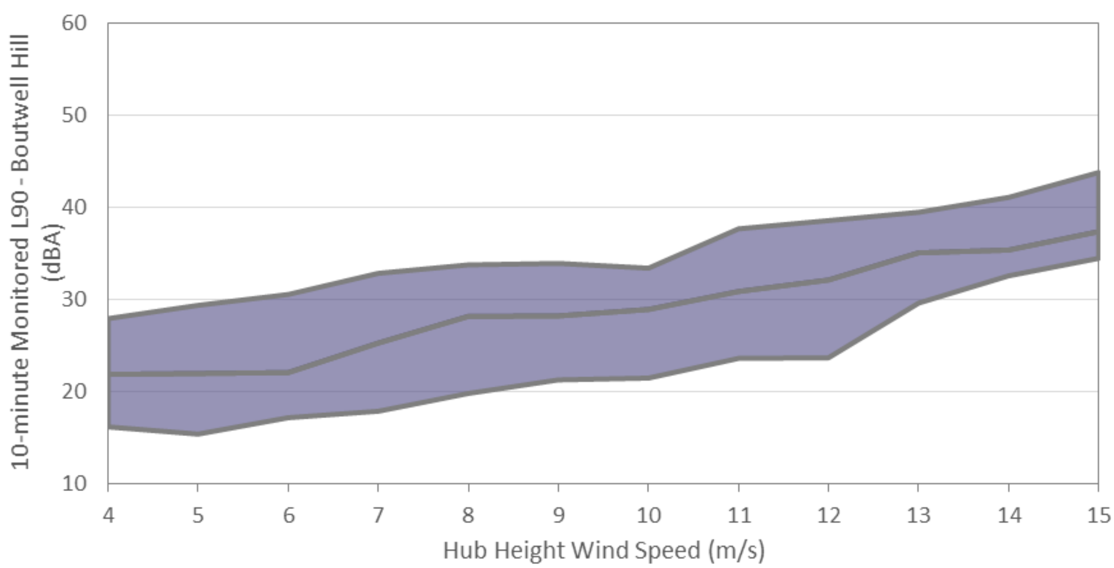


**FIGURE 86: MEASURED 10-MINUTE $L_{90}$ AT THE BOUTWELL HILL MONITOR BY HUB HEIGHT WIND SPEED FROM MET TOWER 1**

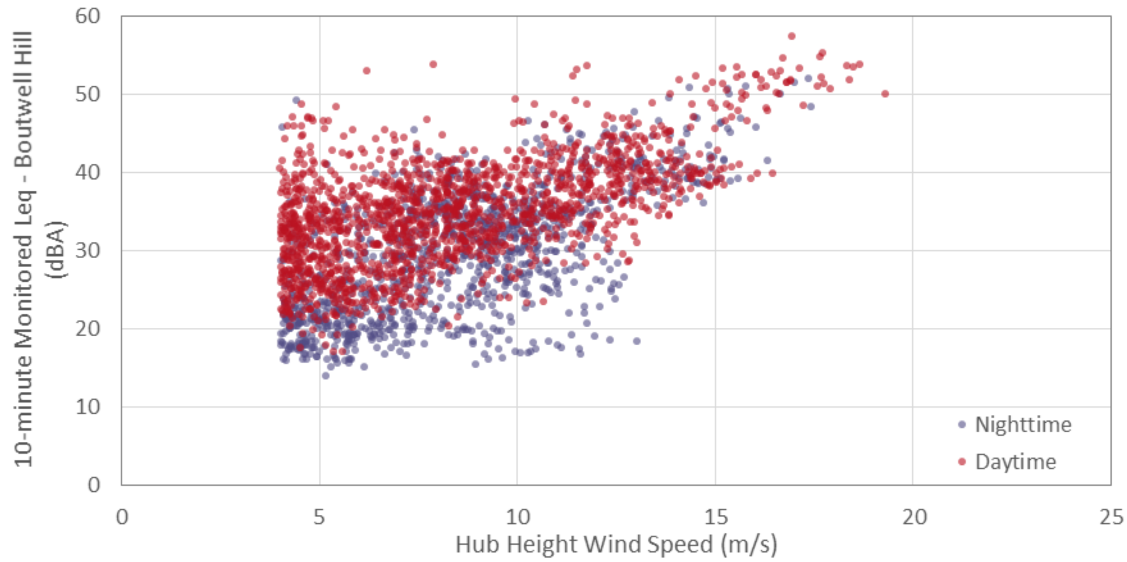


**FIGURE 87: MEASURED 10-MINUTE $L_{EQ}$ AT THE BOUTWELL HILL MONITOR BY HUB HEIGHT WIND SPEED FROM MET TOWER 1**

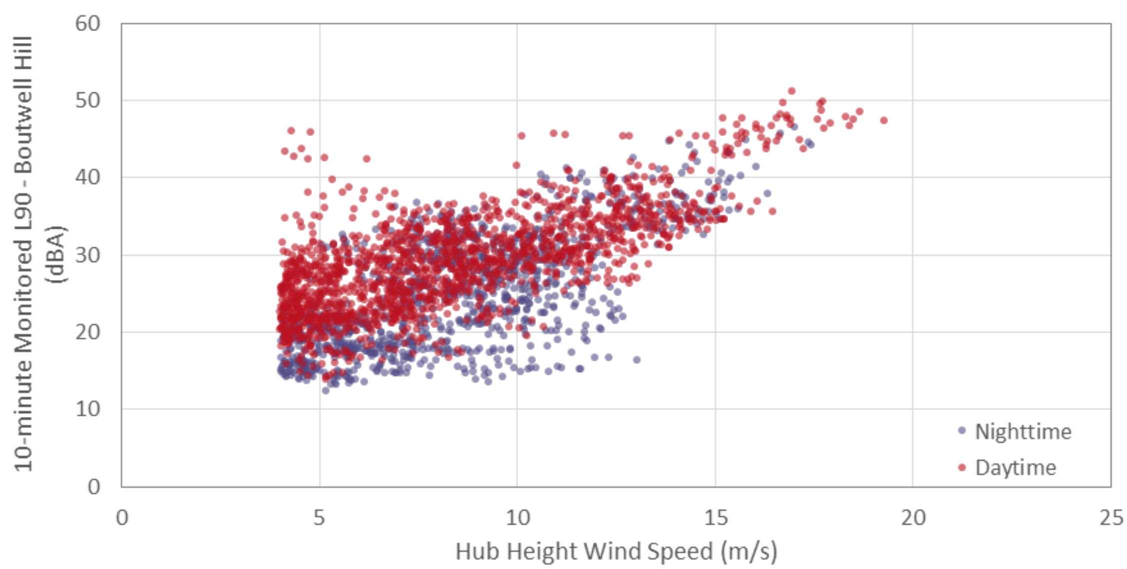


**FIGURE 88: MEASURED 10-MINUTE $L_{90}$S AT THE BOUTWELL HILL MONITOR BY HUB HEIGHT WIND SPEED FROM MET TOWER 1**

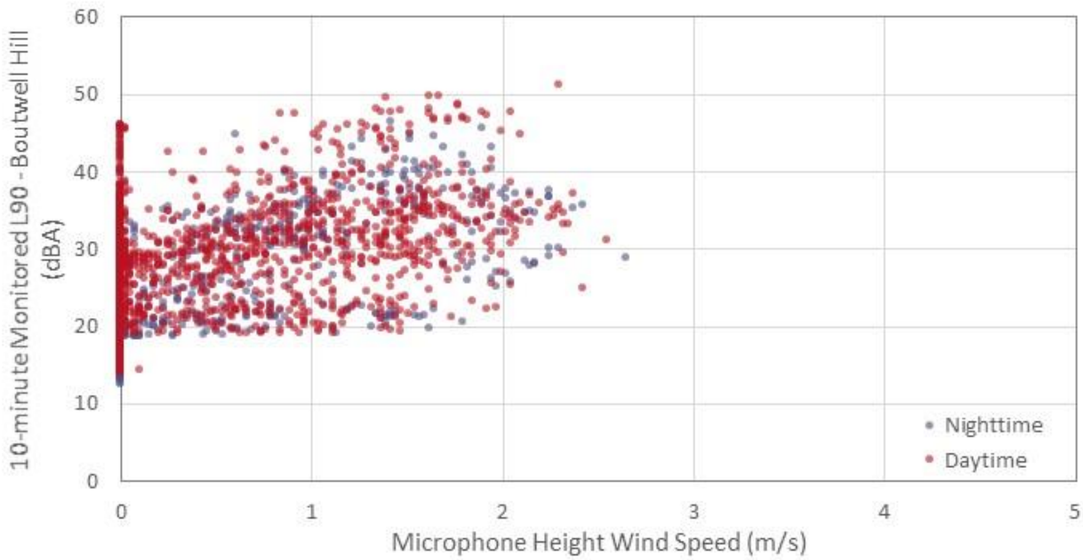


**FIGURE 89: MEASURED 10-MINUTE L90S AT THE BOUTWELL HILL MONITOR BY MICROPHONE HEIGHT WIND SPEED**

## TEMPORAL ACCURACY

Temporal accuracy of the monitoring data was analyzed according to ANSI 12.9 Part 2. The standard analyzes the representativeness of the measurement data for a particular measurement location. This is accomplished through calculating the day-night average sound level ($L_{dn}$) for each day within the monitoring period and then determining the 95$^{th}$ percentile confidence interval for the data series. These confidence intervals are categorized into three classes. Class "A" is for precision measurements, with Class "B" and Class "C" being less precise. Normality of the data set is then calculated using a Kolmogorov-Smirnov test.

Analysis results are shown in Table 19. Three of the sites achieved Class "A" or "B" status, and all sites fit the criteria for normality. The sites that met the criteria for Class "A" or "B" were either located near to a higher traffic road (Cemetery and Nelson Road) or have a major nearby sound source (the pumps that were part of the dairy operations at the Agricultural site). The other sites were either in rural areas, near low traffic roads, or had a sound source added between the two monitoring seasons (the small wind turbine at Pickup Hill). More rural sites have soundscapes dominated by biogenic sounds (birds, wind, etc), that may vary more from day to day and there may also be no dominant sound source to stabilize sound levels over long periods.

The ANSI 12.9 Part 2 method is primarily intended for areas with major sound sources such as military installations, airports, roadways, and railways and is not specifically developed for rural sites. Rural sites that were monitored at Cassadaga showed less stable day-to-day sound levels because of the lack of dominating source. As a result, these sites exhibited low temporal accuracy.

**TABLE 19: MONITORING TEMPORAL ACCURACY (ANSI 12.9 PART 2)**

| | Agricultural | Boutwell Hill | Cemetery | Nelson Road | Pickup Hill | Wooded Area |
|---|---|---|---|---|---|---|
| Number of Samples | 30 | 34 | 34 | 30 | 32 | 31 |
| Upper Confidence Interval (dB) | 0.7 | 4.2 | 2.6 | 2.0 | 3.8 | 3.9 |
| Lower Confidence Interval (dB) | 0.8 | 6.4 | 3.8 | 3.0 | 5.9 | 6.2 |
| Measurement Class | A | >C | B | A | >C | >C |
| Normality | Yes | Yes | Yes | Yes | Yes | Yes |

## INFRASOUND MONITORING

Overall results from preconstruction infrasound monitoring at the Boutwell Hill monitoring location are shown in Table 20. Overall A-weighted levels are slightly lower than what was measured during the regular summer and winter preconstruction monitoring periods, probably due to the infrasound location being further from the road. There is a relatively large spread between the $L_{10}$ and $L_{90}$ metrics, indicating a high amount of variability within the soundscape.

Depending on metric ($L_{EQ}$, $L_{50}$, etc.) there is a 12 to 22 dB difference between the respective A-weighted and C-weighted sound levels.

Overall infrasound levels at this location are 56 dBG $L_{EQ}$. For reference, the threshold of hearing is for infrasound is approximately 90 dBG. The maximum measured 10-minute G-weighted sound level is 84 dBG, which is still below the perceptibility threshold. The spread between the $LG_{10}$ and $LG_{90}$ is approximately 10 dB, indicating that infrasound levels are more consistent than A-weighted sound levels. This is probably since many intermittent sounds, particularly biogenic sounds, are mid- to high-frequency sound sources. Cars and trucks are also primarily low-, mid-, and high-frequency sound sources, with lower infrasonic emissions.

**TABLE 20: PRECONSTRUCTION MONITORING - BOUTWELL HILL INFRASOUND MONITORING**

| Period | Sound Pressure Level (Ai-weighting) | | | | |
|---|---|---|---|---|---|
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{max}$ |
| *Overall* | 36 | 18 | 28 | 39 | 66 |
| *Day* | 38 | 23 | 30 | 40 | 66 |
| *Night* | 34 | 16 | 23 | 37 | 58 |
| **Period** | **Sound Pressure Level (C-weighting)** | | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{max}$ |
| *Overall* | 50 | 40 | 46 | 53 | 80 |
| *Day* | 50 | 43 | 47 | 53 | 74 |
| *Night* | 49 | 38 | 44 | 51 | 80 |
| **Period** | **Sound Pressure Level (G-weighting)** | | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{max}$ |
| *Overall* | 56 | 49 | 54 | 59 | 84 |
| *Day* | 57 | 51 | 55 | 60 | 84 |
| *Night* | 55 | 48 | 52 | 58 | 82 |

# 10.0 WIND TURBINE NOISE – SPECIAL CONSIDERATIONS

## 10.1 | SOURCES OF SOUND GENERATION BY WIND TURBINES

Wind turbines generate two principle types of noise: aerodynamic noise, produced from the flow of air around the blades, and mechanical noise, produced from mechanical and electrical components within the nacelle.

Aerodynamic noise is the primary source of noise associated with wind turbines. These acoustic emissions can be either tonal or broadband. Tonal noise occurs at discrete frequencies, whereas broadband noise is distributed with little peaking across the frequency spectrum.

While unusual, tonal noise can also originate from unstable air flows over holes, slits, or blunt trailing edges on blades. Most modern wind turbines have upwind rotors designed to prevent blade impulsive noise. Therefore, the majority of audible aerodynamic noise from wind turbines is broadband at the middle frequencies, roughly between 200 Hz and 1,000 Hz.

Wind turbines emit aerodynamic broadband noise as the spinning blades interact with atmospheric turbulence and as air flows along their surfaces. This produces a characteristic "whooshing" sound through several mechanisms (Figure 90):

- Inflow turbulence noise occurs when the rotor blades encounter atmospheric turbulence as they pass through the air. Uneven pressure on a rotor blade causes variations in the local angle of attack, which affects the lift and drag forces, causing aerodynamic loading fluctuations. This generates noise that varies across a wide range of frequencies but is most significant at frequencies below 500 Hz.
- Trailing edge noise is produced as boundary-layer turbulence as the air passes into the wake, or trailing edge, of the blade. This noise is distributed across a wide frequency range but is most notable at high frequencies between 700 Hz and 2 kHz.
- Tip vortex noise occurs when tip turbulence interacts with the surface of the blade tip. While this is audible near the turbine, it tends to be a small component of the overall noise further away.
- Stall or separation noise occurs due to the interaction of turbulence with the blade surface.

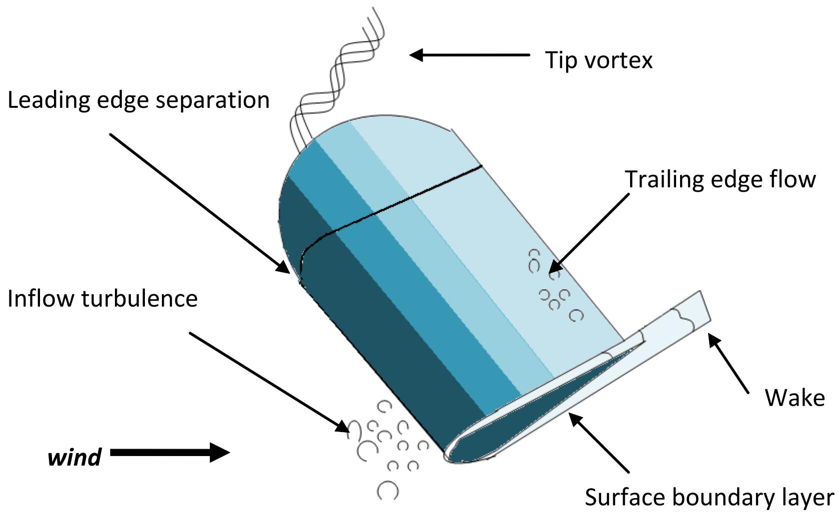


**FIGURE 90: AIRFLOW AROUND A ROTOR BLADE**

Mechanical sound from machinery inside the nacelle tends to be tonal in nature but can also have a broadband component. Potential sources of mechanical noise include the gearbox, generator, yaw drives, cooling fans, and auxiliary equipment. These components are housed within the nacelle, whose surfaces, if untreated, radiate the resulting noise. However modern wind turbines have nacelles that are designed to reduce internal noise, and rarely is the mechanical noise a significant portion of the total noise from a wind turbine.

## 10.2 | AMPLITUDE MODULATION

Amplitude modulation (AM) is a fluctuation in sound level that occurs at the blade passage frequency. There is no consistent definition how much of a sound level fluctuation is necessary for blade swish to be considered AM, however sound level fluctuations in A-weighted sound level can range up to 10 dB. Fluctuations in individual 1/3 octave bands are typically more and can exceed 15 dB. Fluctuations in individual 1/3 octave bands can sometimes synchronize and desynchronize over periods, leading to increases and decreases in magnitude of the A-weighted fluctuations. Similarly, in wind farms with multiple turbines, fluctuations can synchronize and desynchronize, leading to variations in amplitude modulation depth.[54] Most amplitude modulation is in the mid-frequencies and most overall A-weighted AM is less than 4.5 dB in depth.[55]

There are many confirmed and hypothesized causes of amplitude modulation including: blade passage in front of the tower, blade tip sound emission directivity, wind shear, inflow turbulence, and turbine blade yaw error. It has recently been noted that although wind shear can contribute to the extent of amplitude modulation, wind shear does not contribute to the existence of amplitude modulation in and of itself. Instead, there needs to be detachment of

[54] McCunney, Robert, et al. "Wind Turbines and Health: A Critical Review of the Scientific Literature." *Journal of Occupational and Environmental Medicine.* 56(11) November 2014: pp. e108-e130.
[55] RSG, et al., "Massachusetts Study on Wind Turbine Acoustics," Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016

airflow from the blades for wind shear to contribute to amplitude modulation.[56] While factors like the blade passing in front of the tower are intrinsic to wind turbine design, other factors vary with turbine design, local meteorology, topography, and turbine layout. Mountainous areas, for example, are more likely to have turbulent airflow, less likely to have high wind shear, and less likely to have turbine layouts that allow for blade passage synchronization for multiple turbines. Amplitude modulation extent varies with the relative location of a receptor to the turbine. Amplitude Modulation is usually experienced most when the receptor is between 45 and 60 degrees from the downwind or upwind position and is experience least directly with the receptor directly upwind or downwind of the turbines.

## 10.3 | METEOROLOGY

Meteorological conditions can significantly affect sound propagation. The two most important conditions to consider are wind shear and temperature lapse. Wind shear is the difference in wind speeds by elevation and temperature lapse rate is the temperature gradient by elevation. In conditions with high wind shear (large wind speed gradient), sound levels upwind from the source tend to decrease and sound levels downwind tend to increase due to the refraction, or bending, of the sound (Figure 91).

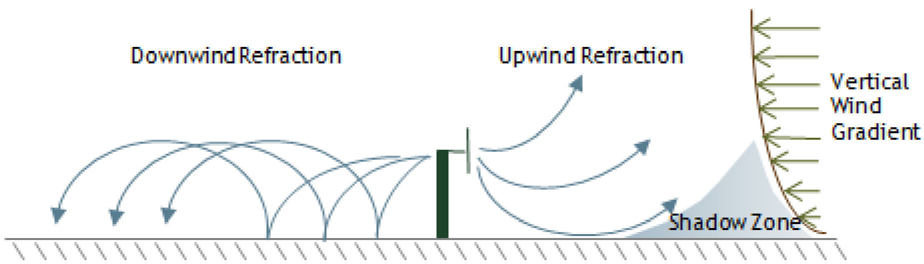


**FIGURE 91: SCHEMATIC OF THE REFRACTION OF SOUND DUE TO VERTICAL WIND GRADIENT (WIND SHEAR)**

With temperature lapse, when ground surface temperatures are higher than those aloft, sound will tend to refract upwards, leading to lower sound levels near the ground. The opposite is true when ground temperatures are lower than those aloft (an inversion condition).

High winds and/or high solar radiation can create turbulence which tends to break up and dissipate sound energy. Highly stable atmospheres, which tend to occur on clear nights with low ground-level wind speeds, tend to minimize atmospheric turbulence and are generally more favorable to downwind propagation.

In general terms, sound propagates along the ground best under stable conditions with a strong temperature inversion. This tends to occur during the night and is characterized by low ground level winds. As a result, worst-case conditions for wind turbines tend to occur downwind under moderate nighttime temperature inversions. Therefore, this is the default condition for modeling wind turbine sound.

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[56] "Wind Turbine Amplitude Modulation: Research to Improve Understanding as to its Cause and Effect." *RenewableUK*. December 2013.

## 10.4 | MASKING

As mentioned above, sound levels from wind turbines are a function of wind speed. Background sound is also a function of wind speed, i.e., the stronger the winds, the louder the resulting background sound. This effect is amplified in areas covered by trees and other vegetation.

The sound from a wind turbine can often be masked by wind noise at downwind receptors because the frequency spectrum from wind is very similar to the frequency spectrum from a wind turbine. Figure 92 compares the shape of the sound spectrum measured during a 5 m/s wind event to that of a Gamesa G114 2.625 MW wind turbine. As shown, the shapes of the spectra are very similar at lower frequencies. At higher frequencies, the sounds from the masking wind noise are higher than the wind turbine. As a result, the masking of turbine noise occurs at higher wind speeds for some meteorological conditions. Masking will occur most, when ground wind speeds are relatively high, creating wind-caused noise such as wind blowing through the trees and interaction of wind with structures.

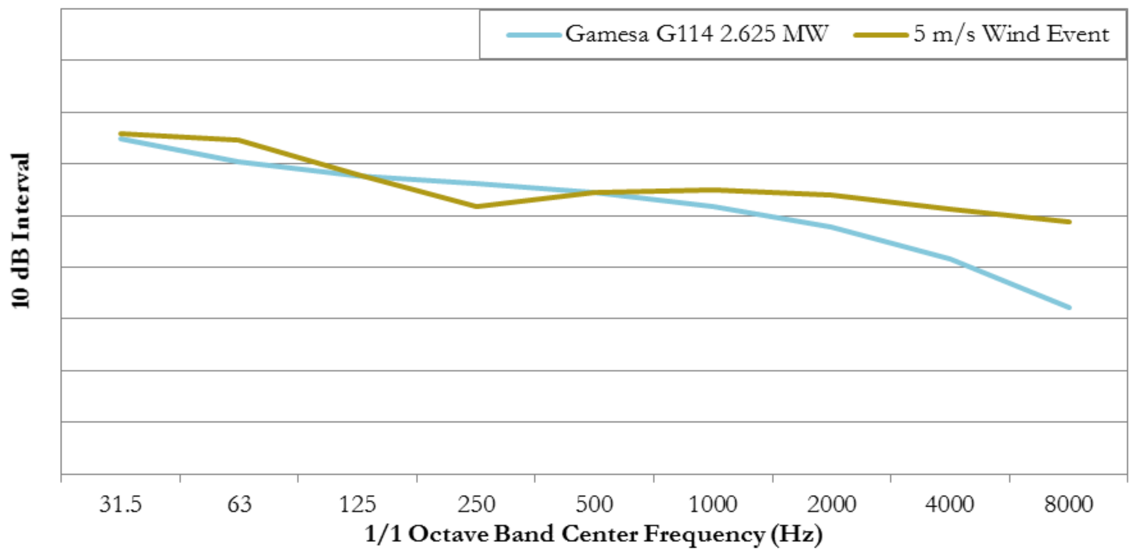


**FIGURE 92: COMPARISON OF NORMALIZED FREQUENCY SPECTRA FROM THE WIND AND THE GAMESA G114 2.625 MW[57]**

It is important to note that while winds may be blowing at turbine height, there may be little to no wind at ground level. This is especially true during strong wind gradients (high wind shear), which mostly occur at night. This can also occur on the leeward side of ridges where the ridge blocks the wind. A site specific analysis of sound level compared to hub-height wind speed is found in Section 9.2 .

[57] The purpose of this Figure is to show the shapes to two spectra relative to one another and not the actual sound level of the two sources of sound. The level of each source was normalized independently.

## 10.5 | INFRASOUND AND LOW FREQUENCY SOUND

Infrasound is sound pressure fluctuations at frequencies below about 20 Hz. Sound below this frequency is only audible at very high magnitudes. Low frequency sound is in the audible range of human hearing, that is, above 20 Hz, but below 100 to 200 Hz depending on the definition.

Low frequency aerodynamic tonal noise is typically associated with downwind rotors on horizontal axis wind turbines. In this configuration, the rotor plane is behind the tower relative to the oncoming wind. As the turbine blades rotate, each blade crosses behind the tower's aerodynamic wake and experiences brief load fluctuations. This causes short, low-frequency pulses or thumping sounds called blade impulsive noise. Large modern wind turbines are "upwind", where the rotor plane is upwind of the tower. As a result, this type of low frequency noise is at a much lower magnitude with upwind turbines than downwind turbines, well below established infrasonic hearing thresholds.

Figure 93 shows the sound levels 350 meters from a wind turbine when the wind turbine was operating (T-on) and shut down (T-off) for wind speeds at hub height greater than 9 m/s. Measurements were made over approximately two weeks.[58] The red 90 dBG line is shown here as the ISO 7196:1995 perceptibility threshold. As shown, the wind turbines generated measurable infrasound, but at least 20 dB below audibility thresholds.

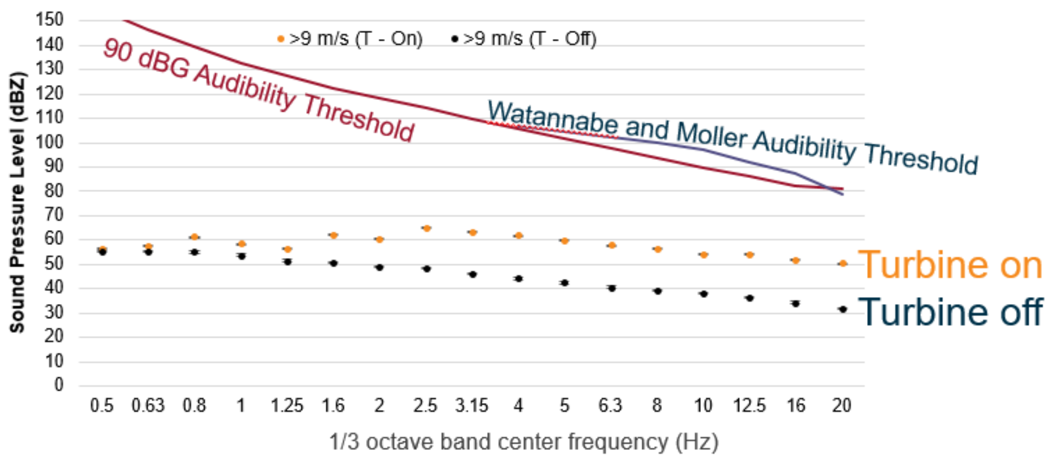


**FIGURE 93: INFRASOUND FROM A WIND TURBINE AT 350 METERS COMPARED WITH PERCEPTION THESHOLDS**

Low frequency sound is primarily generated by the generator and mechanical components. Much of the mechanical noise has been reduced in modern wind turbines through improved sound insulation at the hub. Low frequency sound can also be generated by the blades at higher wind speeds when the inflow air is very turbulent. However, at these wind speeds, low frequency sound from the wind turbine blades is often masked by wind noise at the downwind receptors.

[58] RSG, et al., "Massachusetts Study on Wind Turbine Acoustics," Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016 – Graphic from RSG presentation to MassDEP WNTAG, March, 2016

Finally, low frequency sound is absorbed less by the atmosphere and ground than higher frequency sound. Our modeling takes into account frequency-specific ground attenuation and atmospheric absorption factors that takes this into account.

## 10.6 | WIND TURBINE NOISE ABATEMENT MEASURES

Wind turbine noise can be abated using either factory-installed measures, siting methods, or measures implemented after the project is constructed.

### WIND TURBINE DESIGN

Horizontal axis wind turbines, with three blades, positioned upwind of the tower are the only type used for utility-scale wind power. Turbines with the blades positioned downwind of the tower are obsolete and cause more noise issues than upwind designs due to the blades passing through the wake of the tower. Vertical axis wind turbines are not available in megawatt scale.

The design of the blade can have a substantial impact on noise generation. Noise control is considered during the blade design process.

Some turbine models are available with serrated trailing edge, that reduces wind turbine aerodynamic noise by smoothing the flow of air behind the blade, reducing turbulence and therefore noise emissions. Depending on the turbine model selected for construction, serrated trailing edge technology may or may not be available. On some models, serrations can be installed even after the project is constructed.

### PROJECT SITING

Changing of turbine setbacks from residences can be used to decrease sound levels, however wind turbine layouts are chosen to maximize energy production, comply with wind ordinance setback requirements, comply with setback requirements for other environmental conditions (water, flora, fauna, etc.), meet spacing requirements for the turbines themselves, facilitate access, and accommodate landowner preferences. As a result, modification of turbine arrangements to decrease sound pressure levels at receptors can have adverse effects on project performance and feasibility.

### NOISE REDUCED OPERATIONS (NRO)

Noise Reduced Operations (NROs) are operations changes to the wind turbine to reduce noise generation. NROs are usually accomplished by adjusting turbine blade pitch, slowing the rotor speed of the turbines, which reduces aerodynamic noise produced by the blades. NROs are a readily available technology on most modern wind turbines and may be used to bring reduce turbine sound power to a level at or below the sound power of the turbine modeled in the Application. NROs can be implemented on as as-needed basis. For example, they can be programmed for selected wind speeds, wind directions, and times of day. The programs can be adjusted at any time after the wind turbines have commenced operations.

## PHYSICAL ABATEMENT

Due to the inherent size of wind turbines, many physical noise control measures, such as noise barriers, active noise control, and tree plantings, tend to be impractical and we are unaware of them being implemented at any operating wind projects. At receptors, white noise machines can be used to reduce the prominence of wind turbine noise, and the sound insulation of residences can be improved to reduce interior sound levels.

# 11.0 SOUND PROPAGATION MODELING

## 11.1 | PROCEDURES

Although, ISO 9613-2 is the most widely accepted wind turbine noise modeling algorithm, other algorithms that have been used in wind power projects include:

- CONCAWE;
- Nord2000;
- Harmonoise; and
- NZS 6808-1998.

Both Nord2000 and NZS 6808-1998 are the approved method for specific countries (New Zealand and Australia for NZS 6808-1998 and Nordic countries for Nord2000). NZS 6808-1998 is a simplified method that assumes hemispherical sound propagation and uses the air absorption method from ISO 9613-2. Nord2000 is more in-depth, complicated, and is of similar scope to ISO 9613-2.

Harmonoise, was originally based on Nord 2000 with some refinements and was developed over several years with the aim of becoming the standard algorithm for noise predictions in Europe. The algorithm is available as an open source code and is implemented in several noise prediction software packages. Harmonoise allows modeling of various meteorological conditions, beyond the capabilities of ISO 9613-2, along with more sophisticated methods of handling shielding and ground effects. The use of this model for wind turbine noise has been limited, with few studies validating its accuracy.

CONCAWE was originally developed for the petroleum energy industry in Europe. Characteristics of the model that are unique, are the ability to predict sound levels for particular wind speeds and stability classes. The model has been used internationally for wind turbine noise with some validation studies, though ISO 9613-2 is still more widely used and validated.

None of these algorithms was originally developed for wind turbine noise prediction.

In the United States ISO 9613-2 is by far the most common algorithm used for sound propagation modeling, particularly for wind turbine noise. To our knowledge, the only other algorithm used is CONCAWE, but only in conjunction with ISO 9613-2 for special cases of modeling annualized sound levels under varying meteorological conditions.

Modeling for this project was in accordance with the standard ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation." The ISO standard states,

> This part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level … under meteorological conditions

> favorable to propagation from sources of known sound emissions. These conditions are for downwind propagation … or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

The model takes into account source sound power levels, surface reflection and absorption, atmospheric absorption, geometric divergence, meteorological conditions, walls, barriers, berms, and terrain. The acoustical modeling software used here was CadnaA, from Datakustik GmbH. Cadna/A is a widely accepted acoustical propagation modeling tool, used by many noise control professionals in the United States and internationally.

ISO 9613-2 also assumes downwind sound propagation between every source and every receptor, consequently, all wind directions, including the prevailing wind directions, are taken into account.

Model input parameters are listed in Appendix B, and the modeled sound power spectrum is shown in. Fifty-eight turbine locations were modeled with the Gamesa G114 2.625 MW turbine. The project area was modeled with mixed ground (G=0.5) and a 2 dB uncertainty factor added to the turbine sound power. Foliage was not modeled. These model parameters have been shown to yield conservative results for wind turbines, though the level of conservativeness depends upon several factors including: turbine layout, meteorology, receiver height, and topography.[59,60,61,62] These parameters are most conservative for flat terrain and least conservative (but still conservative), for concave downhill terrain. Different receiver heights result in different interference patters. The 4 meter (13 foot) receiver height mimics the height of a second story bedroom and generally results in 1 to 2 dB higher predictions than a 1.5 meter (5 foot) receiver height. Turbines were modeled at the manufacturer's guaranteed maximum sound power level of 106.6 dBA, with a 2 dB uncertainty factor added to the sound power to increase conservatism. All turbine data used is the most recently available from the manufacturer at the time of this writing. Gamesa bases the published sound power for the turbine on aeroacoustic modeling. Results calculated with these parameters represent the highest 1-hour equivalent average sound level that will be emitted by the project.

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[59] Duncan, E., and Kaliski, K., "Improving Sound Propagation Modeling for Wind Power Projects", Acoustics '08, 2008, Paris, France.

[60] Bowdler, Dick et al,. "Prediction and Assessment of Wind Turbine Noise: Agreement about Relevant Factors for Noise Assessment from Wind Energy Projects." Acoustics Bulletin. 34(2), pp. 35-37.

[61] Evans, Tom and Cooper, Jonathan. "Comparison of Predicted and Measured Wind Farm Noise Levels and Implications for Assessments of New Wind Farms." Acoustics Australia: April 2012. Vol. 40, No. 1.

[62] RSG, et al., "Massachusetts Study on Wind Turbine Acoustics," Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016 Chapter 6

The transformer sound power (also shown in Table 21) was determined using the NEMA TR-1[63] sound pressure level, along with the dimensions and spectrum of a similar sized transformer measured elsewhere by RSG.

Tonal prominence of the Gamesa G114 2.625 MW turbine is shown in Figure 94 and the tonal prominence of the transformer is shown in Figure 95. In the case of the turbine, the tonality criteria of ANSI 12.9 Part 3 is not met in any 1/3 octave band. The transformer meets the criteria for the Fans Off (ONAN) conditions, but not the Fans On (ONAF) condition. Since the particular model for the transformer has not been chosen, the tonal prominence of the transformer that will be used is not known. Transformers are usually tonal in the 125 Hz, 250 Hz, 315 Hz, 500 Hz, or 630 Hz 1/3 octave bands during the ONAN condition, but not the ONAF condition due to masking from the cooling fans. The higher sound power of the ONAF configuration was modeled as a conservative assumption.

**TABLE 21: SOUND POWER FOR THE MODELED TURBINE MODEL AND PROJECT TRANSFORMER**

| Sound Source | Data Source | Data Derivation | 1/1 Octave Band Center Frequency | | | | | | | | | Sum (dBA) | Sum (dBZ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | |
| Gamesa G114 2.625 MW | Gamesa | Gamesa modeled sound power and spectrum | 115 | 111 | 108 | 106 | 105 | 102 | 98 | 92 | 82 | 106.6 | 117.6 |
| Transformer ONAN | NEMA TR-1 | NEMA TR-1 Level - Spectrum from RSG measurement of similarly sized transformer | 83 | 85 | 106 | 101 | 99 | 89 | 77 | 72 | 65 | 98.7 | 107.7 |
| Transformer ONAF | NEMA TR-1 | NEMA TR-1 Level - Spectrum from RSG measurement of similarly sized transformer | 109 | 106 | 104 | 101 | 100 | 94 | 86 | 79 | 73 | 100.4 | 112.4 |

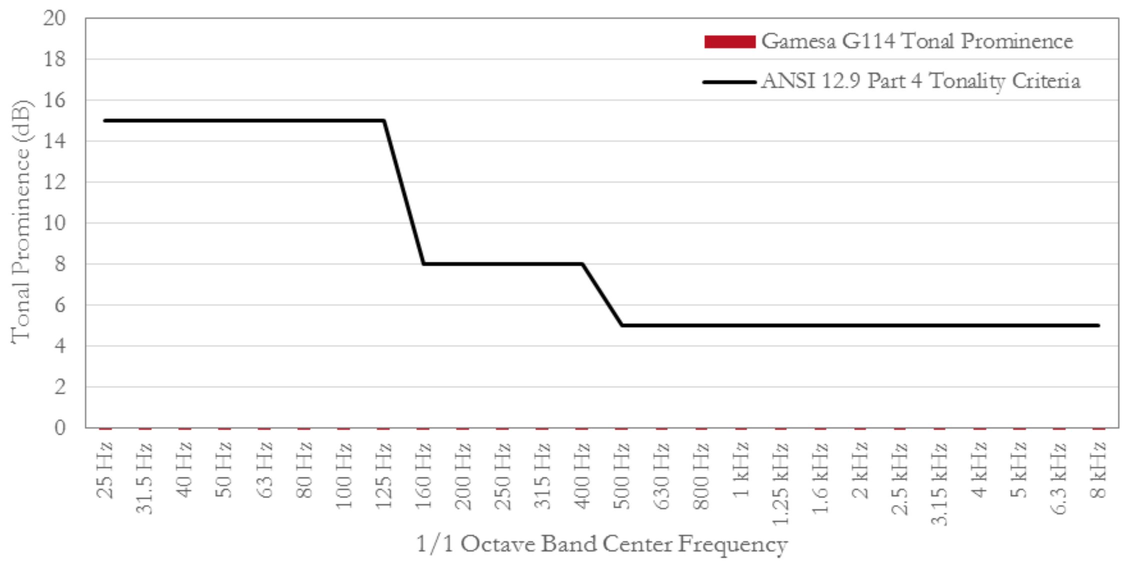


**FIGURE 94: ANSI 12.9 PART 4 TONALITY FOR THE GAMESA G114 2.625 MW**

[63] NEMA-1 TR-1 is a standard, produced by the National Electrical Manufacturers Association (NEMA), that lists minimum performance specifications for electrical transformers, regulators and reactors, including sound emissions. The standards specificies maximum average sound levels for transformers, as measured at a 1 foot distance from the transformer.

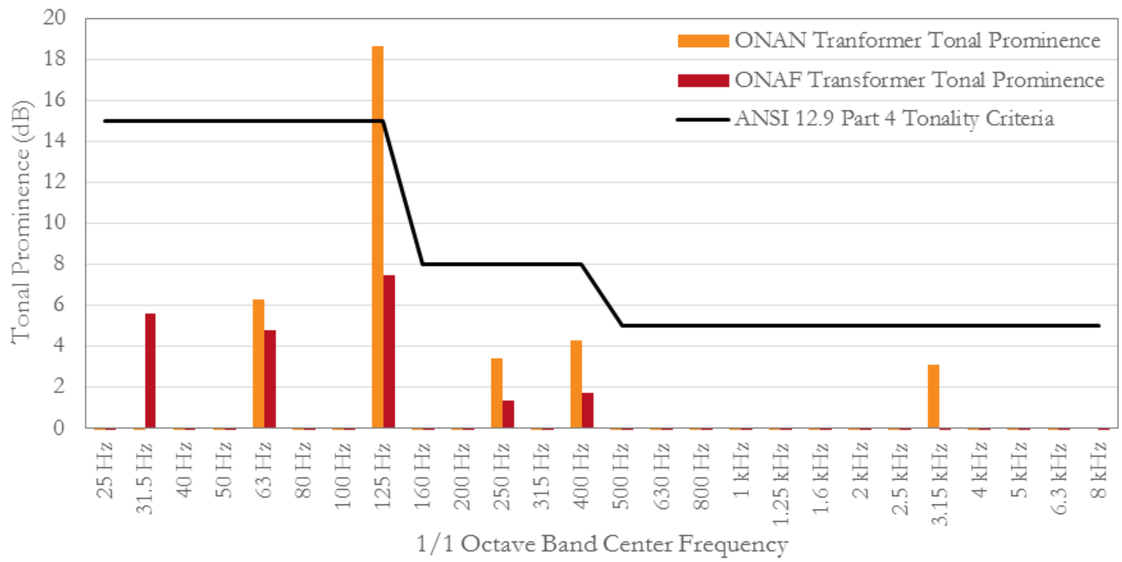


**FIGURE 95: ANSI 12.9 PART 4 TONALITY AN ESTIMATED TRANSFORMER SPECTRUM**

## 11.2 | RESULTS

Sound propagation modeling results are shown in Figure 96. In this case, the highest sound level at a non-participating receptor is 51 dBA, 6 dB above the design goal for the project and up to 3 dB above the town ordinance level and daytime design goal.[64] A total of 41 non-participating receptors exceeded 45 dBA.

To bring project in line with the nighttime 45 dBA $L_{EQ(8)}$ design goal at permanent non-participating receptors, NROs were applied to some turbines and three turbines were removed from the array since the sound level reduction required to bring the project into compliance was greater than the NRO noise reduction typically available.[65],[66] Lower NRO levels would be required to bring the Facility into compliance with the Towns' standards. Sound levels from the transformer were also mitigated, by assuming that the transformer is specified with a 10 dB noise attenuation package. Similar attenuation could also be achieved by installing a sound barrier around the transformer. Assuming these mitigation measures, the highest one-hour nighttime $L_{EQ}$ at a permanent non-participating residence is 45 dBA, as is shown in Figure 97. The highest one-hour nighttime $L_{EQ}$ at a seasonal home is 48 dBA.

The $L_{10}$ is the metric specified in the Charlotte, Arkwright, and Cherry Creek sound level regulations.[22] Based on the MassCEC study of wind turbine acoustics, the $L_{10}$ of wind turbine

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[64] In RSG's experience, the $L_{10}$ for a long term period of wind turbine noise will be less than 2 dB above the $L_{EQ}$, so modeled turbine sound levels of 48 dBA $L_{EQ}$ will be less than or equal to 50 dBA $L_{10}$.
[65] These turbines are not removed from the application since landowner agreements have not been finalized.
[66] Standard modeling procedure using ISO 9613-2 and the parameters used will produce accurate results for the 1-hour $L_{EQ}$ turbine-only sound level. To determine compliance with project design goal 45 dBA $L_{EQ(8)}$ sound level, annualized modeling techniques (as described in Section 11.4) were used. As a result the mitigated modeling results are less than 45 dBA $L_{EQ(1)}$ and $L_{EQ(8)}$.

sound is typically less than 2 dB above the $L_{EQ}$.[67] Consequently, given the maximum $L_{EQ}$ discussed above, wind turbine sound levels will be below the 50 dBA $L_{10}$ town standards at all permanent and seasonal receptors. These mitigation measures are particular to the Gamesa G114 2.625 MW turbine and would likely be lower if another turbine from Table 2 is selected, since the G114 has the highest sound power of turbines that will be presented in the application.[68]

Appendix B also shows enlarged versions of the mitigated modeling result maps. These maps include modeled sound levels in 1 dB intervals.

Sound levels at project parcel boundaries range from 30 dBA to 57 dBA.

Table 22 shows the low frequency modeling results at a worst case non-participating receptor, compared with the ANSI 12.2-2008. The 16 Hz 1/1 octave band is extrapolated from the 31.5 Hz results assuming a slope of -4 dB per octave.[69] Results show that the sound levels from the project will be below the threshold for moderately perceptible vibration and rattle in all three bands.

Figure 98 shows extrapolated modeling results from the worst case non-participating receptor. This data is extrapolated, assuming a -4 dB/octave slope frequencies at and above the 16 Hz 1/1 octave band and a -1 dB/octave slope below 16 Hz. This shows that expected infrasonic sound levels are below perception thresholds. Extrapolated modeling results are consistent with those found with the operating wind turbine of Figure 93. The modeled levels for the Project are higher at 20 Hz, due to the greater number of turbines.

Based on the dose-response curves of Janssen et al 2011, the number of highly annoyed receptors indoors and outdoors was calculated. Each residence was calculated individually, but the total population of the receptors (i.e., as individuals) was not estimated. Results are shown in Table 23. Approximately three receptors will be highly annoyed indoors and seven outdoors based on the mitigated configuration.

[67] RSG, et al., "Massachusetts Study on Wind Turbine Acoustics," Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016

[68] Signing of additional receptors into "participating" status can also help bring the Project into compliance with the design goal.

[69] RSG, et al., "Massachusetts Study on Wind Turbine Acoustics," Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016

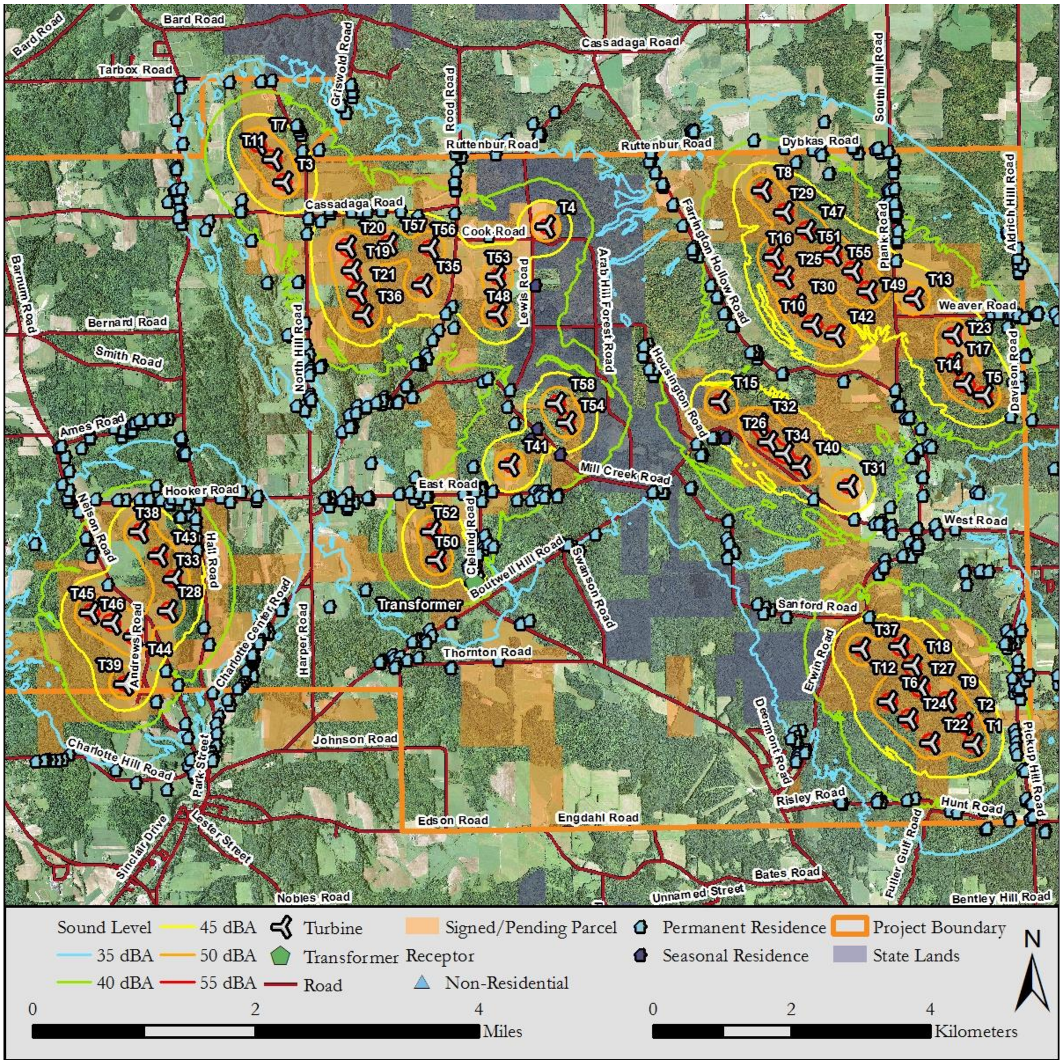


**FIGURE 96: SOUND PROPAGATION MODELING RESULTS - STANDARD ISO 9613-2 MODELING PROCEDURES**

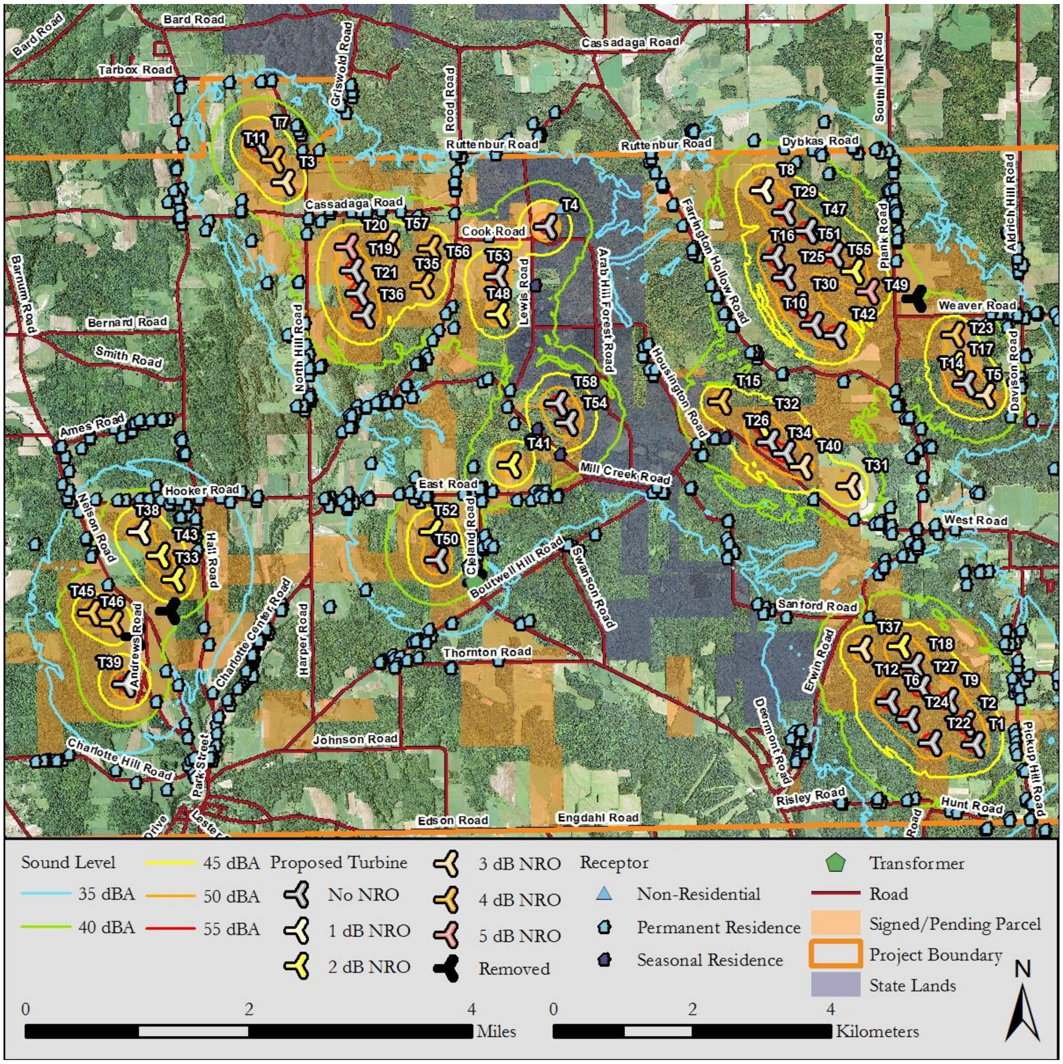


**FIGURE 97: SOUND PROPAGATION MODELING RESULTS - STANDARD ISO 9613-2 MODELING PROCEDURES – MITIGATED TO CONFORM WITH PROJECT DESIGN GOAL**

**TABLE 22: ANSI 12.2-2008 SECTION 6 AND ANSI 12.9 PART 4 ANNEX D LOW FREQUENCY NOISE CRITERIA COMPARED WITH MODELED SOUND LEVELS AT WORST CASE NON-PARTICIPATING RECEPTOR**

| 1/1 Octave Band Center Frequency -> | 16 Hz | 31.5 Hz | 63 Hz |
|---|---|---|---|
| **Modeled Worst Case Non-Participating Receptor Sound Level** | **62 dB** | **58 dB** | **54 dB** |
| ***Low Frequency Guidelines*** | | | |
| *Clearly perceptible vibration and rattles likely* | *75 dB* | *75 dB* | *80 dB* |
| *Moderately perceptible vibration and rattle likely* | *65 dB* | *65 dB* | *70 dB* |
| *Sound Level Below Which Annoyance is Minimal* | *65 dB* | *65 dB* | *65 dB* |

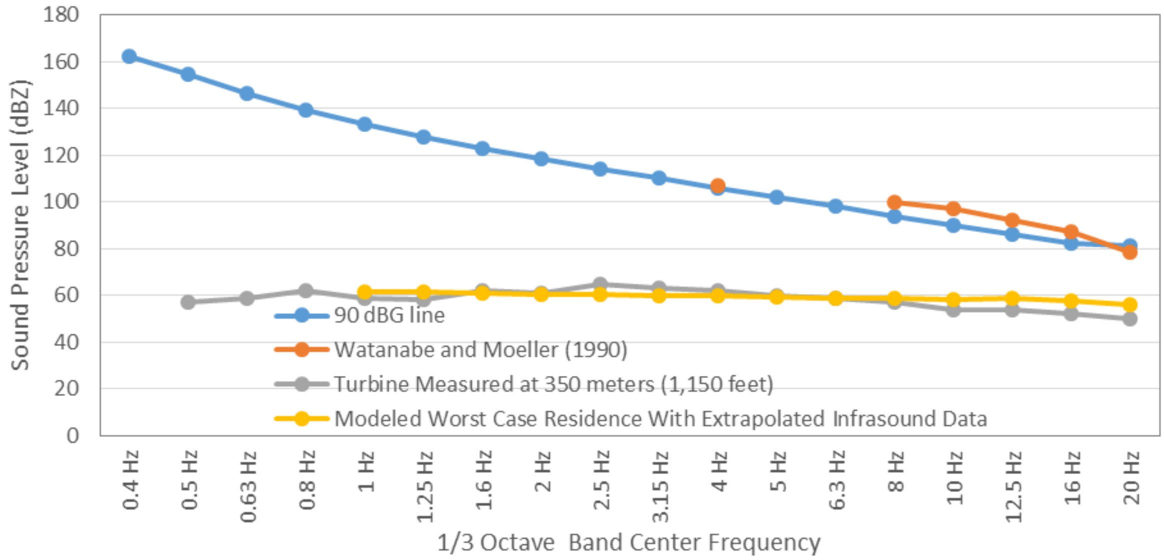


**FIGURE 98: COMPARISON OF MODELED SOUND LEVEL DATA FOR CASSADAGA WIND FARM WITH EXTRAPOLATED INFRASOUND DATA WITH HEARING THRESHOLDS AND 90 DBG LINE**

## 11.3 | POTENTIAL FOR STRUCTURAL DAMAGE AND IMPACTS TO TECHNOLOGY

Given that the model results show no potential for noise-induced vibrations, there is also no potential for structural damage due to vibration from operating wind turbines.

As part of this study, we also evaluated whether there were any infrasound monitoring stations related to the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO). The organization runs infrasound monitoring sites that can detect infrasound related to large explosion and other infrasound events. The closest CTBTO monitoring station is in Ottawa, Canada. This station is over 400 km to the northeast. Given the distance, and relatively low infrasound emissions from the Project, we conclude that there is no potential for impact to the CTBTO's ability to monitor infrasound.

In addition, we know of no high sensitivity medical equipment that would be affected by infrasound in the project area.

**TABLE 23: ESTIMATED HIGHLY ANNOYED RECEPTORS - BASED UPON DOSE REPONSE CURVES OF JANSSEN ET AL 2011**

| Sound Pressure Level (1-hour $L_{EQ}$ - dBA) | Number of Receptors | Percent Highly Annoyed Indoors | Percent Highly Annoyed Outdoors | Receptors Highly Annoyed Indoors | Receptors Highly Annoyed Outdoors |
|---|---|---|---|---|---|
| 30 | 15 | - | - | 0.0 | 0.0 |
| 31 | 16 | - | - | 0.0 | 0.0 |
| 32 | 28 | - | - | 0.0 | 0.0 |
| 33 | 39 | - | 0.0 | 0.0 | 0.0 |
| 34 | 21 | 0.0 | 0.2 | 0.0 | 0.0 |
| 35 | 60 | 0.2 | 0.2 | 0.1 | 0.1 |
| 36 | 55 | 0.2 | 0.3 | 0.1 | 0.2 |
| 37 | 62 | 0.3 | 0.5 | 0.2 | 0.3 |
| 38 | 72 | 0.3 | 0.6 | 0.2 | 0.4 |
| 39 | 59 | 0.4 | 0.9 | 0.2 | 0.5 |
| 40 | 51 | 0.4 | 1.2 | 0.2 | 0.6 |
| 41 | 40 | 0.5 | 1.6 | 0.2 | 0.6 |
| 42 | 56 | 0.7 | 2.2 | 0.4 | 1.2 |
| 43 | 42 | 0.9 | 2.9 | 0.4 | 1.2 |
| 44 | 35 | 1.2 | 3.8 | 0.4 | 1.3 |
| 45 | 8 | 1.6 | 4.9 | 0.1 | 0.4 |
| 46 | 0 | 2.1 | 6.2 | 0.0 | 0.0 |
| 47 | 0 | 2.8 | 7.8 | 0.0 | 0.0 |
| 48 | 0 | 3.6 | 9.6 | 0.0 | 0.0 |
| 49 | 0 | 4.6 | 11.6 | 0.0 | 0.0 |
| 50 | 0 | 5.8 | 14.0 | 0.0 | 0.0 |
| Total | 659 [70] | | | 2.6 | 7.0 |

## 11.4 | ANNUALIZED MODELING USING HOURLY METEOROLOGICAL ADJUSTMENTS

As described in Section 4.2, the World Health Organization, in its "Guidelines for Community Noise", reviewed the latest research on the health effects of noise and recommended 45 dBA averaged over an eight hour night and a 60 dBA maximum, measured outside the bedroom window, to protect against sleep disturbance. In October 2009, the World Health Organization for Europe updated the 2000 review of the scientific literature, and found a no-adverse-effect

[70] Some receptors were below 30 dBA (1-hour Leq), so they are not included in Table 23.

noise level of 40 dB $L_{night}$, outside, which is the A-weighted annual average nighttime sound level.

In Section 11.2, we modeled the maximum one-hour sound level from the proposed wind farm. This is based on a worst-case meteorology of a moderate nighttime inversion, or equivalently, winds blowing from each source to each receptor. In reality, only one wind direction occurs at a time, and winds are not such that they are always generating the highest sound output from the turbines. As a result, the eight-hour, and annual average nighttime, $L_{50}$, and even $L_{10}$ sound levels will tend to be less than the one maximum one-hour $L_{EQ}$.

To model the maximum eight-hour, annual average nighttime, $L_{50}$, and $L_{10}$ sound level, we undergo the following procedure:

1. 8,760 hours of data is obtained from the project meteorological tower. The data includes wind speed at two or more heights, wind direction, the standard deviation of wind direction, and temperature.
2. Cloud cover is obtained from the closest National Weather Service station, the Chautauqua County-Jamestown Airport, about 12 kilometers (7.4 miles) to the south.
3. Atmospheric stability is calculated for each hour. Stability is important for calculating sound propagation. The "stability class" is calculated following the procedure in the U.S. EPA's "On-site meteorological program guidance for regulatory modeling applications." Stability Class ranges from A to G, with Class A being a highly unstable atmosphere and Class G being very stable. Stability Class is a function of wind speed, cloud cover, solar angle, daytime/nighttime, and ceiling height.
4. A sound propagation model is run for 64 different combinations of wind speed, wind direction, and atmospheric stability, using the Cadna/A model and meteorological adjustments from Concawe's "The propagation of noise from petroleum and petrochemical complexes to neighboring communities," as implemented in Cadna/A. A ground absorption factor of G=1 is used.
5. A raw unadjusted sound level is obtained for each receptor for each hour by matching each hour's wind speed, wind direction, and stability class to those used in the model runs.
6. The hourly sound level at each receptor is adjusted to account for the different sound power by hub height wind speed using the manufacturer sound curves. No sound is generated below cut-in and above cut-out wind speeds. The sound power assumed in the model is adjusted based on a randomized normal distribution between -2 dB and +2 dB.
7. Sound levels during each night are calculated and averaged for the entire year.
8. The model is calibrated for each receiver such that the maximum hourly sound level is the same as that run using ISO 9613-2. After calibration, the calculations are repeated.

This modeling procedure was used for the Kingdom Community wind project, in Lowell, Vermont during permitting. In that case, one of the residences most exposed to wind turbine sound was predicted to have an annualized equivalent sound level of 40 dBA. Post-construction measurements of the same project and at the same location were conducted for seven seasons, for a minimum of two weeks per season. The turbine-only sound level averaged over all seasons was measured to be 35 dBA. That is, the model over-predicted annual average sound levels by about 5 dB. This indicates that the modeling, performed for the project, in a similar manner as described above, is conservative.

The results of the modeling are shown in Appendix C. In Table 30, periods where turbines are not operating are included in the calculation and in Table 31, these periods are not included. Under all circumstances, the modeling results show that WHO and WHO Europe guidelines are met. This methodology gives a higher one-hour maximum sound level than the unadjusted method from the previous section because this method uses more conservative assumptions.

## 11.5 | COMPOSITE NOISE RATING

The Modified Composite Noise Rating (CNR) is a method for predicting community annoyance of a noise source.[71] It take into account:

- The level and spectral shape of the noise source,
- The level and spectral shape of the background sound,
- Character of the sound (low frequency, tonal, impulsive),
- Seasonality,
- Daytime/nighttime,
- Intermittency, and
- Previous exposure/community attitude.

The end result of the CNR is a letter-grade which provides an estimate of the community response to the noise. As shown in Figure 99 the grades go from “A” to “I”, with “A”, “B”, and “C” being no community reaction, “D” being sporadic complaints to “I” being vigorous community action. The bold orange line represents the median response of typical communities, and the orange area represents the range of response from typical communities.

[71] Bolt Beranek and Newman Inc., “Electric Power Plant Environmental Noise Guide, Volume 1, 2nd Edition,” Edison Electric Institute, 1984.

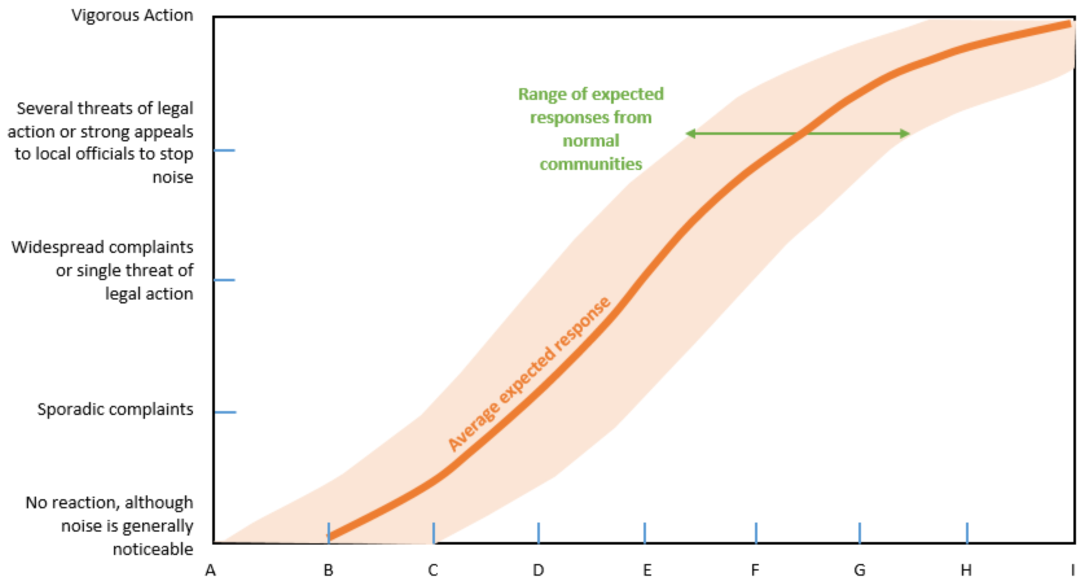


**FIGURE 99: ESTIMATED COMMUNITY RESPONSE VS COMPOSITE NOISE RATING**[72]

The steps in a CNR analysis are as follows:

1) Determine the noise level rank of the sound source by fitting the annual average octave band spectra to the chart in Figure 100. The rank is the highest zone into which the spectra extends. In the example shown, the initial noise rank would be "B".

2) Determine the background noise correction by fitting the background sound level to the chart in Figure 101. The rank, in the case, is the region with the greatest number of points overlapping with the background spectra. In the example shown, the background correction is +2, since most of the background spectra (blue line) falls in the +2 region.

3) Correct for temporal and seasonal factors. Since the wind project runs for both daytime and nighttime and during winter and summer, there are no corrections for these factors. While the method allows for a reduction in noise rating when the source is intermittent, we have not included any correction for this factor since the turbines run more than 50 percent of the time.

[72] Bolt Beranek & Newman "Electric Power Plan Environmental Noise Guide, 2nd Edition" Electric Power Research Institute Report 3637, 1984

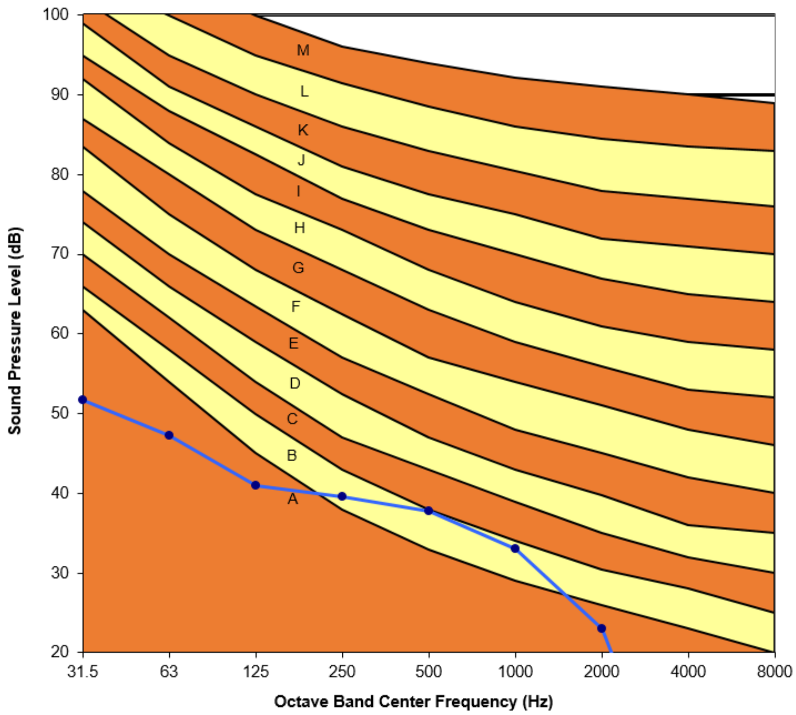


**FIGURE 100: CNR NOISE LEVEL RANK CURVES WITH EXAMPLE NOISE-SOURCE SPECTRA**

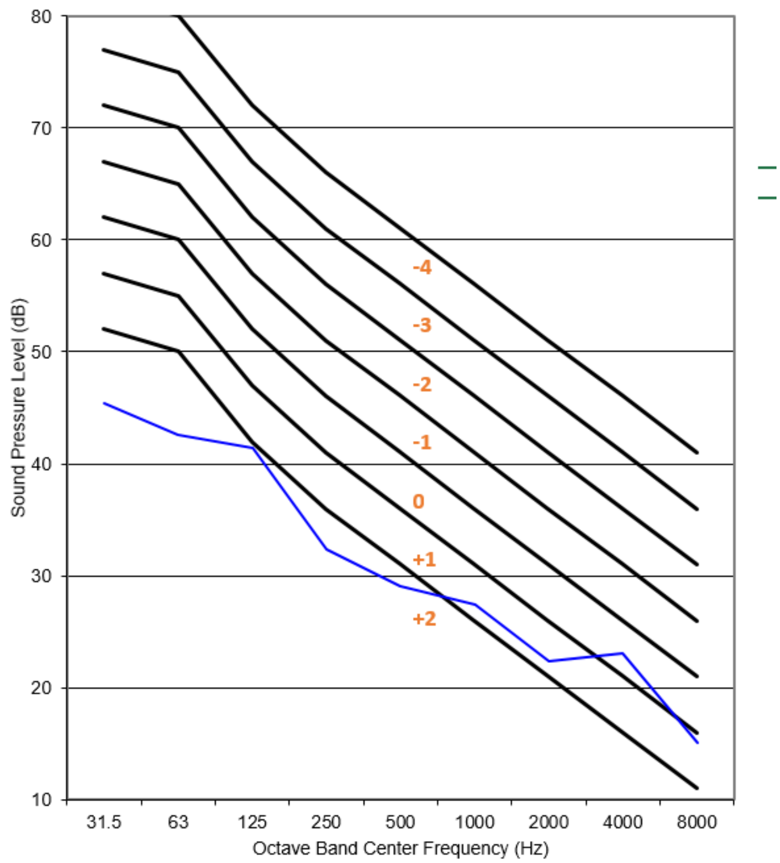


**FIGURE 101: BACKGROUND NOISE CURVES WITH EXAMPLE BACKGROUND SPECTRA**

4) Correct for the character of the source noise. This correction applies a +1 correction for sources that are very low frequency (<75 dB at or below 31.5 Hz), tonal, or impulsive. While the wind turbines do not fall into any of these categories, the sound from wind turbines has been described as more annoying that other common sound sources like highway traffic. Therefore, we use a +1 correction for the character of the source noise.

5) Correction for previous exposure and community attitude. This allows for a correction for new types of sound sources that the community has no experience with. Since there are wind projects nearby, the community has some previous exposure to wind turbine sound. The correction applied would be then be -1.

The sum of the fixed correction factors (Steps 3 through 5) are 0, which means that the only two factors that affect the rank are the background sound level and the modeled turbine sound level.

The background sound level correction for the quietest periods, based on the overall $L_{90}$, is +2 for each monitoring location. Thus, the lowest possible Rank for any receptor is "C" in this case. Under this scenario, most of the non-participating receptors (68%) are ranked as CNR "C", with 29% at "D", and the remainder in "E" (Table 24).

However, we believe that this is somewhat misleading, since the quietest periods represented by the $L_{90}$ are also correlated with the lowest wind speeds when the wind turbines are operating at lower sound powers, or are not operating at all. Due to low $L_{90}$ sound levels in the Project area, it is impossible for the project to receive a rating of less than "C", even with project-only sound levels below the threshold of hearing. Therefore, we also calculated the CNR based on the $L_{50}$ and $L_{EQ}$, or the median and energy average sound levels in the area. Under the $L_{50}$ scenario, 90% are ranked as CNR "C", with 10% at "D" (Table 24). Under the $L_{EQ}$ scenario, 93% are at CNR "A", 5% are at CNR "B", and 3% are at CNR "C". Using the $L_{50}$ to $L_{50}$ comparison and $L_{EQ}$ to $L_{EQ}$ comparison, the predicted response ranges from "sporadic complaints" to "no reaction."

#### TABLE 24: COMPOSITE NOISE RATINGS OF MODELED HOMES

| | Percent of Homes | | |
|---|---|---|---|
| Rank | Quiet Times ($L_{90}$) | Typical Times ($L_{50}$) | Overall ($L_{EQ}$) |
| A | 0% | 0% | 93% |
| B | 0% | 0% | 5% |
| C | 68% | 90% | 3% |
| D | 29% | 10% | 0% |
| E | 3% | 0% | 0% |
| F | 0% | 0% | 0% |

## 12.0 TURBULENCE INTENSITY AND WIND SHEAR

In order to determine wind shear and turbulence intensity conditions present at the site, RSG analyzed a year of meteorological data take from Met 1, at the project site. The wind speed at two anemometer heights (40 meters and 60 meters) and wind speed standard deviation were used to calculate the turbulence intensity present at the site.

Figure 102 shows the turbulence intensity by hour at the site. Turbulence intensity is the ratio of the wind speed standard deviation to the wind speed at a given measurement height. Results show that the turbulence intensity is higher overall during the day than at night, though the turbulence intensity is more variable at night. These values are not higher than what has been found by RSG at other proposed wind power projects. Figure 103 shows the turbulence intensity by hub height wind speed. This shows that turbulence intensity decreases slightly from cut-in to 13 or 14 m/s. Turbulence intensity increases beyond 14 m/s. Wind speeds above this range are probably most prevalent during storm conditions. Wind turbines generate turbulence in the wake of the blade, consequently turbines that are regularly downwind of other turbines may experience more turbulence that this data indicates.

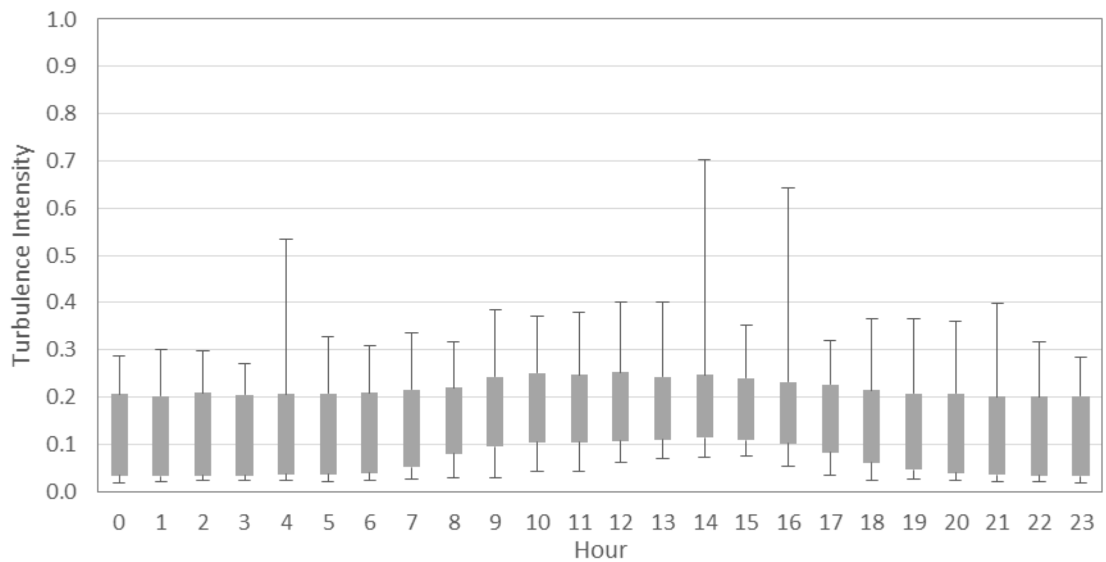


**FIGURE 102: TURBULENCE INTENSITY BY HOUR – GREY BOXES SHOW 90% OF DATA AND THE “WHISKERS” ARE +5% AND -5% OUTLIERS**

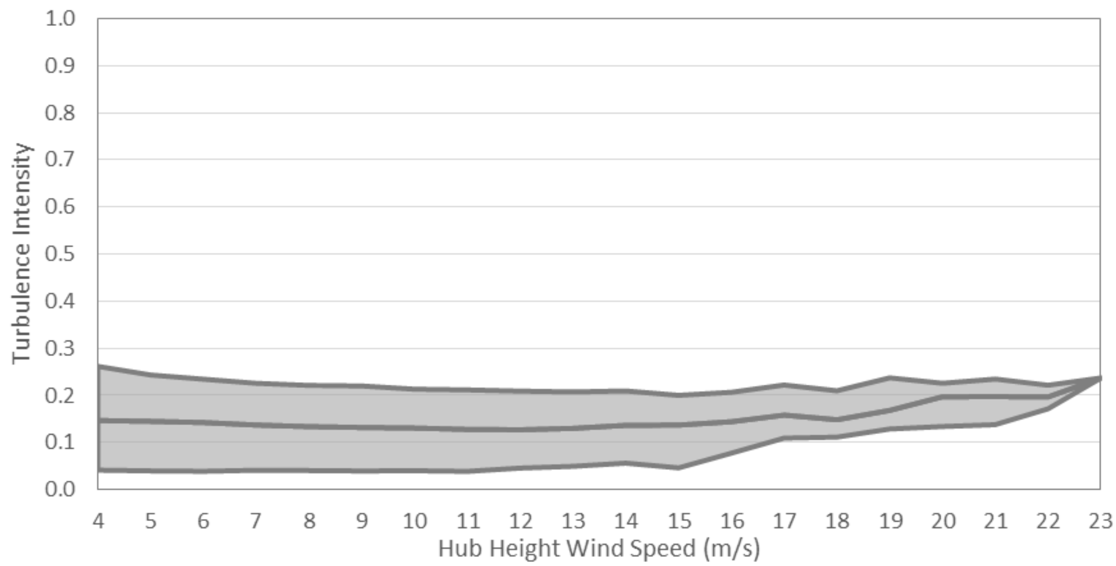


**FIGURE 103: TURBULENCE INTENSITY BY HUB HEIGHT WIND SPEED - GREY AREA SHOWS 90% OF DATA, CENTER LINE IS MEDIAN**

Figure 104 shows the wind shear as measured at Met 1 by hour. This shows that overall, wind shear is higher at night, when the atmosphere is more stable, than during the day. It also shows the exceptional variability of wind shear, the upper 5th percentile is four times the lower 5th percentile at night. Figure 105 shows the wind shear by hub height wind speed, this indicates that the periods with highest wind shear occur near the cut-in wind speed for the turbine, when sound emissions will be lowest. Figure 106 compares the turbulence intensity and wind shear for the same periods. This shows that periods with particularly high wind shear and particularly high turbulence intensity are not coincident. This is not surprising since, the stable atmosphere required for high wind shear, should not also be turbulent.

In summary the Cassadaga wind site does not have higher turbulence intensity, but does have higher wind shear than other projects RSG has worked on, mostly located on ridge tops. One reason for this is, is that on ridgeline projects, air passing over the ridge compresses, increasing wind speeds. This occurs to a greater extent closer to the ground than at higher altitudes, reducing effective wind shear. What is important to note is that most periods with high wind shear do not also simultaneously have high turbulence intensity. Most wind shear data falls into a relatively narrow range, with outliers falling over a much larger range. As is mentioned in Section 10.0, wind shear alone can exacerbate amplitude modulation, but it is not sufficient to cause amplitude modulation. For high levels of amplitude modulation to occur blade stall, or detached flow has to occur. So, high wind shear generally has to be coincident with high turbulence intensity to cause high levels of amplitude modulation, an uncommon condition at Cassadaga.

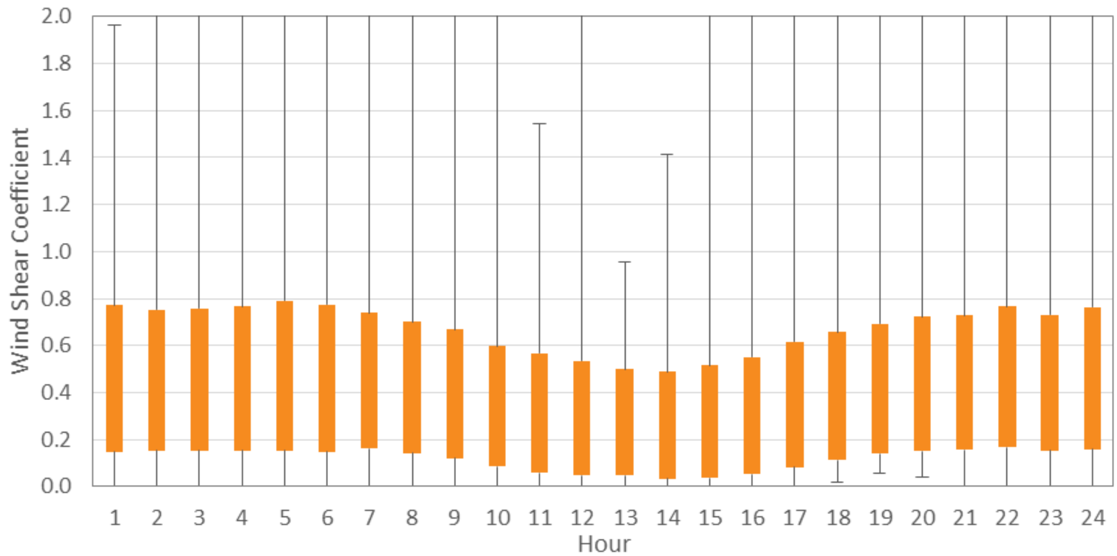


**FIGURE 104: WIND SHEAR COEFFICIENT BY HOUR**

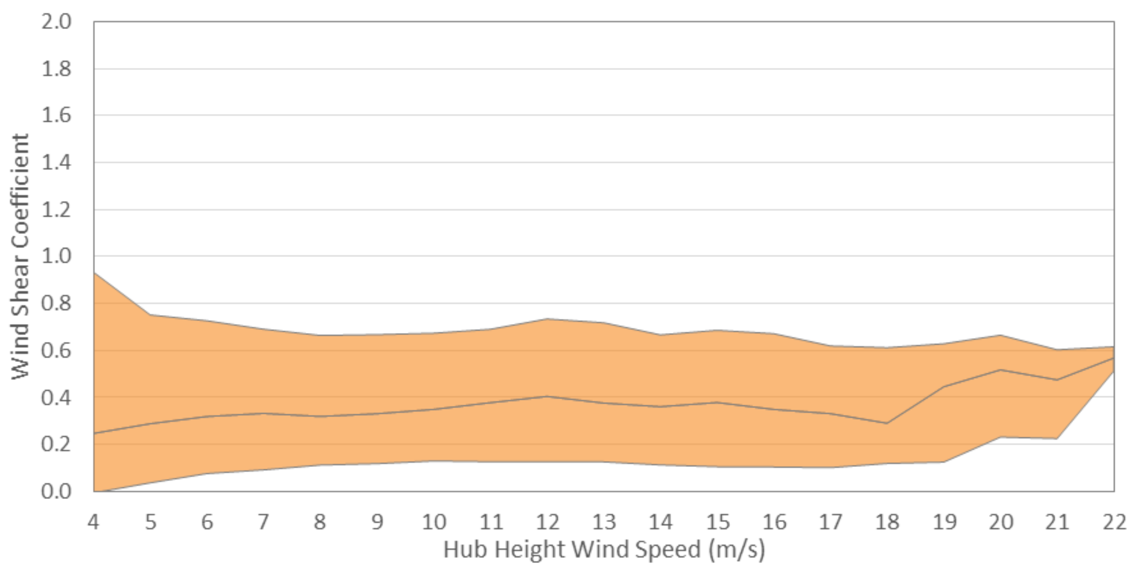


**FIGURE 105: WIND SHEAR COEFFICIENT BY HUB HEIGHT WIND SPEED**

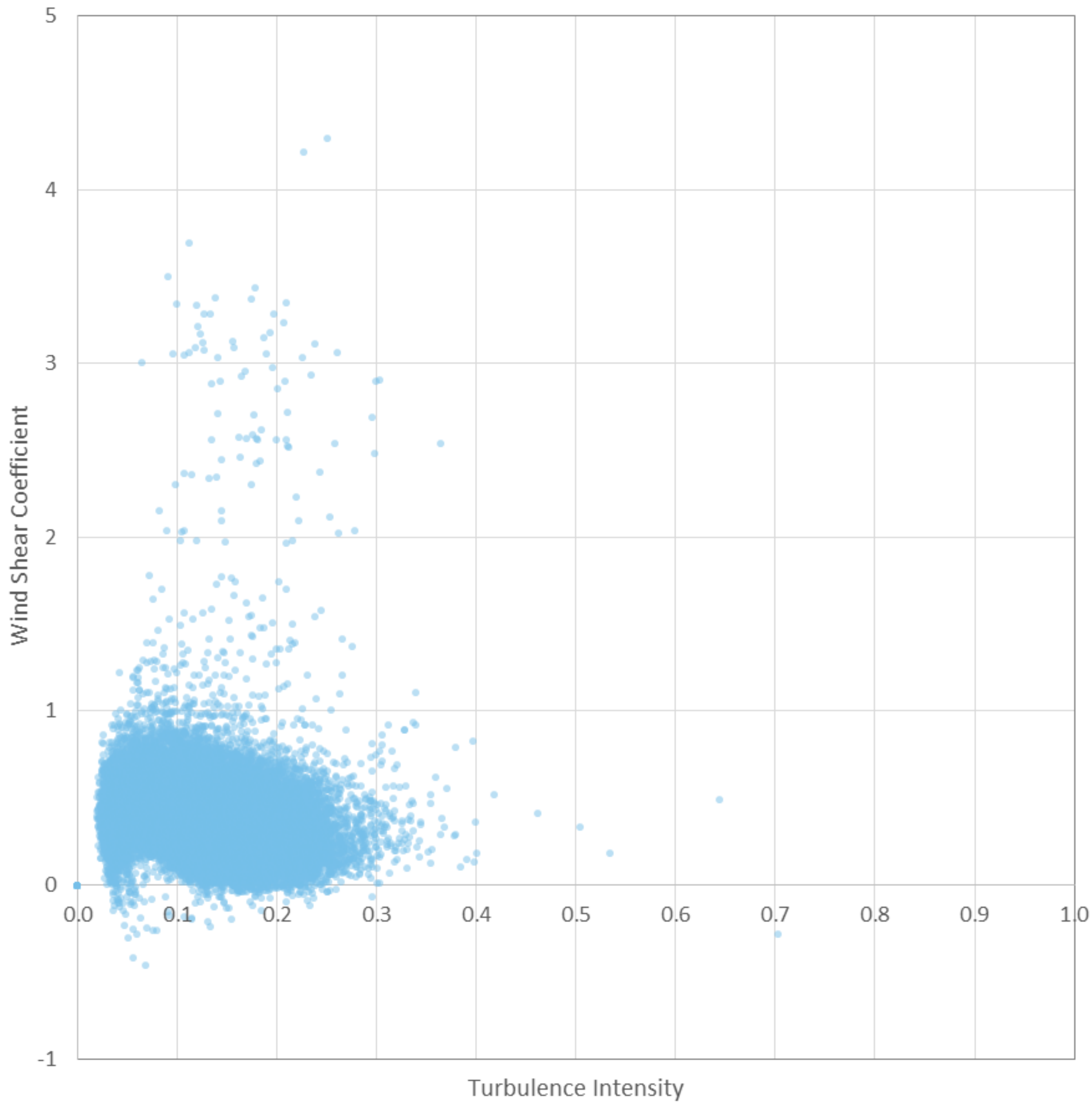


**FIGURE 106: COMPARISON OF TURBULENCE INTENSITY AND WIND SHEAR**

# 13.0 CONSTRUCTION NOISE

Construction noise modeling was performed using the ISO 9613-2 environmental noise prediction algorithm, as implemented in Datakustik's Cadna/A sound propagation modeling software package. Discrete receptor and grid heights are the same as was used in operational sound propagation modeling for the project, as described in Section 11.1. Sound source information was obtained either from the literature, RSG measurements, the FHWA's Reference Energy Mean Emission Levels (REMEL) data, or FHWA's Roadway Construction Noise Model (RCNM). Modeling procedures generally followed guidelines in the FHWA's Highway Construction Noise Handbook, where appropriate and where data was available.

Construction of the turbines will take place primarily on the ridge lines throughout the project area. While there may be activity closer to receptors for road construction and utility work, such work will be of a relatively short duration.

Equipment used for the construction will be varied. Sound power levels of some of the louder pieces of equipment are shown in Table 25.

Figure 107 and Figure 108 show sound propagation modeling results for construction around turbine T11. This is the closest turbine to a non-participating receptor (approximately 450 meters or 1,500 feet). Figure 107 shows sound levels with all construction sources operating and Figure 108 shows sound levels with all sources operating that will be used in the construction phase where the land is cleared of vegetation (the loudest construction phase). Figure 109 and Figure 110 show modeling results for construction around turbine T1, a more typical distance from the closest non-participating receptor (610 meters or 2,000 feet). Figure 109 shows results with all construction noise sources operating simultaneously and Figure 110 shows sources operating that are part of the loudest construction phase (the clearing phase). Figure 111 shows modeling of the area surrounding the laydown yard and concrete batch plant. The closest non-participating receptor to the batch plant is approximately 300 meters (980 feet).

The results are shown as maximum 1-second $L_{EQ}$, with all pieces of equipment operating. Under actual operations, not all pieces of equipment will not be operating at the same time and the highest sound levels from each piece of equipment would not tend to occur at the same time.

The highest sound level at a non-participating receptor near T11 is 63 dBA with all sources operating, and 61 dBA during the clearing phase. The highest sound level at a non-participating receptor near T1 are 57 dBA with all sources operating and 56 dBA during the site clearing phase. The "all sources" scenarios will not happen in practice, since sources from different construction phases do not operate simultaneously. The highest sound level at a non-participating receptor near the laydown area/batch plant is 53 dBA.

Construction is proposed to take place from April to October at turbine sites. Major construction work, such as clearing for the access roads, will occur primarily during from early morning to late evening (6:00 am to 10:00 pm); however, minor construction work may extend earlier or later. In addition, certain work, like tower section and blade erection could also extend into throughout night, depending on conditions.

Construction at each turbine site will take approximately 60 days, not including turbine erection. Due to the setbacks involved and the limited duration of the activities, construction noise should create minimal adverse impacts.

The potential for structural damage due to vibration during construction is minimized, as no blasting is proposed.

### TABLE 25: MODELED SOURCES FOR CONTRUCTION AREAS AND LAYDOWN AREA/CONCRETE BATCH PLANT WITH MODELED MAXIMUM SOUND LEVELS

| Equipment | Modeled Sound Power (dBA) | Sound Pressure Level at Closest Non-Participating Receptor from T11 (dBA) | Sound Pressure Level at Closest Non-Participating Receptor from T1 (dBA) | Sound Pressure Level at Closest Non-Participating Receptor from Laydown Yard/Batch Plant (dBA) |
|---|---|---|---|---|
| **Turbine Construction Site** | | | | |
| Bulldozer | 117 | 47 | 36 | - |
| Backhoe | 112 | 42 | 37 | - |
| Concrete Truck | 113 | 43 | 38 | - |
| Chipper | 131 | 61 | 56 | - |
| Heavy Truck | 115 | 42 | 37 | - |
| Medium Truck | 110 | 38 | 32 | - |
| 2250 S3 Lift Crane | 110 | 35 | 35 | - |
| M250 Auxiliary Crane | 114 | 39 | 40 | - |
| Excavator | 115 | 46 | 41 | - |
| Pneumatic Drill | 132 | 54 | 47 | - |
| Truck Being Loaded with Rock | 118 | 50 | 44 | - |
| **Total – Site Clearing** | 131 | 61 | 56 | - |
| **Total – Turbine Erection** | 117 | 42 | 42 | - |
| **Total – Foundation** | 120 | 50 | 45 | - |
| **Total - Excavation** | 132 | 53 | 50 | - |
| **Laydown Area/Concrete Batch Plant** | | | | |
| Cement Blower | 115 | - | - | 49 |
| Cement Blower Truck | 101 | - | - | 48 |
| Concrete Truck - Mixing | 110 | - | - | 44 |
| Backup Alarm | 109 | - | - | 43 |
| Heavy Truck | 115 | - | - | 35 |

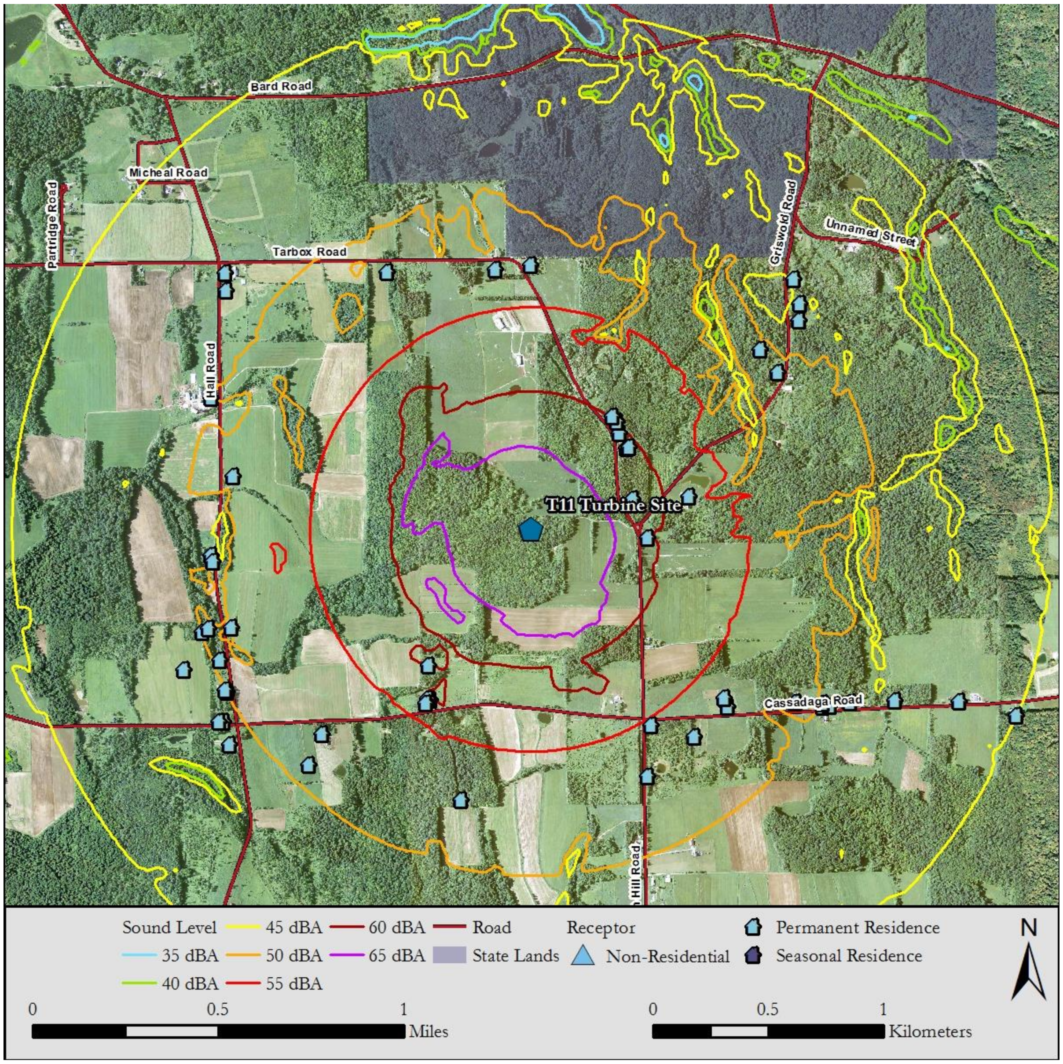


**FIGURE 107: CONSTRUCTION SOUND LEVELS FROM T11 TURBINE SITE – ALL CONSTRUCTION SOURCES**

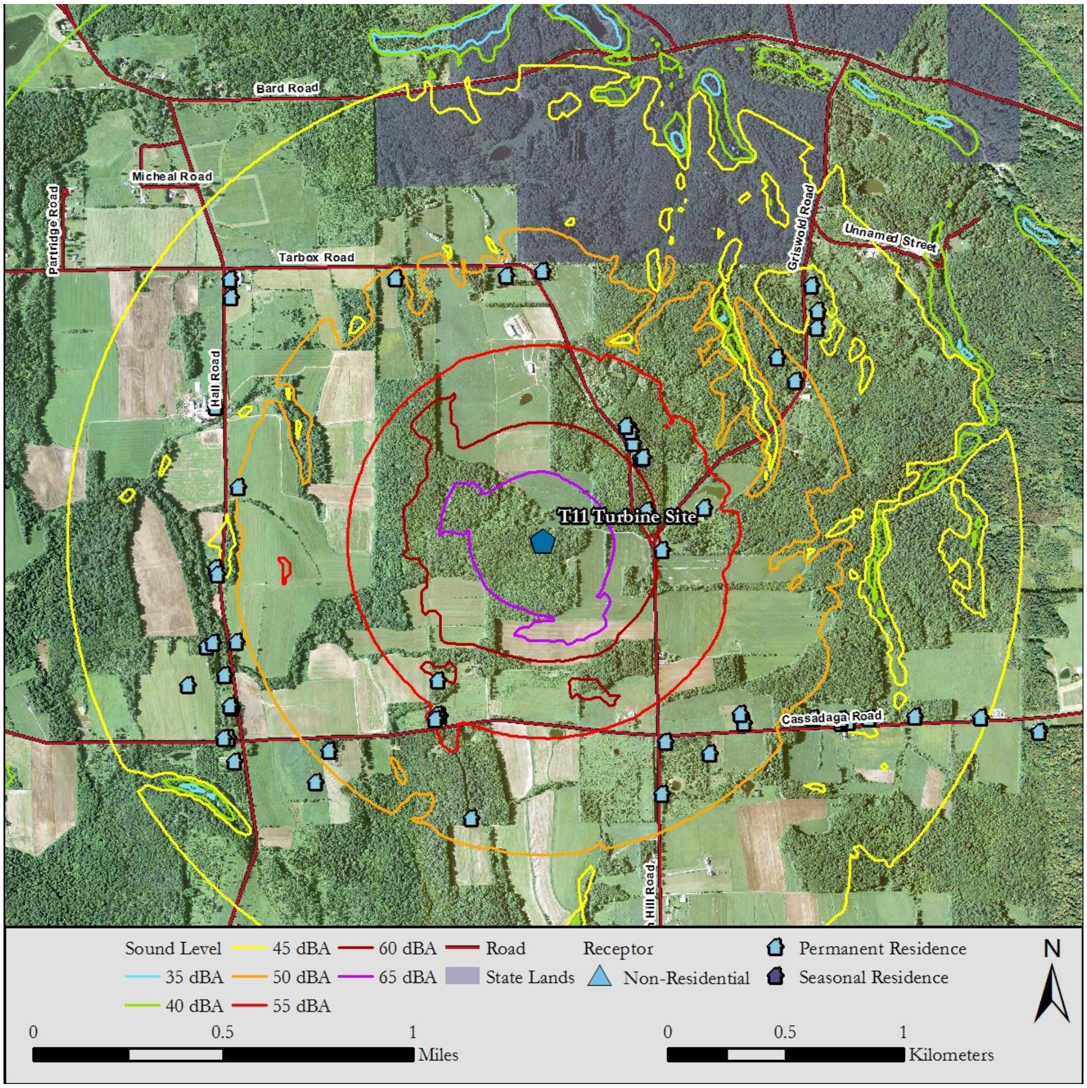


**FIGURE 108: CONSTRUCTION SOUND LEVELS FROM T11 TURBINE SITE - CLEARING PHASE**

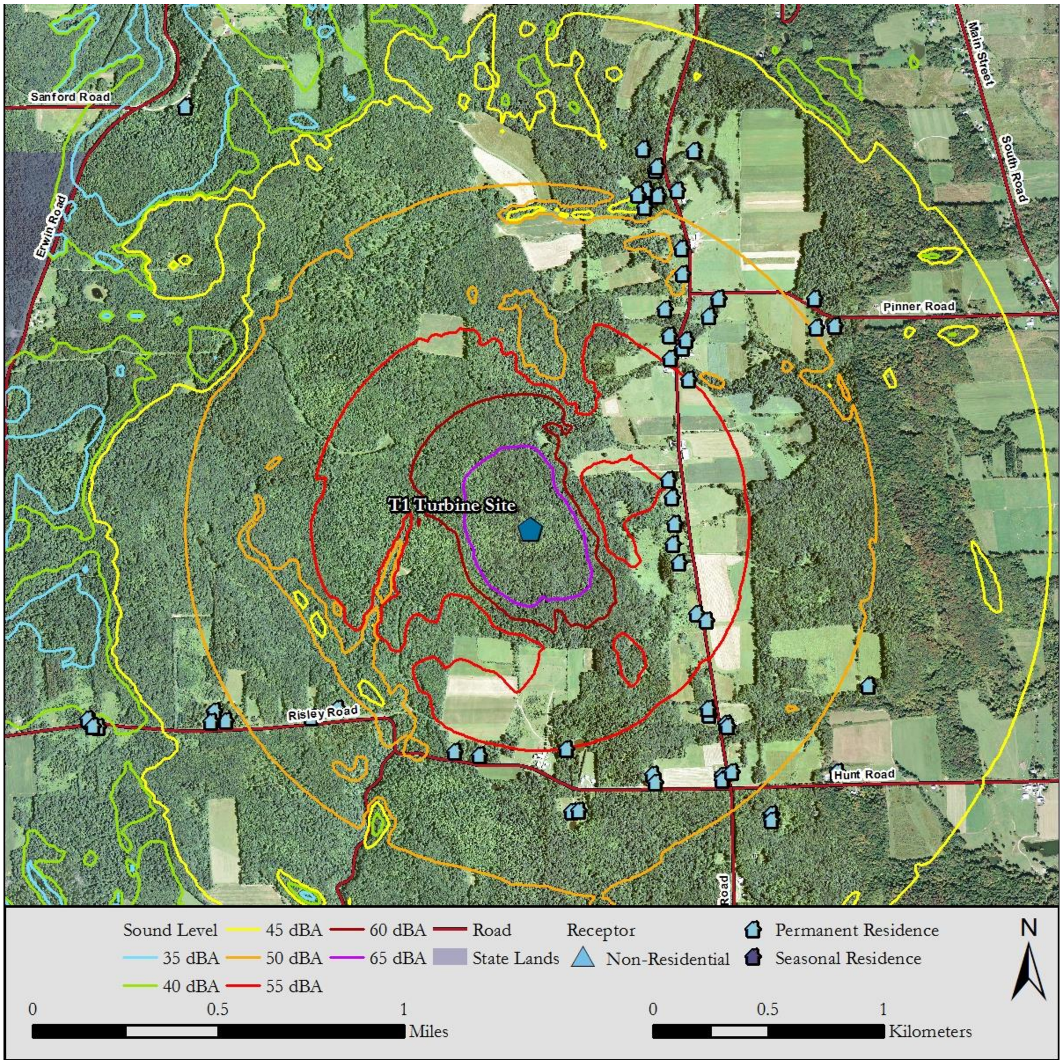


**FIGURE 109: CONSTRUCTION SOUND LEVELS FROM T1 TURBINE SITE – ALL CONSTRUCTION SOURCES**

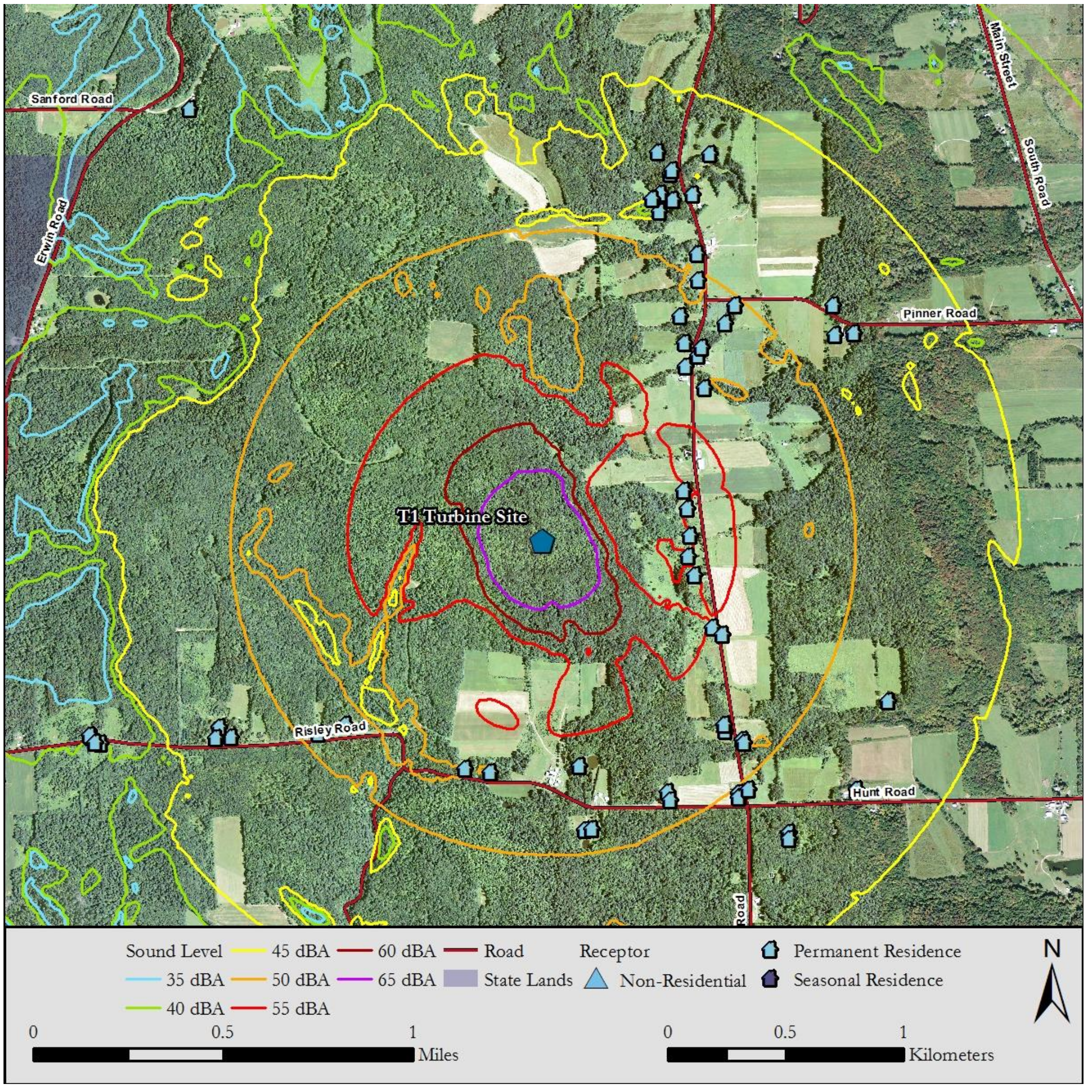


**FIGURE 110: CONSTRUCTION SOUND LEVELS FROM T1 TURBINE SITE - CLEARING CONSTRUCTION PHASE**

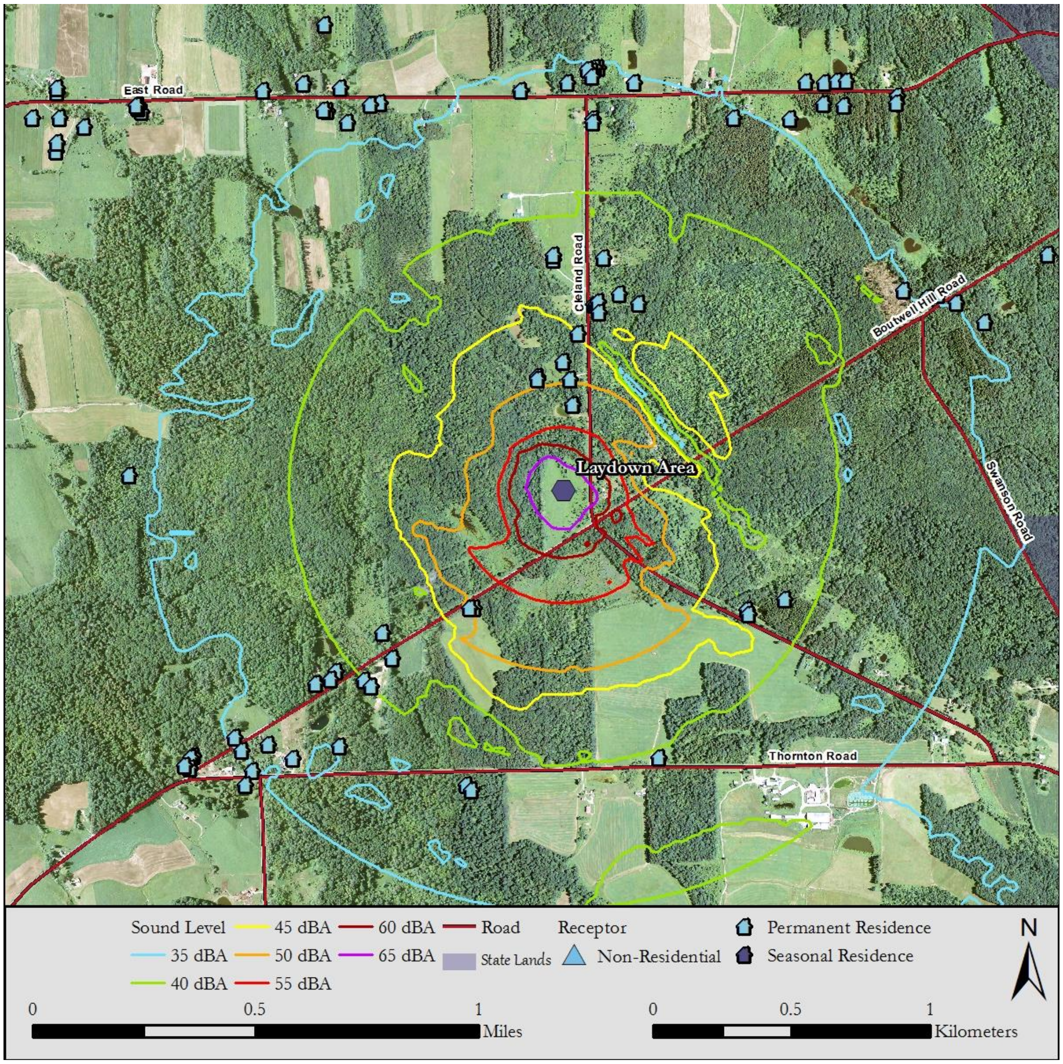


**FIGURE 111: SOUND LEVELS FROM LAYDOWN YARD/CONCRETE BATCH PLANT**

## 14.0 SUMMARY AND CONCLUSIONS

Cassadaga Wind, LLC, a wholly owned subsidiary of EverPower Wind Holdings, Inc., is proposing to construct a wind farm in Chautauqua County, New York. The project is proposed to include up to 58 turbines with a nameplate capacity of up to 126 MW. In preparation for Article 10 proceedings, RSG prepared a noise impact assessment for the project. Summary and conclusions are as follows:

- The Project is being permitted under the jurisdiction of the New York Department of Public Service (NYSDPS) and the recently completed Article X guidelines for permitting power projects. The Towns of Cherry Creek, Arkwright, and Charlotte also have their own wind turbine siting ordinances.
- There is no federal noise standard applicable to the project. There are no fixed state sound level limits. NYSDPS Article 10, found in New York Code, Rules, and Regulations16, Chapter 10, Exhibit 19 (1001.19) does not specify a fixed limit, but instead sets criteria for assessment.
- The assessment was performed in accordance with stipulations made between Cassadaga Wind, LLC and the NYSDEC and NYSDPS, town noise regulations, and NYSDPS Article 10 requirements.
- A 45 dBA $L_{(8)}$ (the equivalent sound level averaged over the night) Project design goal was selected, based on World Health Organization (WHO) guidelines for protection against sleep disturbance. This goal is applied at permanent non-participating receptors. The sound level limit specified in ordinances for the Towns of Arkwright, Charlotte, and Cherry Creek is 50 dBA $L_{10}$ is applicable during the day and night and at all homes in the study area. Their standards have sound levels that are higher than the project nighttime design goal.
- A literature review shows that wind turbine sound is often perceived as more intrusive than other environmental sound sources. This is due to the amplitude modulated character of the sound, tonal content, and low frequency content. Although wind turbines produce infrasound, it has found to be below human hearing thresholds at receiver distances, and there is no generally accepted agreement that sub-audible infrasound is perceptible and can cause adverse health impacts. If wind turbine noise is too high, it can cause annoyance and sleep disturbance. These impacts can be minimized through proper project design and operation.
- The Project area is rural overall, with some agricultural use. The villages of Charlotte and Cherry Creek are within the Project boundary.
- Background sound level measurement was performed at six locations surrounding the Project for two weeks at each location in both the summer and winter seasons. Monitoring locations were chosen to represent different soundscapes in the Project area. A summary of background sound levels, is shown in the chart below. Background sound levels are indicative of the rural nature of the project area. Primary

sound sources included car passbys, wind noise, airplane overflights, biogenic noise (birds, insects, etc.,), and agricultural equipment. Most of these noise sources are intermittent, resulting in a wide range of sound levels experienced at the site, as is indicated in the wide spread of statistical sound levels ($L_{10}$, $L_{50}$, and $L_{90}$).

| Location | Average Sound Pressure Level (dBA) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | | | | Day | | | | Night | | | |
| | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_{EQ}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ |
| Agricultural | 46 | 28 | 40 | 49 | 48 | 31 | 42 | 50 | 42 | 25 | 36 | 44 |
| Boutwell Hill | 40 | 21 | 30 | 41 | 40 | 22 | 31 | 42 | 39 | 20 | 26 | 40 |
| Cemetery | 47 | 30 | 36 | 42 | 49 | 31 | 37 | 45 | 38 | 29 | 34 | 40 |
| Nelson Road | 40 | 26 | 33 | 42 | 40 | 27 | 34 | 42 | 38 | 25 | 31 | 40 |
| Pickup Hill | 47 | 26 | 32 | 40 | 49 | 27 | 33 | 41 | 36 | 25 | 31 | 38 |
| Wooded Area | 36 | 22 | 29 | 39 | 36 | 23 | 30 | 39 | 35 | 21 | 28 | 40 |
| **Overall Average** | **45** | **26** | **35** | **44** | **46** | **28** | **36** | **45** | **39** | **25** | **32** | **41** |

- Infrasound monitoring was performed at the Boutwell Hill monitoring location for one week. Results show the presence of infrasound at this site, but at levels below the threshold of human hearing (below 90 dBG).

- Sound propagation modeling was performed using ISO 9613-2 sound propagation modeling algorithms at non-participating receptors within 1 mile of Project turbines. This includes 678 long-term permanent residences, two non-residential locations within Boutwell Hill State Forest, a cabin rental business, and five non-participating seasonal residences. The Gamesa G114 2.625 MW turbine, with a 93-meter hub height and 114 meter rotor diameter, was modeled as a worst-case assumption.

- Using ISO 9613-2 procedures, the highest sound level calculated at a permanent non-participating receptor is 45 dBA (1-hour equivalent sound level or 1-hour $L_{EQ}$) and the highest sound level calculated at a seasonal non-participating receptor is 48 dBA (1-hour $L_{EQ}$). This is with Noise Reduced Operations (NROs) applied to some turbines, three turbines removed from the Project, and a project transformer specified at 10 dB below the NEMA TR-1 standard. These mitigation methods may change if a different turbine is selected.

- The $L_{10}$ is generally less than 2 dB above the $L_{EQ}$ for wind turbine sound. Therefore, the project is expected to meet the 50 dBA $L_{10}$ town noise regulations of Arkwright, Cherry Creek, and Charlotte.

- Low frequency sound emissions from the project are below the ANSI 12.2 2008 Section 6 threshold for "Moderately Perceptible Building Vibrations" and the ANSI 12.9 Part 4 Annex D threshold for "Sound Level Below Which Annoyance is Minimal." Extrapolated infrasound levels from the project are below established perception thresholds.

- Using the CONCAWE sound propagation modeling algorithm with ISO 9613-2 and one year of meteorological data, long-term average and statistical sound levels were calculated.
- Long term averages show that the highest nighttime sound level at a permanent non-participating receptor (averaged over a single night) is 45 dBA $L_{(8)}$. Sound level averages over the night for an entire year are 40 dBA or less at all permanent non-participating receptors.
- Using background sound level monitoring data and long-term average sound propagation modeling results, a CNR analysis was performed. When typical background ($L_{50}$) and typical project-only ($L_{50}$) sound levels are compared, 90 percent of receptors show a "C" rating. A "C" rating means that there will be "no reaction." The rest of the receptors fit into the "D" category which predicts "sporadic complaints".
- Analysis of the wind shear and turbulence intensity over 1-year of meteorological data shows that conditions necessary for excessive amplitude modulation are uncommon.
- Construction noise was modeled using ISO 9613-2 around two turbine sites and the laydown yard/batch plant. Maximum 1-second $L_{EQ}$ sound levels near a typical turbine site were 57 dBA. Maximum sound levels near the laydown yard/batch plant were calculated to be 53 dBA. These are maximum levels, and will not be consistently experienced by nearby receptors. Impacts will also be of relatively short duration, particularly near turbine sites.

Based upon results from the analysis completed in this report, showing adherence of the project to appropriate noise guidelines and Town noise ordinances, we can conclude that adverse impacts due to sound from construction and operation of the proposed Cassadaga Wind Farm have been minimized to the extent practicable.

# APPENDIX A. A PRIMER ON SOUND AND NOISE

Sound consists of tiny, repeating fluctuations in ambient air pressure. The strength, or amplitude, of these fluctuations determines the sound pressure level (SPL). "Noise" can be defined as "a sound of any kind, especially when loud, confused, indistinct, or disagreeable."

### *Expressing Sound in Decibel Levels*

The varying air pressure that constitutes sound can be characterized in many different ways. The human ear is the basis for the metrics that are used in acoustics. Normal human hearing is sensitive to sound fluctuations over an enormous range of pressures, from about 20 micropascals (the "threshold of audibility") to about 20 pascals (the "threshold of pain").[73] This factor of one million in sound pressure difference is challenging to convey in engineering units. Instead, sound pressure is converted to sound "levels" in units of "decibels" (dB, named after Alexander Graham Bell). Once a measured sound is converted to dB, it is denoted as a level with the letter "L".

The conversion from sound pressure in pascals to sound level in dB is a four-step process. First, the sound wave's measured amplitude is squared and the mean is taken. Second, a ratio is taken between the mean square sound pressure and the square of the threshold of audibility (20 micropascals). Third, using the logarithm function, the ratio is converted to factors of 10. The final result is multiplied by 10 to give the decibel level. By this decibel scale, sound levels range from 0 dB at the threshold of audibility to 120 dB at the threshold of pain.

Typical sources of noise, and their sound pressure levels, are listed on the scale in Figure 112.

### *Human Response to Sound Levels: Apparent Loudness*

For every 20 dB increase in sound level, the sound pressure increases by a *factor* of 10; the sound *level* range from 0 dB to 120 dB covers 6 factors of 10, or one million, in sound *pressure*. However, for an increase of 10 dB in sound *level* as measured by a meter, humans perceive an approximate doubling of apparent loudness: to the human ear, a sound level of 70 dB sounds about "twice as loud" as a sound level of 60 dB. Smaller changes in sound level, less than 3 dB up or down, are generally not perceptible.

### *Frequency Spectrum of Sound*

The "frequency" of a sound is the rate at which it fluctuates in time, expressed in Hertz (Hz), or cycles per second. Very few sounds occur at only one frequency: most sound contains energy at many different frequencies, and it can be broken down into different frequency divisions, or bands. These bands are similar to musical pitches, from low tones to high tones. The most common division is the standard octave band. An octave is the range of frequencies whose upper frequency limit is twice its lower frequency limit, exactly like an octave in music. An octave band is identified by its center frequency: each successive band's center frequency is

[73] The pascal is a measure of pressure in the metric system. In Imperial units, they are themselves very small: one pascal is only 145 millionths of a pound per square inch (psi). The sound pressure at the threshold of audibility is only 3 one-billionths of one psi: at the threshold of pain, it is about 3 one-thousandths of one psi.

twice as high (one octave) as the previous band. For example, the 500 Hz octave band includes all sound whose frequencies range between 354 Hz (Hertz, or cycles per second) and 707 Hz. The next band is centered at 1,000 Hz with a range between 707 Hz and 1,414 Hz. The range of human hearing is divided into 10 standard octave bands: 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1,000 Hz, 2,000 Hz, 4,000 Hz, 8,000 Hz, and 16,000 Hz. For analyses that require finer frequency detail, each octave-band can be subdivided. A commonly-used subdivision creates three smaller bands within each octave band, or so-called 1/3-octave bands.

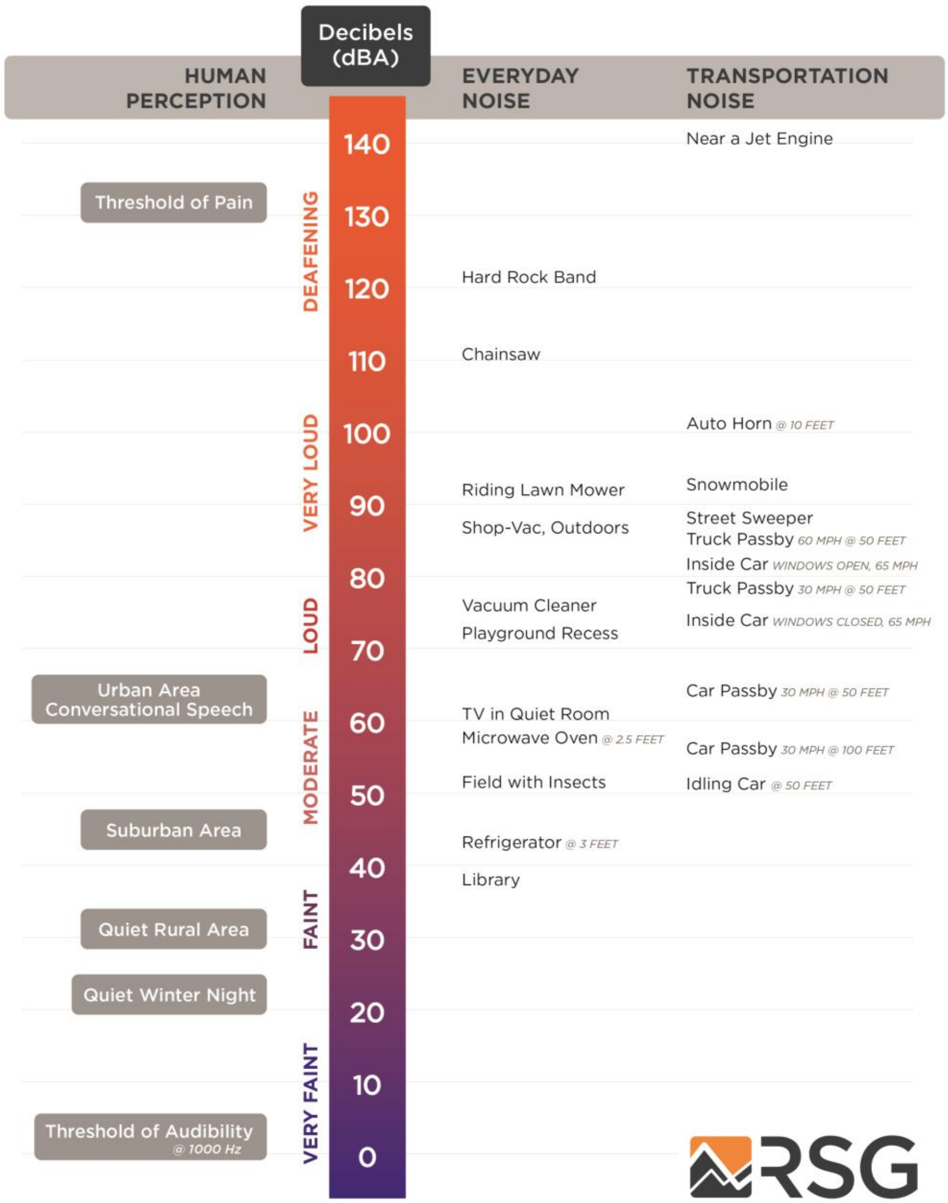


**FIGURE 112: A SCALE OF SOUND PRESSURE LEVELS FOR TYPICAL NOISE SOURCES**

### Human Response to Frequency: Weighting of Sound Levels

The human ear is not equally sensitive to sounds of all frequencies. Sounds at some frequencies seem louder than others, despite having the same decibel level as measured by a sound level meter. In particular, human hearing is much more sensitive to medium pitches (from about 500 Hz to about 4,000 Hz) than to very low or very high pitches. For example, a tone measuring 80 dB at 500 Hz (a medium pitch) sounds quite a bit louder than a tone measuring 80 dB at 60 Hz (a very low pitch). The frequency response of normal human hearing ranges from 20 Hz to 20,000 Hz. Below 20 Hz, sound pressure fluctuations are not “heard”, but sometimes can be “felt”. This is known as “infrasound”. Likewise, above 20,000 Hz, sound can no longer be heard by humans; this is known as “ultrasound”. As humans age, they tend to lose the ability to hear higher frequencies first; many adults do not hear very well above about 16,000 Hz. Most natural and man-made sound occurs in the range from about 40 Hz to about 4,000 Hz. Some insects and birdsongs reach to about 8,000 Hz.

To adjust measured sound pressure levels so that they mimic human hearing response, sound level meters apply filters, known as “frequency weightings”, to the signals. There are several defined weighting scales, including “A”, “B”, “C”, “D”, “G”, and “Z”. The most common weighting scale used in environmental noise analysis and regulation is A-weighting. This weighting represents the sensitivity of the human ear to sounds of low to moderate level. It attenuates sounds with frequencies below 1000 Hz and above 4000 Hz; it amplifies very slightly sounds between 1000 Hz and 4000 Hz, where the human ear is particularly sensitive. The C-weighting scale is sometimes used to describe louder sounds. The B- and D- scales are seldom used. All of these frequency weighting scales are normalized to the average human hearing response at 1000 Hz: at this frequency, the filters neither attenuate nor amplify. When a reported sound level has been filtered using a frequency weighting, the letter is appended to “dB”. For example, sound with A-weighting is usually denoted “dBA”. When no filtering is applied, the level is denoted “dB” or “dBZ”. The letter is also appended as a subscript to the level indicator “L”, for example “$L_A$” for A-weighted levels.

### Time Response of Sound Level Meters

Because sound levels can vary greatly from one moment to the next, the time over which sound is measured can influence the value of the levels reported. Often, sound is measured in real time, as it fluctuates. In this case, acousticians apply a so-called “time response” to the sound level meter, and this time response is often part of regulations for measuring noise. If the sound level is varying slowly, over a few seconds, “Slow” time response is applied, with a time constant of one second. If the sound level is varying quickly (for example, if brief events are mixed into the overall sound), “Fast” time response can be applied, with a time constant of one-eighth of a second.[74] The time response setting for a sound level measurement is indicated with the subscript “S” for Slow and “F” for Fast: $L_S$ or $L_F$. A sound level meter set to Fast

[74] There is a third time response defined by standards, the “Impulse” response. This response was defined to enable use of older, analog meters when measuring very brief noises; it is no longer in common use.

time response will indicate higher sound levels than one set to Slow time response when brief events are mixed into the overall sound, because it can respond more quickly.

In some cases, the maximum sound level that can be generated by a source is of concern. Likewise, the minimum sound level occurring during a monitoring period may be required. To measure these, the sound level meter can be set to capture and hold the highest and lowest levels measured during a given monitoring period. This is represented by the subscript “max”, denoted as “$L_{max}$”. One can define a “max” level with Fast response $L_{Fmax}$ (1/8-second time constant), Slow time response $L_{Smax}$ (1-second time constant), or Continuous Equivalent level over a specified time period $L_{EQmax}$. Note that, in the precedents set by the former Environmental Board under Vermont Act 250, the time response is not specified, but in the Barre Granite case which set the 55 dBA Lmax precedent the metric LSmax (a 1-second response time) was used. Since that time, maximum $L_{EQ}$ 1-second has also been used as it is comparable to the LSmax.

### *Accounting for Changes in Sound Over Time*

A sound level meter’s time response settings are useful for continuous monitoring. However, they are less useful in summarizing sound levels over longer periods. To do so, acousticians apply simple statistics to the measured sound levels, resulting in a set of defined types of sound level related to averages over time. An example is shown in Figure 113. The sound level at each instant of time is the grey trace going from left to right. Over the total time it was measured (100 seconds in the figure), the sound energy spends certain fractions of time near various levels, ranging from the minimum (about 37 dB in the figure) to the maximum (about 68 dB in the figure). The simplest descriptor is the average sound level, known as the Equivalent Continuous Sound Level. Statistical levels are used to determine for what percentage of time the sound is louder than any given level. These levels are described in the following sections.

### *Equivalent Continuous Sound Level - $L_{EQ}$*

One straightforward, common way of describing sound levels is in terms of the Continuous Equivalent Sound Level, or $L_{EQ}$. The $L_{EQ}$ is the average sound pressure level over a defined period of time, such as one hour or one day. $L_{EQ}$ is the most commonly used descriptor in noise standards and regulations. $L_{EQ}$ is representative of the overall sound to which a person is exposed. Because of the logarithmic calculation of decibels, $L_{EQ}$ tends to favor higher sound levels: loud and infrequent sources have a larger impact on the resulting average sound level than quieter but more frequent noises. For example, in Figure 113, even though the sound levels spends most of the time near about 47 dBA, the $L_{EQ}$ is 53 dBA, having been “inflated” by the maximum level of 68 dBA.

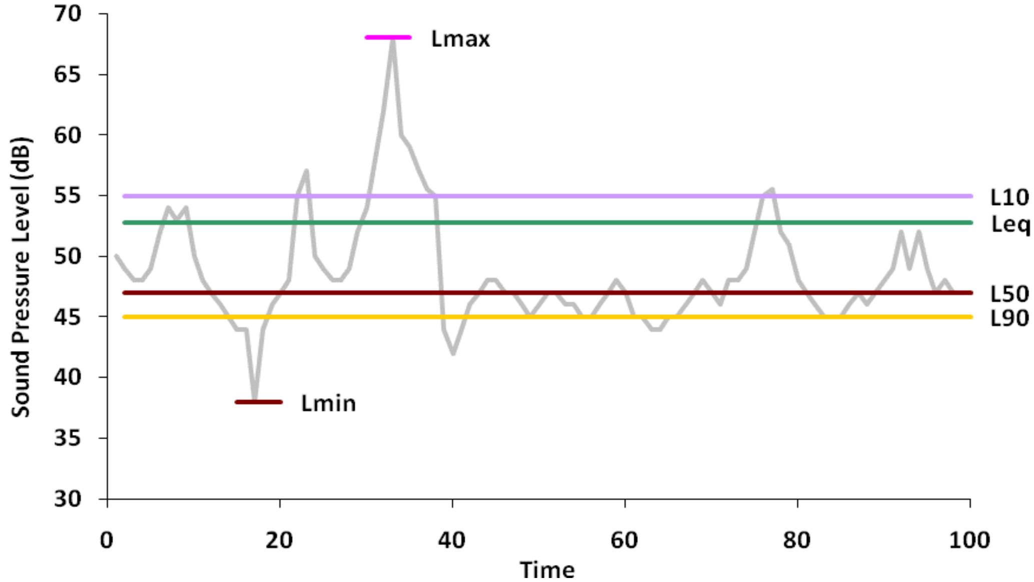


**FIGURE 113: EXAMPLE OF DESCRIPTIVE TERMS OF SOUND MEASUREMENT OVER TIME**

### *Percentile Sound Levels – $L_N$*

Percentile sound levels describe the statistical distribution of sound levels over time. "$L_N$" is the level above which the sound spends "N" percent of the time. For example, $L_{90}$ (sometimes called the "residual base level") is the sound level exceeded 90% of the time: the sound is louder than $L_{90}$ most of the time. $L_{10}$ is the sound level that is exceeded only 10% of the time. $L_{50}$ (the "median level") is exceeded 50% of the time: half of the time the sound is louder than $L_{50}$, and half the time it is quieter than $L_{50}$. Note that $L_{50}$ (median) and $L_{EQ}$ (mean) are not always the same, for reasons described in the previous section.

$L_{90}$ is often a good representation of the "ambient sound" in an area. This is the sound that persists for longer periods, and below which the overall sound level seldom falls. It tends to filter out other short-term environmental sounds that aren't part of the source being investigated. $L_{10}$ represents the higher, but less frequent, sound levels. These could include such events as barking dogs, vehicles driving by and aircraft flying overhead, gusts of wind, and work operations. $L_{90}$ represents the background sound that is present when these event noises are excluded.

Note that if one sound source is very constant and dominates the noise in an area, all of the descriptive sound levels mentioned here tend toward the same value. It is when the sound is varying widely from one moment to the next that the statistical descriptors are useful.

# APPENDIX B: MODELING INFORMATION

**TABLE 26: STANDARD ISO 9613-2 SOUND PROPAGATION MODELING PARAMETERS**

| Parameter | Setting |
|---|---|
| Ground Absorption | Spectral for all sources, Mixed Ground (G=0.5) |
| Atmospheric Absorption | Based on 10 Degrees Celsius, 70% Relative Humidity |
| Reflections | None |
| Receiver Height | 4 meters for residences, 1.5 metes for grid |
| Search Distance | 8,000 meters |

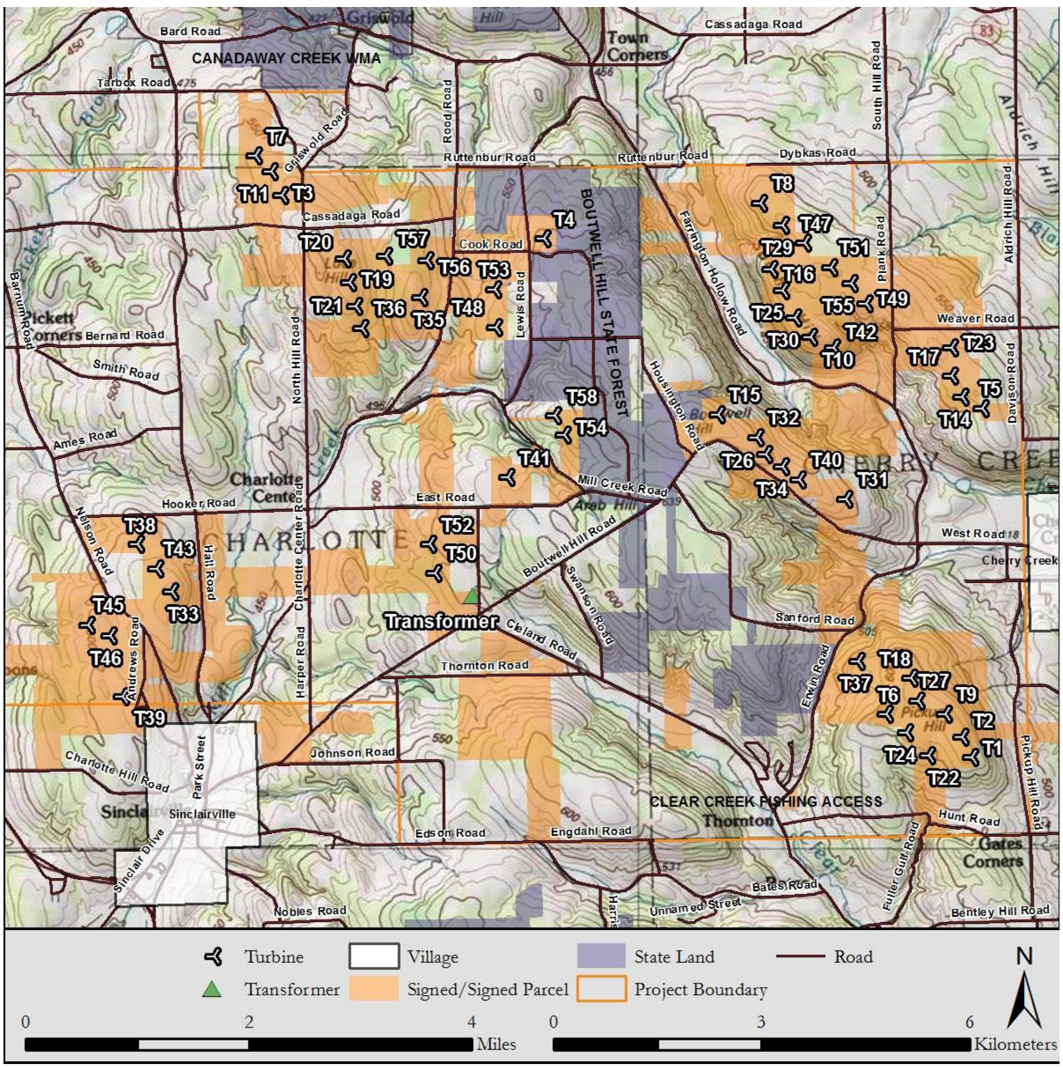


**FIGURE 114: SOURCE LOCATION MAP**

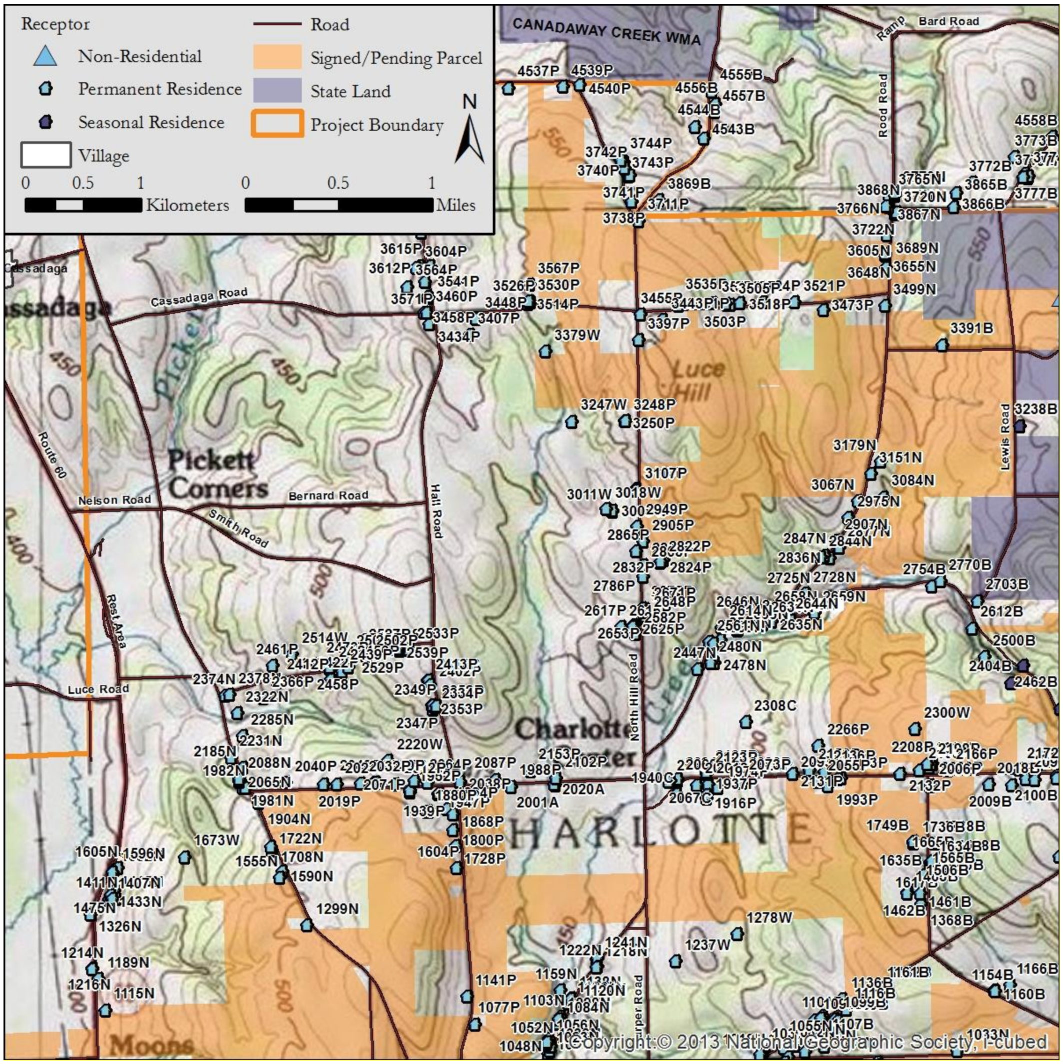


FIGURE 115: RECEPTOR LOCATION MAP - NW QUAD

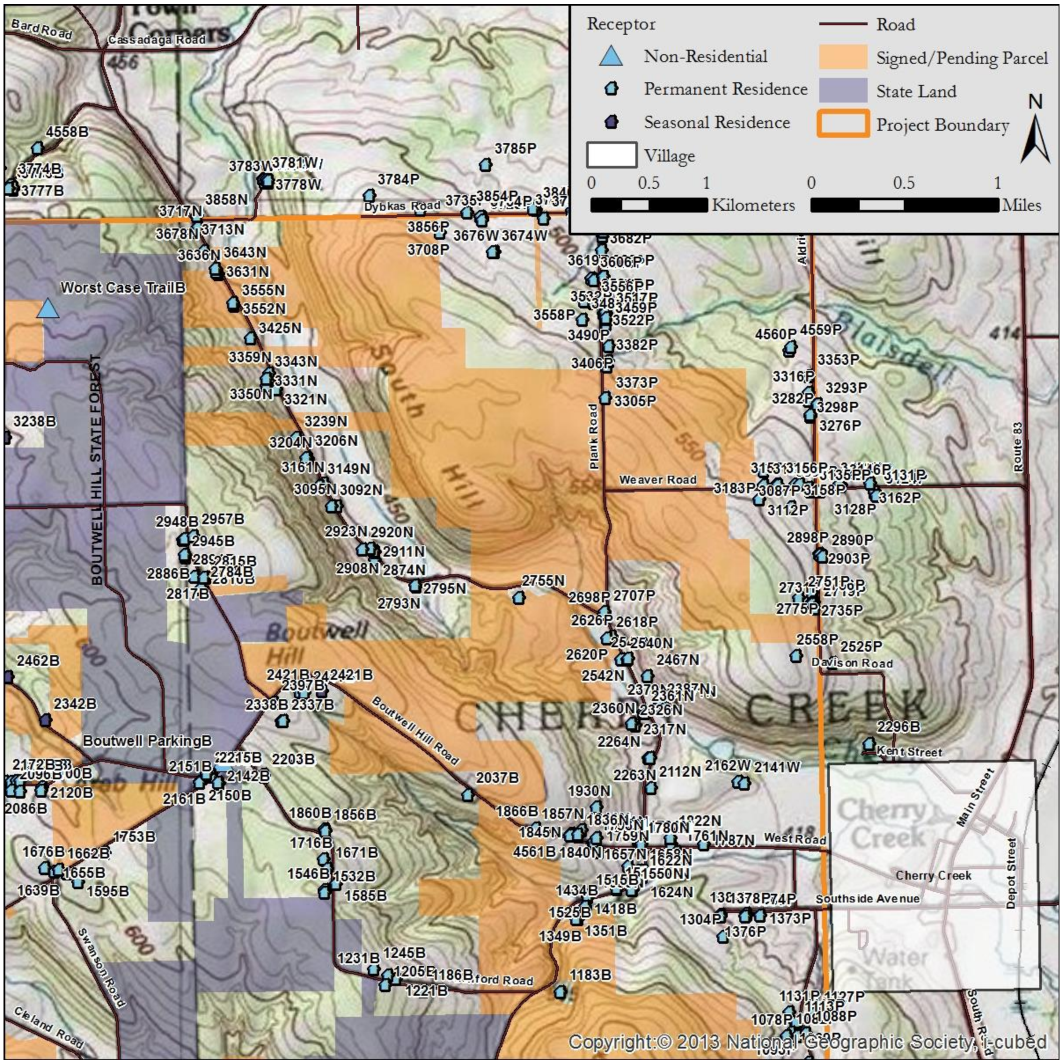


FIGURE 116: RECEPTOR LOCATION MAP - NE QUAD

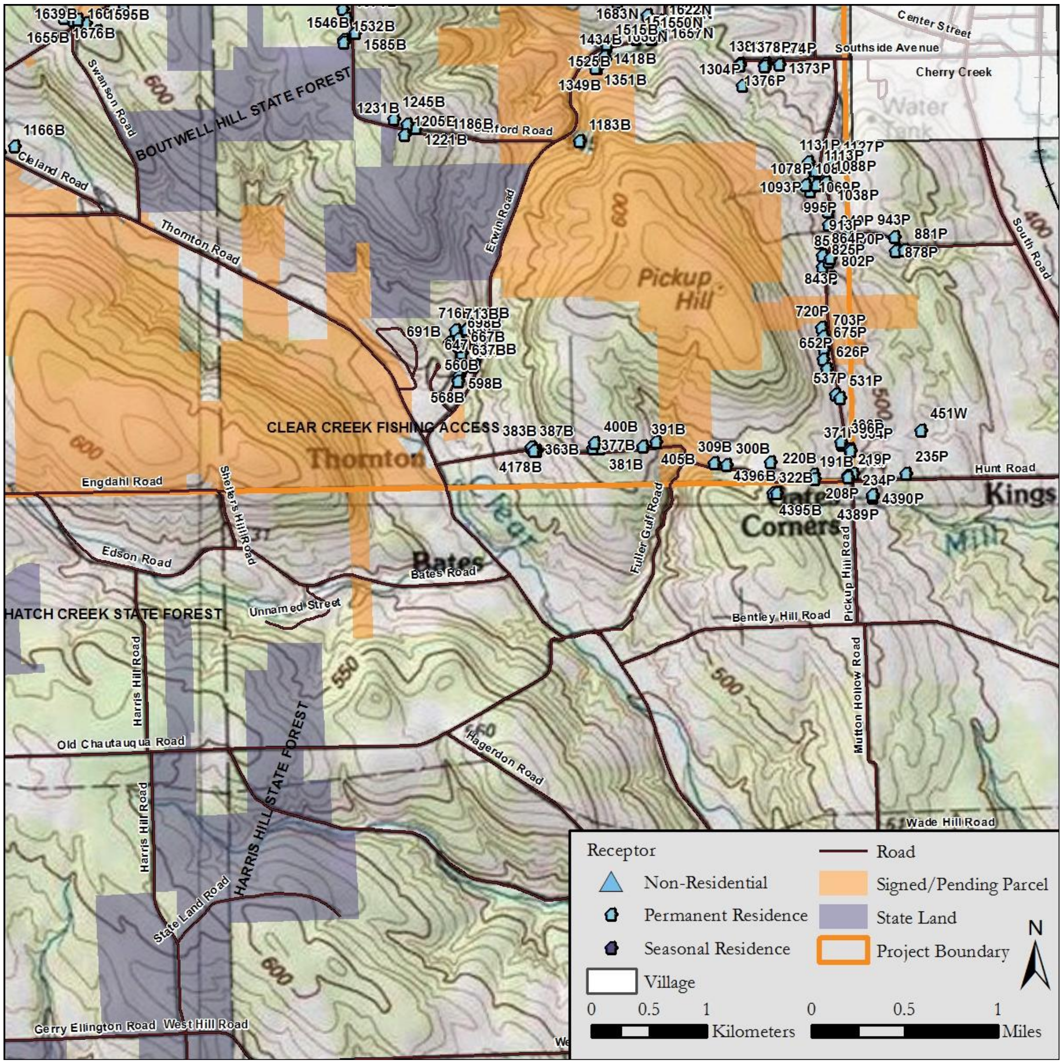


FIGURE 117: RECEPTOR LOCATION MAP - SE QUAD

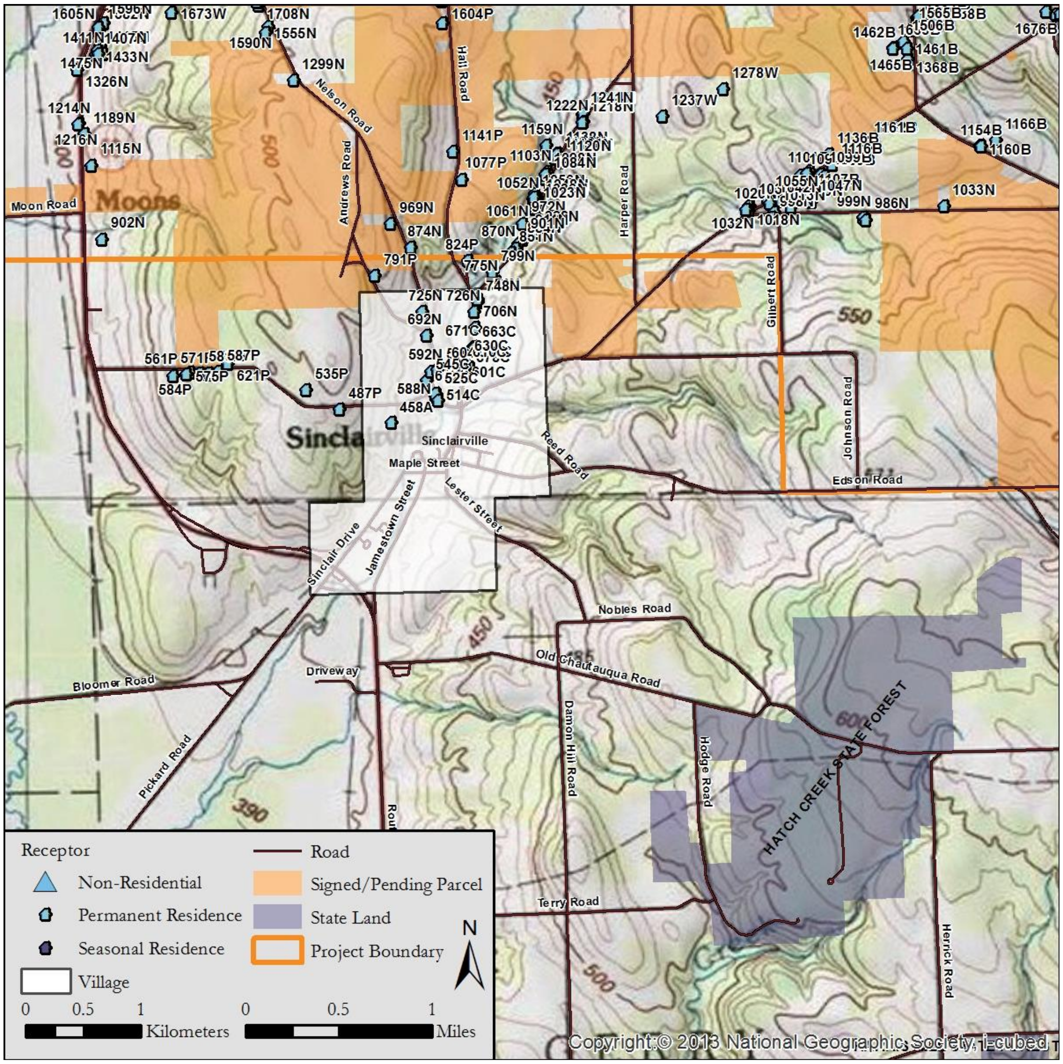


**FIGURE 118: RECEPTOR LOCATION MAP - SW QUAD**

**TABLE 27: SOUND SOURCE INFORMATION**

| Source | Modeled Total Sound Power Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| T1 | 108.6 | 108.6 | 93 | 654809 | 4681535 | 713 |
| T2 | 108.6 | 108.6 | 93 | 654677 | 4681835 | 718 |
| T3 | 108.6 | 105.6 | 93 | 644854 | 4689641 | 673 |
| T4 | 108.6 | 108.6 | 93 | 648643 | 4689011 | 700 |
| T5 | 108.6 | 105.6 | 93 | 654969 | 4686566 | 668 |
| T6 | 108.6 | 108.6 | 93 | 653578 | 4682154 | 715 |
| T7 | 108.6 | 108.6 | 93 | 644474 | 4690205 | 654 |
| T8 | 108.6 | 107.6 | 93 | 651769 | 4689527 | 660 |

| Source | Modeled Total Sound Power Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| T9 | 108.6 | 108.6 | 93 | 654432 | 4682164 | 721 |
| T10 | 108.6 | 108.6 | 93 | 652493 | 4687594 | 683 |
| T11 | 108.6 | 104.6 | 93 | 644699 | 4689976 | 663 |
| T12 | 108.6 | 106.6 | 93 | 653743 | 4682956 | 701 |
| T13 | 108.6 | - | 93 | 653956 | 4687973 | 673 |
| T14 | 108.6 | 108.6 | 93 | 654681 | 4686736 | 659 |
| T15 | 108.6 | 104.6 | 93 | 651154 | 4686482 | 706 |
| T16 | 108.6 | 108.6 | 93 | 651924 | 4688567 | 671 |
| T17 | 108.6 | 106.6 | 93 | 654519 | 4687031 | 661 |
| T18 | 108.6 | 108.6 | 93 | 653934 | 4682674 | 712 |
| T19 | 108.6 | 108.6 | 93 | 645841 | 4688376 | 690 |
| T20 | 108.6 | 103.6 | 93 | 645765 | 4688720 | 686 |
| T21 | 108.6 | 108.6 | 93 | 645927 | 4688043 | 680 |
| T22 | 108.6 | 108.6 | 93 | 654189 | 4681557 | 697 |
| T23 | 108.6 | 104.6 | 93 | 654525 | 4687443 | 666 |
| T24 | 108.6 | 108.6 | 93 | 653878 | 4681895 | 708 |
| T25 | 108.6 | 108.6 | 93 | 652080 | 4688268 | 678 |
| T26 | 108.6 | 108.6 | 93 | 651849 | 4685905 | 697 |
| T27 | 108.6 | 108.6 | 93 | 654044 | 4682354 | 718 |
| T28 | 108.6 | - | 93 | 643190 | 4683459 | 623 |
| T29 | 108.6 | 108.6 | 93 | 652084 | 4689213 | 665 |
| T30 | 108.6 | 108.6 | 93 | 652265 | 4687876 | 672 |
| T31 | 108.6 | 105.6 | 93 | 653004 | 4685260 | 650 |
| T32 | 108.6 | 106.6 | 93 | 651715 | 4686148 | 693 |
| T33 | 108.6 | 106.6 | 93 | 643268 | 4683921 | 626 |
| T34 | 108.6 | 108.6 | 93 | 652078 | 4685728 | 687 |
| T35 | 108.6 | 104.6 | 93 | 646862 | 4688160 | 676 |
| T36 | 108.6 | 108.6 | 93 | 646015 | 4687727 | 657 |
| T37 | 108.6 | 105.6 | 93 | 653182 | 4682916 | 674 |
| T38 | 108.6 | 107.6 | 93 | 642776 | 4684606 | 605 |
| T39 | 108.6 | 108.6 | 93 | 642560 | 4682408 | 603 |
| T40 | 108.6 | 105.6 | 93 | 652328 | 4685540 | 679 |
| T41 | 108.6 | 106.6 | 93 | 648126 | 4685569 | 677 |
| T42 | 108.6 | 108.6 | 93 | 652821 | 4687440 | 664 |
| T43 | 108.6 | 106.6 | 93 | 643058 | 4684255 | 617 |
| T44 | 108.6 | - | 93 | 642697 | 4683087 | 611 |
| T45 | 108.6 | 104.6 | 93 | 642063 | 4683441 | 592 |
| T46 | 108.6 | 104.6 | 93 | 642375 | 4683286 | 608 |

| Source | Modeled Total Sound Power Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| T47 | 108.6 | 108.6 | 93 | 652404 | 4688949 | 666 |
| T48 | 108.6 | 106.6 | 93 | 647938 | 4687735 | 665 |
| T49 | 108.6 | 103.6 | 93 | 653288 | 4688076 | 666 |
| T50 | 108.6 | 108.6 | 93 | 647067 | 4684192 | 634 |
| T51 | 108.6 | 108.6 | 93 | 652778 | 4688598 | 671 |
| T52 | 108.6 | 106.6 | 93 | 646996 | 4684608 | 640 |
| T53 | 108.6 | 108.6 | 93 | 647933 | 4688285 | 665 |
| T54 | 108.6 | 108.6 | 93 | 648940 | 4686182 | 682 |
| T55 | 108.6 | 106.6 | 93 | 653079 | 4688368 | 672 |
| T56 | 108.6 | 104.6 | 93 | 646959 | 4688699 | 660 |
| T57 | 108.6 | 105.6 | 93 | 646362 | 4688759 | 666 |
| T58 | 108.6 | 108.6 | 93 | 648799 | 4686463 | 682 |
| Transformer | 100.4 | 90.4 | 2 | 647620 | 4683863 | 553 |

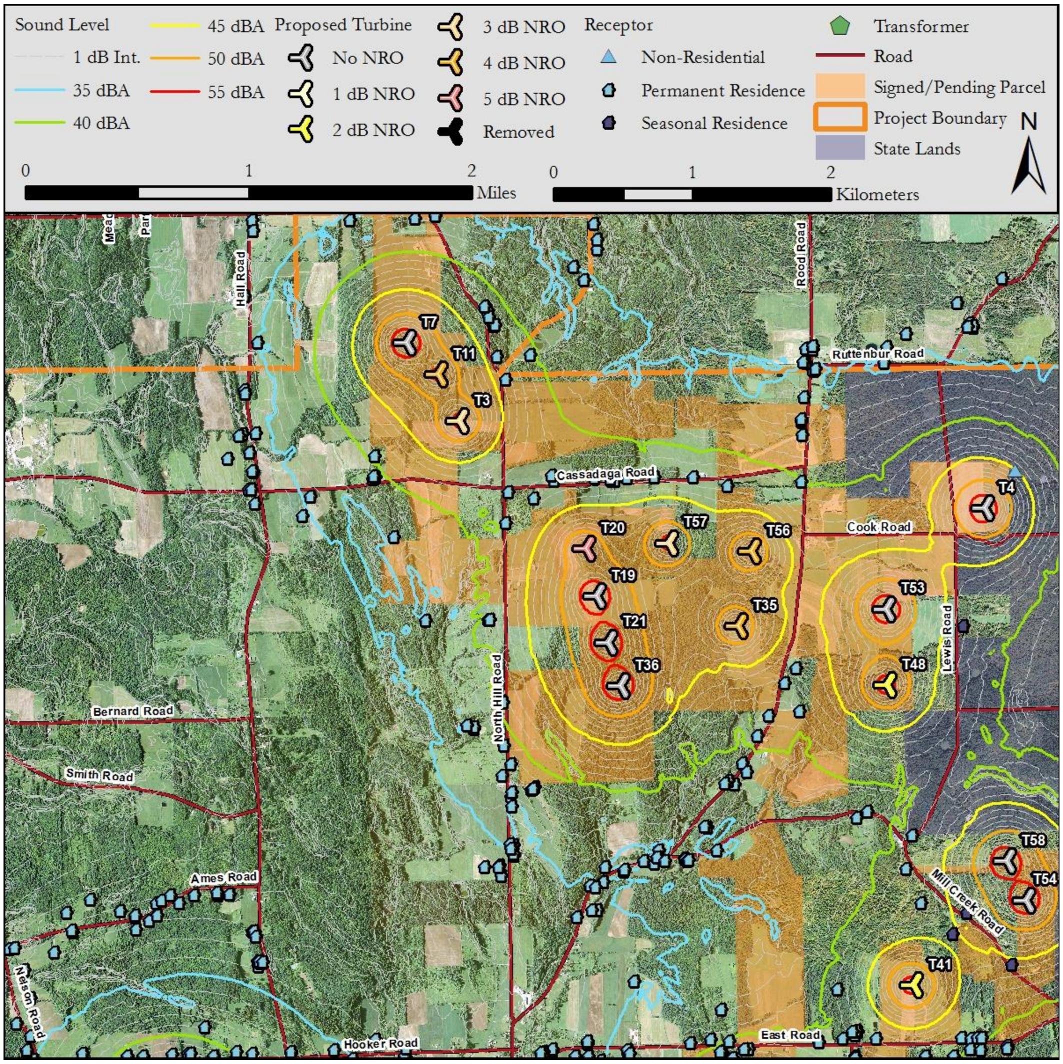


FIGURE 119: SOUND PROPAGATION MODELING RESULTS - MITIGATED ARRAY - NW QUAD

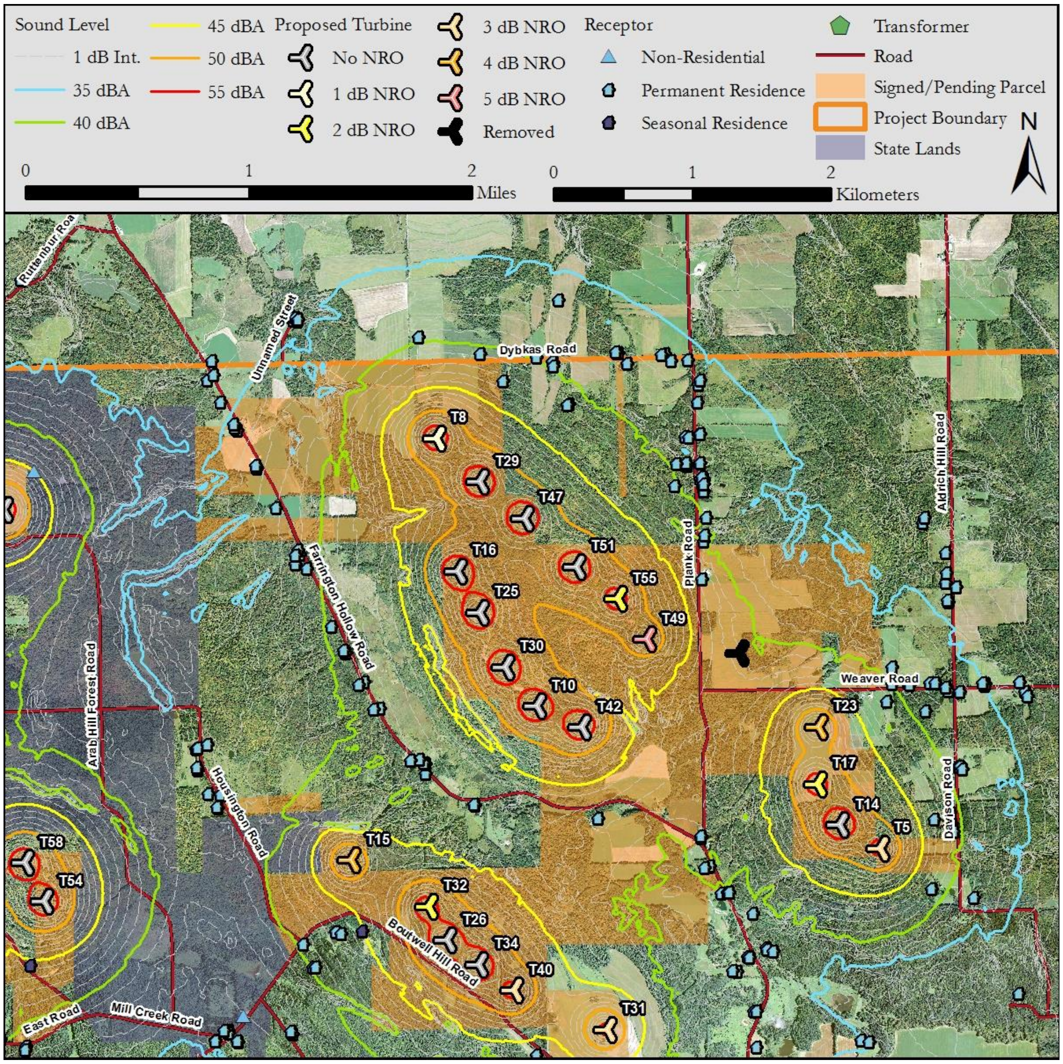


FIGURE 120: SOUND PROPAGATION MODELING RESULTS - MITIGATED ARRAY - NE QUAD

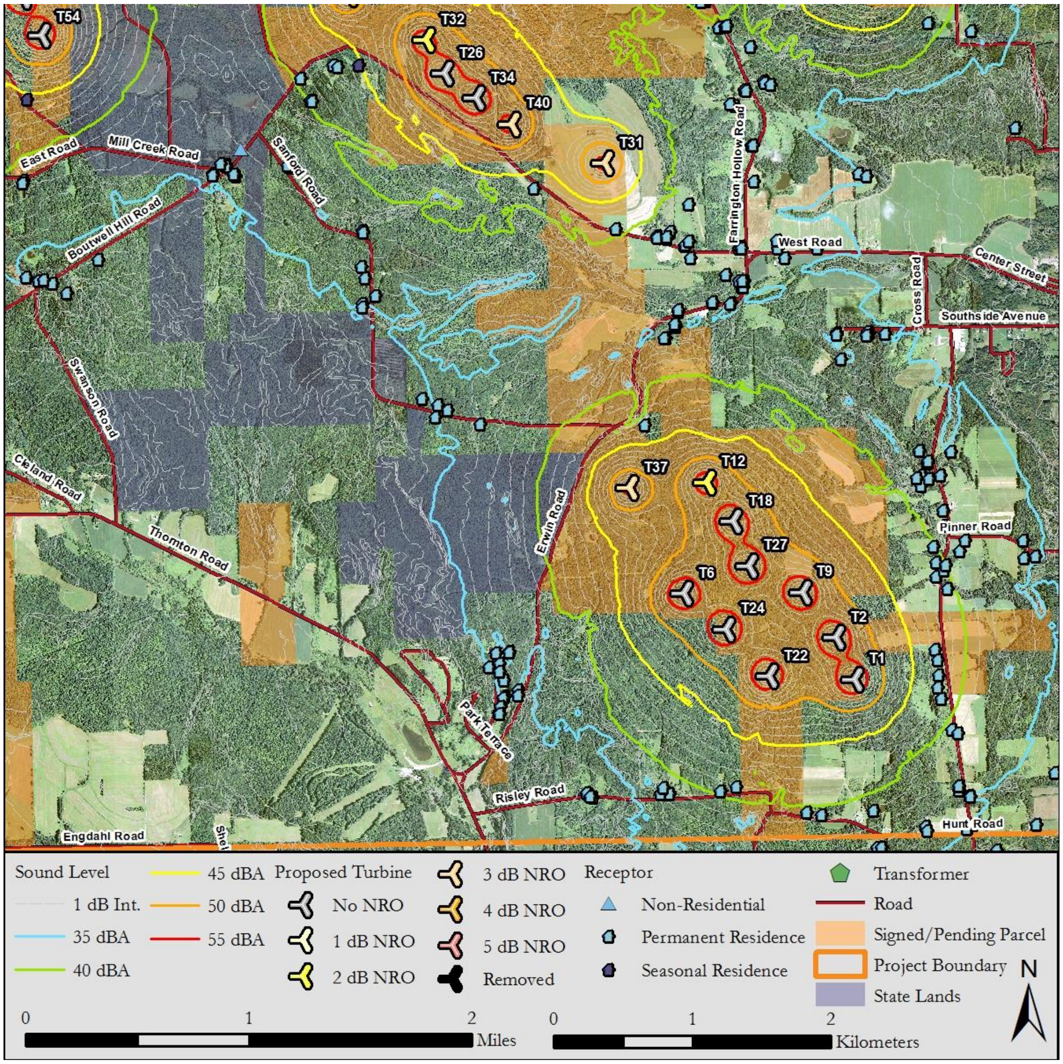


**FIGURE 121: SOUND PROPAGATION MODELING RESULTS - MITIGATED ARRAY - SE QUAD**

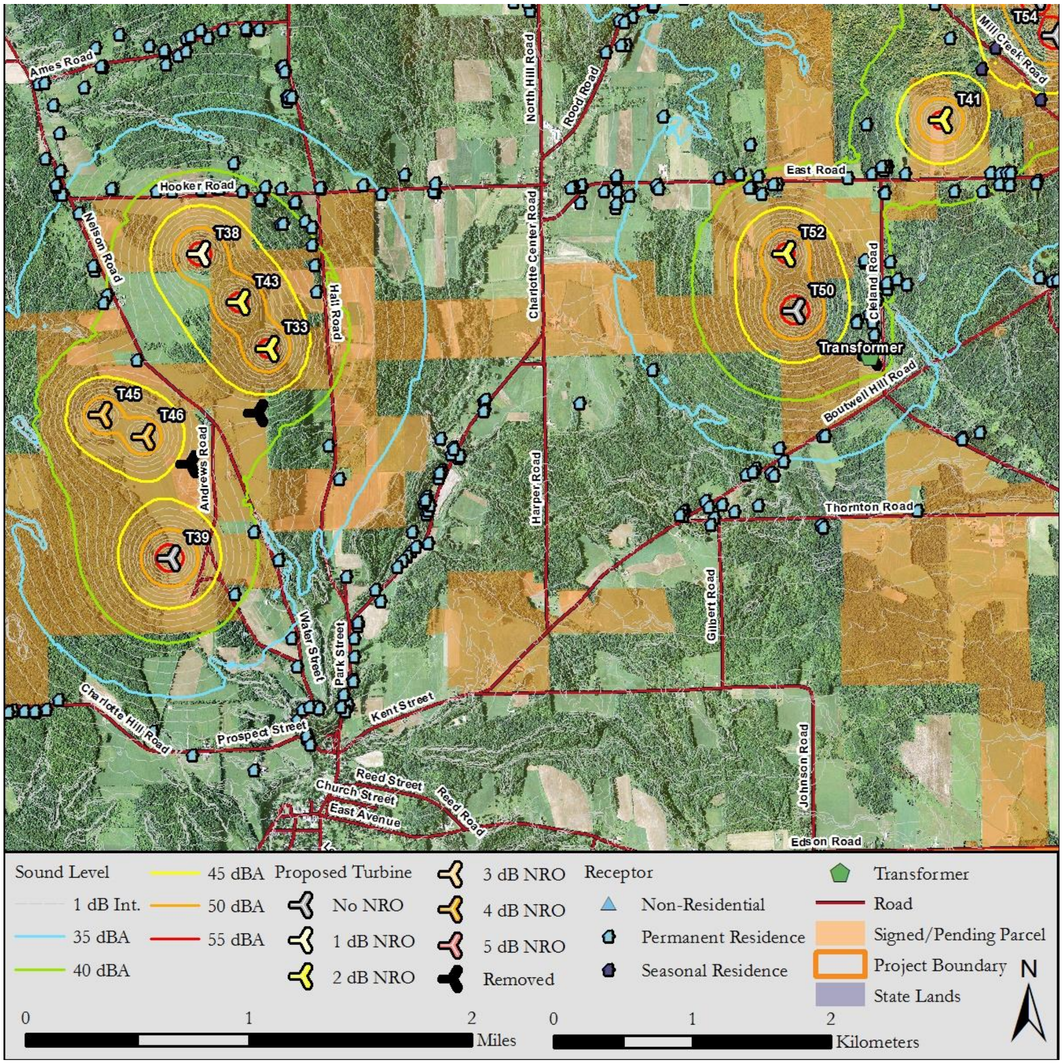


**FIGURE 122: SOUND PROPAGATION MODELING RESULTS - MITIGATED ARRAY - SW QUAD**

**TABLE 28: DISCRETE RECEPTOR RESULTS - STANDARD ISO 9613-2 MODELING PROCEDURES**

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1013N | 31 | 29 | 4 | 640689 | 4684337 | 411 |
| 1018N | 31 | 28 | 4 | 643576 | 4681334 | 428 |
| 1020N | 30 | 28 | 4 | 646283 | 4682753 | 491 |
| 1023N | 34 | 32 | 4 | 643736 | 4688955 | 523 |
| 1030N | 31 | 29 | 4 | 644525 | 4683047 | 447 |
| 1032N | 31 | 29 | 4 | 643320 | 4689835 | 496 |
| 1033N | 29 | 28 | 4 | 640642 | 4684072 | 409 |
| 1036N | 34 | 32 | 4 | 643413 | 4685743 | 521 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1037N | 31 | 29 | 4 | 645524 | 4683528 | 490 |
| 1038P | 40 | 40 | 4 | 645917 | 4686420 | 495 |
| 1042N | 31 | 29 | 4 | 643644 | 4681326 | 430 |
| 1047N | 34 | 33 | 4 | 650744 | 4690394 | 455 |
| 1048N | 33 | 30 | 4 | 648457 | 4690492 | 541 |
| 1049N | 31 | 29 | 4 | 648783 | 4690667 | 507 |
| 1052N | 33 | 30 | 4 | 643194 | 4689368 | 503 |
| 1055N | 31 | 29 | 4 | 643800 | 4681334 | 438 |
| 1056N | 33 | 30 | 4 | 641764 | 4681384 | 486 |
| 1061N | 33 | 30 | 4 | 655308 | 4688952 | 476 |
| 1069P | 39 | 39 | 4 | 653526 | 4684099 | 460 |
| 1077P | 42 | 37 | 4 | 650733 | 4685244 | 635 |
| 1078P | 39 | 39 | 4 | 651269 | 4684244 | 644 |
| 1082P | 39 | 39 | 4 | 645791 | 4685148 | 485 |
| 1084N | 33 | 30 | 4 | 648574 | 4690326 | 537 |
| 1088P | 40 | 39 | 4 | 651797 | 4683422 | 636 |
| 1089B | 36 | 35 | 4 | 654173 | 4685838 | 438 |
| 1093P | 39 | 39 | 4 | 647376 | 4690155 | 528 |
| 1094B | 36 | 35 | 4 | 645178 | 4687079 | 532 |
| 1098N | 33 | 30 | 4 | 648572 | 4690313 | 538 |
| 1099B | 36 | 35 | 4 | 653688 | 4689235 | 519 |
| 1101B | 36 | 35 | 4 | 644973 | 4687429 | 526 |
| 1103N | 33 | 30 | 4 | 656138 | 4680487 | 493 |
| 1107B | 36 | 36 | 4 | 645396 | 4686985 | 541 |
| 1113P | 39 | 39 | 4 | 641772 | 4685030 | 457 |
| 1115N | 35 | 31 | 4 | 655636 | 4680451 | 519 |
| 1116B | 37 | 36 | 4 | 648505 | 4688164 | 602 |
| 1117P | 39 | 39 | 4 | 653529 | 4684077 | 462 |
| 1120N | 36 | 33 | 4 | 653496 | 4684765 | 504 |
| 1124N | 36 | 33 | 4 | 644923 | 4687444 | 523 |
| 1126N | 35 | 32 | 4 | 646128 | 4685599 | 497 |
| 1127P | 39 | 38 | 4 | 643924 | 4681921 | 434 |
| 1131P | 39 | 39 | 4 | 645811 | 4686291 | 490 |
| 1135N | 36 | 33 | 4 | 653711 | 4689197 | 522 |
| 1136B | 38 | 37 | 4 | 643835 | 4681302 | 440 |
| 1138N | 36 | 33 | 4 | 653440 | 4680750 | 576 |
| 1141P | 44 | 39 | 4 | 642471 | 4685058 | 498 |
| 1154B | 35 | 34 | 4 | 643410 | 4690205 | 507 |
| 1159N | 35 | 33 | 4 | 654321 | 4684573 | 441 |
| 1160B | 35 | 34 | 4 | 646964 | 4683200 | 527 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1161B | 39 | 38 | 4 | 652268 | 4681333 | 509 |
| 1162B | 39 | 38 | 4 | 641792 | 4685031 | 456 |
| 1166B | 34 | 33 | 4 | 650176 | 4689983 | 460 |
| 1183B | 46 | 44 | 4 | 646798 | 4689168 | 574 |
| 1186B | 39 | 38 | 4 | 655464 | 4688550 | 490 |
| 1189N | 34 | 31 | 4 | 648970 | 4684419 | 608 |
| 1205B | 38 | 37 | 4 | 644053 | 4682178 | 434 |
| 1214N | 35 | 31 | 4 | 645255 | 4686577 | 512 |
| 1216N | 35 | 32 | 4 | 650325 | 4689623 | 457 |
| 1218N | 37 | 34 | 4 | 645204 | 4689939 | 577 |
| 1221B | 38 | 37 | 4 | 642531 | 4686061 | 488 |
| 1222N | 37 | 34 | 4 | 652510 | 4685073 | 562 |
| 1231B | 38 | 37 | 4 | 644645 | 4683133 | 445 |
| 1237W | 34 | 31 | 4 | 645458 | 4685080 | 484 |
| 1241N | 37 | 34 | 4 | 640660 | 4684135 | 409 |
| 1244N | 37 | 34 | 4 | 640631 | 4684098 | 407 |
| 1245B | 38 | 37 | 4 | 655983 | 4685515 | 438 |
| 1278W | 38 | 37 | 4 | 643823 | 4681399 | 438 |
| 1299N | 48 | 44 | 4 | 648881 | 4689280 | 589 |
| 1304P | 38 | 37 | 4 | 641770 | 4685476 | 451 |
| 1326N | 34 | 31 | 4 | 643447 | 4685734 | 521 |
| 1349B | 40 | 38 | 4 | 651820 | 4683511 | 634 |
| 1351B | 40 | 38 | 4 | 655638 | 4680471 | 520 |
| 1365P | 38 | 37 | 4 | 641676 | 4681316 | 480 |
| 1368B | 47 | 43 | 4 | 652053 | 4686885 | 455 |
| 1370P | 38 | 38 | 4 | 641947 | 4685805 | 453 |
| 1373P | 38 | 37 | 4 | 652913 | 4680686 | 533 |
| 1374P | 38 | 37 | 4 | 642847 | 4686164 | 507 |
| 1376P | 38 | 37 | 4 | 643376 | 4691011 | 484 |
| 1378P | 39 | 38 | 4 | 648279 | 4683280 | 534 |
| 1384P | 38 | 37 | 4 | 644089 | 4682095 | 436 |
| 1407N | 30 | 27 | 4 | 646270 | 4682711 | 488 |
| 1411N | 30 | 27 | 4 | 646272 | 4682747 | 490 |
| 1415N | 30 | 27 | 4 | 640642 | 4684297 | 406 |
| 1418B | 38 | 36 | 4 | 641435 | 4681309 | 476 |
| 1433N | 30 | 27 | 4 | 640678 | 4684065 | 412 |
| 1434B | 38 | 36 | 4 | 643888 | 4681533 | 434 |
| 1461B | 46 | 43 | 4 | 647615 | 4684176 | 560 |
| 1462B | 47 | 45 | 4 | 652951 | 4686779 | 483 |
| 1465B | 47 | 45 | 4 | 646275 | 4689235 | 557 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1475N | 30 | 27 | 4 | 646250 | 4682719 | 487 |
| 1506B | 45 | 44 | 4 | 647873 | 4685183 | 588 |
| 1515B | 39 | 38 | 4 | 643445 | 4681833 | 462 |
| 1525B | 39 | 37 | 4 | 646722 | 4683014 | 526 |
| 1532B | 37 | 35 | 4 | 653515 | 4689341 | 526 |
| 1546B | 37 | 36 | 4 | 646470 | 4682650 | 492 |
| 1549N | 39 | 38 | 4 | 645258 | 4686501 | 512 |
| 1550N | 39 | 38 | 4 | 647000 | 4683106 | 528 |
| 1553N | 39 | 38 | 4 | 650224 | 4689782 | 459 |
| 1555N | 44 | 42 | 4 | 653100 | 4684784 | 528 |
| 1561N | 39 | 37 | 4 | 645713 | 4686057 | 483 |
| 1565B | 43 | 42 | 4 | 655623 | 4682535 | 480 |
| 1582N | 32 | 28 | 4 | 642955 | 4686219 | 519 |
| 1585B | 39 | 37 | 4 | 643346 | 4689143 | 507 |
| 1590N | 44 | 42 | 4 | 650826 | 4685872 | 633 |
| 1595B | 37 | 36 | 4 | 650787 | 4688721 | 458 |
| 1596N | 32 | 29 | 4 | 641594 | 4681306 | 479 |
| 1604P | 46 | 44 | 4 | 651664 | 4687207 | 459 |
| 1605N | 33 | 30 | 4 | 650784 | 4690385 | 459 |
| 1617B | 43 | 42 | 4 | 654028 | 4685787 | 441 |
| 1622N | 39 | 38 | 4 | 652262 | 4681283 | 505 |
| 1624N | 39 | 38 | 4 | 649035 | 4684390 | 613 |
| 1634B | 43 | 42 | 4 | 653712 | 4689144 | 527 |
| 1635B | 43 | 42 | 4 | 655562 | 4687154 | 536 |
| 1638B | 42 | 40 | 4 | 647812 | 4686819 | 528 |
| 1639B | 37 | 36 | 4 | 647525 | 4684113 | 556 |
| 1643B | 43 | 42 | 4 | 655465 | 4682644 | 482 |
| 1655B | 36 | 35 | 4 | 653958 | 4685675 | 456 |
| 1656N | 39 | 38 | 4 | 645791 | 4685164 | 485 |
| 1657N | 39 | 38 | 4 | 645825 | 4686111 | 486 |
| 1658N | 39 | 38 | 4 | 644262 | 4685177 | 473 |
| 1662B | 36 | 35 | 4 | 653400 | 4684732 | 506 |
| 1665B | 42 | 41 | 4 | 655348 | 4683094 | 472 |
| 1671B | 39 | 38 | 4 | 650133 | 4689946 | 463 |
| 1673W | 38 | 35 | 4 | 642080 | 4685953 | 463 |
| 1676B | 37 | 36 | 4 | 644262 | 4689237 | 558 |
| 1683N | 40 | 38 | 4 | 645889 | 4685026 | 489 |
| 1708N | 43 | 40 | 4 | 655551 | 4687158 | 537 |
| 1716B | 39 | 38 | 4 | 647366 | 4690164 | 529 |
| 1722N | 43 | 40 | 4 | 648818 | 4685111 | 603 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1728P | 44 | 42 | 4 | 643614 | 4684526 | 490 |
| 1736B | 45 | 44 | 4 | 647593 | 4685541 | 583 |
| 1738B | 43 | 41 | 4 | 650241 | 4686952 | 632 |
| 1749B | 45 | 44 | 4 | 655450 | 4681395 | 529 |
| 1753B | 37 | 36 | 4 | 653718 | 4686423 | 447 |
| 1759N | 40 | 38 | 4 | 645767 | 4690654 | 519 |
| 1761N | 39 | 38 | 4 | 648932 | 4684410 | 606 |
| 1780N | 39 | 38 | 4 | 646060 | 4686401 | 492 |
| 1783N | 39 | 38 | 4 | 646899 | 4683028 | 523 |
| 1784N | 39 | 38 | 4 | 655477 | 4688343 | 496 |
| 1787N | 38 | 37 | 4 | 642527 | 4686072 | 489 |
| 1791N | 39 | 38 | 4 | 655747 | 4687752 | 499 |
| 1793N | 40 | 38 | 4 | 651368 | 4684304 | 641 |
| 1800P | 44 | 42 | 4 | 650893 | 4685710 | 626 |
| 1802N | 40 | 38 | 4 | 653548 | 4684202 | 461 |
| 1821N | 40 | 38 | 4 | 653596 | 4690091 | 491 |
| 1822N | 39 | 38 | 4 | 645539 | 4685104 | 486 |
| 1836N | 41 | 39 | 4 | 650285 | 4685248 | 641 |
| 1840N | 42 | 39 | 4 | 653077 | 4690148 | 504 |
| 1841N | 41 | 39 | 4 | 650479 | 4689328 | 458 |
| 1845N | 42 | 39 | 4 | 647337 | 4689637 | 534 |
| 1856B | 40 | 39 | 4 | 651889 | 4683479 | 630 |
| 1857N | 42 | 39 | 4 | 655478 | 4687699 | 516 |
| 1860B | 40 | 39 | 4 | 646084 | 4685091 | 499 |
| 1866B | 45 | 42 | 4 | 643224 | 4684991 | 493 |
| 1868P | 43 | 41 | 4 | 655525 | 4681172 | 530 |
| 1878P | 45 | 43 | 4 | 643092 | 4685056 | 492 |
| 1880P | 45 | 43 | 4 | 655356 | 4686272 | 568 |
| 1884P | 43 | 41 | 4 | 646854 | 4687016 | 534 |
| 1904N | 40 | 38 | 4 | 654927 | 4684033 | 443 |
| 1916P | 38 | 36 | 4 | 640673 | 4682464 | 423 |
| 191B | 38 | 38 | 4 | 640467 | 4683460 | 407 |
| 1930N | 42 | 40 | 4 | 653579 | 4689540 | 504 |
| 1937P | 38 | 36 | 4 | 644250 | 4682387 | 438 |
| 1939P | 43 | 41 | 4 | 645238 | 4687162 | 538 |
| 1940C | 37 | 35 | 4 | 652726 | 4689769 | 529 |
| 1947P | 43 | 41 | 4 | 655460 | 4682753 | 479 |
| 1952P | 44 | 42 | 4 | 645380 | 4690119 | 562 |
| 1965P | 44 | 42 | 4 | 648637 | 4685189 | 601 |
| 1974P | 38 | 37 | 4 | 652934 | 4680682 | 534 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 1981N | 39 | 37 | 4 | 645243 | 4686859 | 519 |
| 1982N | 39 | 36 | 4 | 643381 | 4689273 | 507 |
| 1988P | 39 | 37 | 4 | 644480 | 4685048 | 468 |
| 1993P | 45 | 43 | 4 | 645204 | 4688905 | 602 |
| 1995P | 43 | 42 | 4 | 652630 | 4690068 | 510 |
| 2001A | 37 | 35 | 4 | 644412 | 4682829 | 442 |
| 2006P | 43 | 42 | 4 | 643255 | 4685089 | 485 |
| 2009B | 43 | 41 | 4 | 642015 | 4684518 | 489 |
| 2011C | 37 | 36 | 4 | 644403 | 4682811 | 442 |
| 2012P | 44 | 43 | 4 | 655410 | 4682377 | 502 |
| 2013P | 38 | 36 | 4 | 643176 | 4680879 | 455 |
| 2018B | 44 | 43 | 4 | 647723 | 4685053 | 580 |
| 2019P | 44 | 42 | 4 | 647463 | 4685155 | 572 |
| 2020A | 37 | 35 | 4 | 640617 | 4684061 | 407 |
| 2021P | 45 | 43 | 4 | 651377 | 4687573 | 456 |
| 202P | 37 | 36 | 4 | 643030 | 4685263 | 479 |
| 2032P | 45 | 44 | 4 | 645123 | 4690333 | 556 |
| 2037B | 47 | 45 | 4 | 653312 | 4683366 | 531 |
| 2038P | 41 | 39 | 4 | 650285 | 4685239 | 641 |
| 2040P | 41 | 39 | 4 | 653641 | 4684572 | 472 |
| 2046P | 39 | 37 | 4 | 644486 | 4685114 | 470 |
| 2047P | 42 | 40 | 4 | 647342 | 4689536 | 536 |
| 2048P | 45 | 43 | 4 | 643033 | 4682147 | 506 |
| 2049P | 45 | 43 | 4 | 647721 | 4685224 | 585 |
| 2053C | 37 | 35 | 4 | 646780 | 4687026 | 529 |
| 2055P | 44 | 42 | 4 | 647671 | 4684277 | 554 |
| 2063P | 44 | 42 | 4 | 653840 | 4686241 | 443 |
| 2064P | 41 | 39 | 4 | 652260 | 4681648 | 537 |
| 2065N | 38 | 36 | 4 | 644342 | 4682491 | 440 |
| 2067C | 37 | 35 | 4 | 655493 | 4682185 | 506 |
| 2068C | 37 | 35 | 4 | 651222 | 4687747 | 463 |
| 2071P | 43 | 41 | 4 | 655579 | 4682460 | 485 |
| 2073P | 39 | 37 | 4 | 643382 | 4685957 | 532 |
| 2084P | 39 | 37 | 4 | 644833 | 4683546 | 462 |
| 2086B | 42 | 41 | 4 | 650743 | 4685234 | 636 |
| 2087P | 39 | 37 | 4 | 645800 | 4685056 | 486 |
| 2088N | 38 | 36 | 4 | 648548 | 4690349 | 534 |
| 208P | 37 | 36 | 4 | 655069 | 4687873 | 529 |
| 2090P | 39 | 37 | 4 | 643843 | 4682276 | 459 |
| 2091C | 37 | 35 | 4 | 651113 | 4687991 | 468 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 2093P | 44 | 43 | 4 | 655505 | 4686741 | 546 |
| 2096B | 43 | 41 | 4 | 653899 | 4686249 | 444 |
| 2099P | 44 | 43 | 4 | 651129 | 4687977 | 467 |
| 2100B | 41 | 40 | 4 | 655337 | 4680474 | 541 |
| 2102P | 37 | 35 | 4 | 647641 | 4684113 | 559 |
| 2112N | 40 | 39 | 4 | 643793 | 4689092 | 531 |
| 2120B | 41 | 40 | 4 | 655559 | 4687696 | 514 |
| 2123P | 38 | 36 | 4 | 643580 | 4681066 | 422 |
| 2131P | 42 | 40 | 4 | 643655 | 4685073 | 483 |
| 2132P | 43 | 42 | 4 | 646681 | 4685179 | 532 |
| 2135P | 37 | 36 | 4 | 645862 | 4690951 | 490 |
| 2136P | 43 | 42 | 4 | 643471 | 4684983 | 486 |
| 2141W | 38 | 36 | 4 | 643558 | 4681107 | 422 |
| 2142B | 39 | 38 | 4 | 641775 | 4685201 | 461 |
| 2150B | 39 | 37 | 4 | 648286 | 4683266 | 535 |
| 2151B | 39 | 38 | 4 | 646725 | 4686543 | 502 |
| 2153P | 38 | 36 | 4 | 645858 | 4690881 | 497 |
| 2156P | 42 | 41 | 4 | 650628 | 4689022 | 461 |
| 2161B | 39 | 38 | 4 | 641671 | 4685292 | 455 |
| 2162W | 38 | 37 | 4 | 644279 | 4682422 | 439 |
| 2164B | 44 | 42 | 4 | 655390 | 4682492 | 497 |
| 2166P | 45 | 44 | 4 | 646837 | 4685041 | 542 |
| 2168P | 44 | 42 | 4 | 655480 | 4682356 | 501 |
| 2172B | 44 | 43 | 4 | 653747 | 4686430 | 447 |
| 2174B | 43 | 42 | 4 | 650851 | 4688582 | 455 |
| 2175B | 43 | 42 | 4 | 643369 | 4685077 | 485 |
| 2185N | 38 | 36 | 4 | 652897 | 4680710 | 533 |
| 2189P | 44 | 43 | 4 | 645179 | 4687607 | 544 |
| 2198P | 44 | 43 | 4 | 655412 | 4682278 | 505 |
| 2199B | 41 | 39 | 4 | 654010 | 4684362 | 449 |
| 219P | 37 | 37 | 4 | 647762 | 4684552 | 561 |
| 2201P | 44 | 43 | 4 | 646764 | 4685081 | 534 |
| 2202B | 39 | 38 | 4 | 655534 | 4688450 | 491 |
| 2203B | 41 | 39 | 4 | 654696 | 4684034 | 449 |
| 2206P | 45 | 43 | 4 | 648492 | 4685187 | 595 |
| 2208P | 45 | 43 | 4 | 653970 | 4680761 | 552 |
| 2209B | 39 | 38 | 4 | 655474 | 4688358 | 495 |
| 220B | 38 | 38 | 4 | 642072 | 4685961 | 464 |
| 2214B | 41 | 39 | 4 | 654010 | 4684643 | 449 |
| 2215B | 39 | 38 | 4 | 645171 | 4686360 | 524 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 2217B | 39 | 38 | 4 | 655458 | 4688483 | 492 |
| 2220W | 42 | 40 | 4 | 655305 | 4683009 | 476 |
| 2231N | 37 | 34 | 4 | 652630 | 4690044 | 510 |
| 2263N | 41 | 39 | 4 | 654022 | 4684362 | 449 |
| 2264N | 41 | 39 | 4 | 652121 | 4683372 | 606 |
| 2266P | 41 | 39 | 4 | 653933 | 4684248 | 450 |
| 2285N | 35 | 33 | 4 | 647345 | 4690065 | 528 |
| 2296B | 33 | 32 | 4 | 648533 | 4690320 | 536 |
| 2300W | 44 | 43 | 4 | 646751 | 4685085 | 533 |
| 2308C | 38 | 36 | 4 | 643621 | 4681339 | 430 |
| 2317N | 42 | 40 | 4 | 653687 | 4689557 | 501 |
| 2322N | 34 | 32 | 4 | 648846 | 4684435 | 609 |
| 2326N | 42 | 40 | 4 | 654093 | 4685128 | 447 |
| 2334P | 38 | 35 | 4 | 640583 | 4683104 | 414 |
| 2337B | 43 | 42 | 4 | 646912 | 4687171 | 532 |
| 2338B | 43 | 42 | 4 | 643467 | 4684976 | 487 |
| 2342B | 46 | 46 | 4 | 646554 | 4689232 | 574 |
| 2347P | 37 | 35 | 4 | 646459 | 4682775 | 504 |
| 2349P | 37 | 35 | 4 | 648854 | 4685718 | 575 |
| 234P | 36 | 36 | 4 | 646756 | 4685392 | 539 |
| 2352P | 37 | 35 | 4 | 648427 | 4685938 | 561 |
| 2353P | 37 | 35 | 4 | 646551 | 4682796 | 508 |
| 235P | 35 | 35 | 4 | 647952 | 4690177 | 528 |
| 2360N | 42 | 40 | 4 | 653678 | 4689557 | 501 |
| 2361N | 42 | 40 | 4 | 643653 | 4685086 | 483 |
| 2366P | 36 | 33 | 4 | 650353 | 4685168 | 641 |
| 2371N | 39 | 38 | 4 | 645859 | 4686110 | 489 |
| 2374N | 33 | 30 | 4 | 642537 | 4685969 | 480 |
| 2378N | 32 | 29 | 4 | 643820 | 4681427 | 435 |
| 2379N | 40 | 39 | 4 | 654918 | 4684039 | 442 |
| 2387N | 39 | 38 | 4 | 646052 | 4686391 | 492 |
| 2397B | 44 | 42 | 4 | 653756 | 4686438 | 447 |
| 2402P | 37 | 35 | 4 | 651263 | 4687767 | 456 |
| 2404B | 47 | 46 | 4 | 642332 | 4683838 | 511 |
| 2411B | 46 | 44 | 4 | 645841 | 4689226 | 579 |
| 2412P | 35 | 33 | 4 | 653676 | 4689912 | 490 |
| 2413P | 37 | 35 | 4 | 653503 | 4689183 | 536 |
| 2414P | 37 | 35 | 4 | 650910 | 4685707 | 626 |
| 2420P | 35 | 33 | 4 | 653989 | 4684411 | 450 |
| 2421B | 48 | 44 | 4 | 653192 | 4684660 | 513 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 2421B | 48 | 44 | 4 | 653192 | 4684660 | 513 |
| 2422P | 36 | 34 | 4 | 655270 | 4682986 | 481 |
| 2439P | 36 | 33 | 4 | 644544 | 4691103 | 528 |
| 2447N | 37 | 36 | 4 | 645534 | 4689248 | 599 |
| 2451P | 35 | 33 | 4 | 653479 | 4690082 | 497 |
| 2456P | 35 | 33 | 4 | 652667 | 4690524 | 489 |
| 2458P | 35 | 33 | 4 | 653409 | 4690128 | 498 |
| 2461P | 34 | 32 | 4 | 646925 | 4683007 | 524 |
| 2462B | 48 | 48 | 4 | 650392 | 4685353 | 634 |
| 2467N | 41 | 39 | 4 | 656037 | 4682538 | 476 |
| 2473P | 35 | 33 | 4 | 646051 | 4683766 | 502 |
| 2478N | 37 | 36 | 4 | 655494 | 4686722 | 546 |
| 2480N | 37 | 36 | 4 | 647728 | 4684382 | 552 |
| 2500B | 45 | 44 | 4 | 642907 | 4685078 | 497 |
| 2501P | 35 | 33 | 4 | 650329 | 4689599 | 458 |
| 2502P | 35 | 33 | 4 | 654850 | 4685181 | 445 |
| 2508P | 35 | 33 | 4 | 655724 | 4687761 | 500 |
| 2514W | 34 | 32 | 4 | 643422 | 4685743 | 521 |
| 2525P | 41 | 39 | 4 | 650285 | 4685233 | 641 |
| 2527P | 35 | 32 | 4 | 645786 | 4684936 | 489 |
| 2528P | 35 | 33 | 4 | 654908 | 4685167 | 442 |
| 2529P | 35 | 33 | 4 | 646523 | 4686475 | 501 |
| 2533P | 36 | 34 | 4 | 646511 | 4686469 | 502 |
| 2539P | 35 | 33 | 4 | 654264 | 4684699 | 441 |
| 2540N | 43 | 41 | 4 | 655196 | 4687749 | 529 |
| 2542N | 43 | 41 | 4 | 654041 | 4685779 | 441 |
| 2545N | 42 | 40 | 4 | 655356 | 4683107 | 472 |
| 2558P | 45 | 43 | 4 | 645068 | 4690443 | 550 |
| 2559N | 38 | 37 | 4 | 643564 | 4681117 | 423 |
| 2561N | 37 | 37 | 4 | 640523 | 4683376 | 409 |
| 2568N | 37 | 36 | 4 | 640661 | 4684321 | 408 |
| 2582P | 37 | 36 | 4 | 647963 | 4682750 | 519 |
| 2605N | 37 | 37 | 4 | 643525 | 4681317 | 426 |
| 2608N | 37 | 37 | 4 | 646495 | 4682699 | 496 |
| 2612B | 44 | 43 | 4 | 648556 | 4685108 | 598 |
| 2614N | 38 | 37 | 4 | 642784 | 4686217 | 509 |
| 2616P | 37 | 36 | 4 | 646922 | 4685105 | 543 |
| 2617P | 37 | 36 | 4 | 646432 | 4682822 | 505 |
| 2618P | 43 | 42 | 4 | 648630 | 4685101 | 601 |
| 2620P | 44 | 42 | 4 | 653730 | 4688952 | 537 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 2625P | 37 | 36 | 4 | 641661 | 4685837 | 434 |
| 2626P | 43 | 42 | 4 | 652622 | 4690076 | 511 |
| 2631N | 38 | 37 | 4 | 643854 | 4681348 | 440 |
| 2632N | 36 | 35 | 4 | 655462 | 4687729 | 514 |
| 2635N | 38 | 37 | 4 | 643805 | 4681347 | 438 |
| 2637N | 39 | 38 | 4 | 649137 | 4684319 | 614 |
| 2640N | 39 | 38 | 4 | 643373 | 4689282 | 507 |
| 2642N | 39 | 38 | 4 | 641746 | 4685102 | 460 |
| 2644N | 39 | 38 | 4 | 655678 | 4680486 | 519 |
| 2646N | 37 | 35 | 4 | 647889 | 4684386 | 558 |
| 2648P | 37 | 36 | 4 | 647524 | 4684122 | 556 |
| 2653P | 37 | 36 | 4 | 648232 | 4685058 | 595 |
| 2658N | 38 | 37 | 4 | 640471 | 4683469 | 407 |
| 2659N | 37 | 36 | 4 | 655492 | 4686741 | 547 |
| 2665P | 37 | 36 | 4 | 648091 | 4686412 | 539 |
| 2671P | 37 | 36 | 4 | 651096 | 4685952 | 623 |
| 2675P | 37 | 36 | 4 | 648197 | 4686161 | 558 |
| 2698P | 44 | 42 | 4 | 651027 | 4688163 | 467 |
| 2703B | 44 | 43 | 4 | 652505 | 4690111 | 512 |
| 2707P | 44 | 42 | 4 | 653856 | 4680724 | 561 |
| 2719P | 44 | 42 | 4 | 647725 | 4685042 | 579 |
| 2725N | 40 | 39 | 4 | 654918 | 4684027 | 443 |
| 2728N | 40 | 39 | 4 | 646076 | 4685099 | 498 |
| 2731P | 44 | 42 | 4 | 655494 | 4686825 | 545 |
| 2735P | 45 | 42 | 4 | 651331 | 4687570 | 460 |
| 2736P | 44 | 42 | 4 | 652097 | 4690136 | 528 |
| 2751P | 46 | 44 | 4 | 651695 | 4687181 | 461 |
| 2754B | 41 | 40 | 4 | 641912 | 4684899 | 462 |
| 2755N | 45 | 44 | 4 | 643362 | 4684821 | 497 |
| 2770B | 40 | 39 | 4 | 655660 | 4680685 | 512 |
| 2775P | 44 | 42 | 4 | 647633 | 4685183 | 580 |
| 2784B | 41 | 40 | 4 | 653668 | 4689785 | 495 |
| 2786P | 36 | 35 | 4 | 655664 | 4686213 | 547 |
| 2789B | 41 | 40 | 4 | 651262 | 4684511 | 642 |
| 2793N | 45 | 45 | 4 | 645110 | 4690328 | 556 |
| 2795N | 45 | 45 | 4 | 643623 | 4684336 | 498 |
| 2808P | 38 | 37 | 4 | 641293 | 4681283 | 470 |
| 2815B | 41 | 40 | 4 | 653448 | 4683999 | 486 |
| 2816B | 41 | 40 | 4 | 650059 | 4687289 | 640 |
| 2817B | 41 | 40 | 4 | 651291 | 4684428 | 641 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 2819P | 38 | 37 | 4 | 642683 | 4686162 | 503 |
| 2822P | 41 | 40 | 4 | 650189 | 4685181 | 643 |
| 2824P | 41 | 40 | 4 | 656044 | 4682411 | 474 |
| 2832P | 41 | 40 | 4 | 655578 | 4680736 | 521 |
| 2836N | 42 | 41 | 4 | 653164 | 4690064 | 502 |
| 2844N | 42 | 41 | 4 | 646639 | 4686712 | 526 |
| 2847N | 42 | 41 | 4 | 651272 | 4684772 | 619 |
| 2865P | 40 | 39 | 4 | 652289 | 4681396 | 516 |
| 2874N | 45 | 44 | 4 | 647099 | 4687513 | 553 |
| 2877N | 42 | 41 | 4 | 653686 | 4689346 | 511 |
| 2886B | 40 | 39 | 4 | 646275 | 4686450 | 497 |
| 2890P | 42 | 40 | 4 | 655441 | 4683006 | 474 |
| 2894B | 40 | 39 | 4 | 645236 | 4686931 | 524 |
| 2898P | 42 | 40 | 4 | 653588 | 4689347 | 518 |
| 2903P | 43 | 40 | 4 | 653710 | 4689235 | 518 |
| 2905P | 41 | 40 | 4 | 653926 | 4684247 | 450 |
| 2907N | 42 | 41 | 4 | 643350 | 4682394 | 480 |
| 2908N | 45 | 44 | 4 | 645076 | 4688208 | 571 |
| 2911N | 45 | 44 | 4 | 643382 | 4684821 | 497 |
| 2920N | 44 | 44 | 4 | 653693 | 4686653 | 458 |
| 2923N | 45 | 44 | 4 | 647720 | 4685207 | 584 |
| 2945B | 39 | 38 | 4 | 645260 | 4686514 | 511 |
| 2948B | 39 | 38 | 4 | 641745 | 4685086 | 460 |
| 2949P | 41 | 41 | 4 | 647278 | 4683289 | 547 |
| 2957B | 40 | 39 | 4 | 643960 | 4685101 | 479 |
| 2975N | 44 | 42 | 4 | 653715 | 4688779 | 544 |
| 3008W | 40 | 39 | 4 | 646084 | 4685103 | 499 |
| 300B | 40 | 40 | 4 | 654554 | 4684646 | 436 |
| 3011W | 40 | 40 | 4 | 644077 | 4691089 | 515 |
| 3018W | 40 | 39 | 4 | 650346 | 4689582 | 457 |
| 3067N | 45 | 43 | 4 | 655035 | 4687629 | 547 |
| 3084N | 45 | 43 | 4 | 655431 | 4681562 | 524 |
| 3087P | 43 | 40 | 4 | 654585 | 4680558 | 535 |
| 3092N | 43 | 42 | 4 | 646532 | 4685155 | 534 |
| 3095N | 44 | 43 | 4 | 647337 | 4689202 | 538 |
| 309B | 41 | 41 | 4 | 653799 | 4684252 | 454 |
| 3107P | 43 | 42 | 4 | 653715 | 4689226 | 519 |
| 3110P | 43 | 42 | 4 | 653624 | 4684961 | 504 |
| 3112P | 46 | 43 | 4 | 647583 | 4684545 | 559 |
| 3124P | 37 | 35 | 4 | 645085 | 4688206 | 572 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 3128P | 37 | 35 | 4 | 645051 | 4690465 | 549 |
| 3131P | 37 | 35 | 4 | 647744 | 4685236 | 586 |
| 3132P | 41 | 38 | 4 | 654270 | 4684643 | 442 |
| 3135P | 41 | 39 | 4 | 654163 | 4685848 | 439 |
| 3146P | 39 | 37 | 4 | 646293 | 4686494 | 499 |
| 3149N | 43 | 42 | 4 | 650206 | 4686855 | 632 |
| 3150P | 43 | 40 | 4 | 654479 | 4680574 | 536 |
| 3151N | 46 | 44 | 4 | 651705 | 4687106 | 465 |
| 3152P | 39 | 36 | 4 | 645535 | 4685088 | 486 |
| 3153P | 44 | 41 | 4 | 648604 | 4685189 | 600 |
| 3156P | 43 | 40 | 4 | 645189 | 4687296 | 538 |
| 3157P | 41 | 39 | 4 | 644695 | 4691121 | 531 |
| 3158P | 42 | 39 | 4 | 654093 | 4685389 | 445 |
| 3159P | 39 | 37 | 4 | 651269 | 4684220 | 642 |
| 3161N | 43 | 43 | 4 | 650798 | 4688689 | 459 |
| 3162P | 37 | 35 | 4 | 647730 | 4685238 | 585 |
| 3179N | 47 | 45 | 4 | 645961 | 4689210 | 571 |
| 3183P | 44 | 41 | 4 | 643540 | 4684843 | 489 |
| 3204N | 43 | 42 | 4 | 653487 | 4680709 | 575 |
| 3206N | 43 | 42 | 4 | 650203 | 4686863 | 632 |
| 322B | 40 | 40 | 4 | 653800 | 4684259 | 454 |
| 3238B | 45 | 45 | 4 | 642925 | 4685077 | 496 |
| 3239N | 42 | 42 | 4 | 644971 | 4687421 | 526 |
| 3247W | 40 | 39 | 4 | 652261 | 4681587 | 535 |
| 3248P | 44 | 43 | 4 | 643172 | 4682599 | 498 |
| 3250P | 44 | 43 | 4 | 642113 | 4684309 | 505 |
| 3276P | 39 | 36 | 4 | 643302 | 4689548 | 498 |
| 3282P | 39 | 36 | 4 | 644843 | 4683552 | 462 |
| 3293P | 38 | 35 | 4 | 652889 | 4680715 | 532 |
| 3298P | 38 | 36 | 4 | 644429 | 4682519 | 442 |
| 3305P | 47 | 44 | 4 | 652065 | 4686876 | 455 |
| 3316P | 38 | 35 | 4 | 642033 | 4686089 | 467 |
| 3321N | 41 | 41 | 4 | 653462 | 4683995 | 486 |
| 3331N | 41 | 40 | 4 | 646497 | 4686479 | 502 |
| 3343N | 41 | 40 | 4 | 653548 | 4684188 | 461 |
| 3350N | 41 | 41 | 4 | 646490 | 4686484 | 502 |
| 3353P | 37 | 35 | 4 | 643312 | 4689862 | 495 |
| 3359N | 41 | 40 | 4 | 654001 | 4684656 | 449 |
| 3373P | 44 | 42 | 4 | 643221 | 4685007 | 492 |
| 3379W | 41 | 39 | 4 | 655576 | 4680761 | 522 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 3382P | 44 | 41 | 4 | 643596 | 4684667 | 484 |
| 3391B | 45 | 44 | 4 | 647321 | 4687545 | 554 |
| 3397P | 45 | 43 | 4 | 651598 | 4687199 | 463 |
| 3406P | 44 | 41 | 4 | 653888 | 4686246 | 444 |
| 3407P | 38 | 36 | 4 | 644212 | 4682343 | 438 |
| 3425N | 40 | 39 | 4 | 652185 | 4681624 | 534 |
| 3434P | 37 | 35 | 4 | 647737 | 4684383 | 553 |
| 3443P | 47 | 44 | 4 | 646078 | 4689226 | 561 |
| 3448P | 39 | 37 | 4 | 645701 | 4685056 | 485 |
| 3455P | 46 | 43 | 4 | 655421 | 4681675 | 523 |
| 3458P | 36 | 34 | 4 | 653926 | 4685685 | 454 |
| 3459P | 42 | 40 | 4 | 650747 | 4685227 | 636 |
| 3460P | 37 | 35 | 4 | 655581 | 4687136 | 535 |
| 3473P | 47 | 44 | 4 | 651060 | 4685963 | 623 |
| 3484P | 43 | 42 | 4 | 643596 | 4684799 | 486 |
| 3490P | 42 | 40 | 4 | 655303 | 4682933 | 483 |
| 3492P | 41 | 39 | 4 | 650488 | 4689310 | 457 |
| 3499N | 44 | 41 | 4 | 655467 | 4682323 | 504 |
| 3501P | 46 | 44 | 4 | 651705 | 4687175 | 461 |
| 3503P | 47 | 44 | 4 | 647828 | 4688865 | 553 |
| 3505P | 47 | 44 | 4 | 645991 | 4689211 | 568 |
| 3513P | 47 | 44 | 4 | 647212 | 4687750 | 561 |
| 3514P | 43 | 41 | 4 | 648823 | 4685135 | 602 |
| 3517P | 42 | 40 | 4 | 650055 | 4687147 | 636 |
| 3518P | 47 | 44 | 4 | 653704 | 4688509 | 566 |
| 3519P | 47 | 44 | 4 | 645960 | 4689223 | 571 |
| 3521P | 46 | 44 | 4 | 645407 | 4689080 | 603 |
| 3522P | 42 | 40 | 4 | 654075 | 4685390 | 444 |
| 3523P | 41 | 40 | 4 | 653593 | 4684660 | 477 |
| 3524P | 47 | 44 | 4 | 655379 | 4686774 | 557 |
| 3526P | 43 | 41 | 4 | 642027 | 4684485 | 491 |
| 3530P | 43 | 41 | 4 | 654962 | 4680586 | 553 |
| 3532P | 41 | 40 | 4 | 653627 | 4684697 | 476 |
| 3535P | 46 | 43 | 4 | 642791 | 4685070 | 505 |
| 3541P | 37 | 35 | 4 | 648132 | 4686648 | 548 |
| 3544P | 37 | 35 | 4 | 646956 | 4685110 | 544 |
| 3552N | 39 | 38 | 4 | 643370 | 4685956 | 532 |
| 3555N | 39 | 38 | 4 | 643488 | 4681627 | 448 |
| 3556P | 41 | 40 | 4 | 653604 | 4684669 | 476 |
| 3558P | 42 | 41 | 4 | 650227 | 4686953 | 632 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 3560P | 41 | 39 | 4 | 650046 | 4687282 | 639 |
| 3561P | 41 | 40 | 4 | 655016 | 4680319 | 556 |
| 3564P | 36 | 34 | 4 | 644394 | 4688805 | 551 |
| 3567P | 44 | 42 | 4 | 645177 | 4687618 | 544 |
| 3571P | 37 | 35 | 4 | 647704 | 4685232 | 585 |
| 3603P | 41 | 39 | 4 | 654696 | 4684021 | 451 |
| 3604P | 37 | 35 | 4 | 647018 | 4687367 | 543 |
| 3605N | 41 | 39 | 4 | 654987 | 4680317 | 559 |
| 3606P | 41 | 39 | 4 | 652292 | 4681527 | 529 |
| 3612P | 37 | 35 | 4 | 655310 | 4687558 | 531 |
| 3615P | 36 | 34 | 4 | 647297 | 4683289 | 547 |
| 3619P | 40 | 39 | 4 | 656125 | 4682420 | 470 |
| 3620P | 40 | 39 | 4 | 647422 | 4690000 | 529 |
| 3631N | 38 | 37 | 4 | 643559 | 4681125 | 423 |
| 3636N | 37 | 37 | 4 | 644442 | 4682791 | 441 |
| 363B | 33 | 32 | 4 | 643210 | 4686227 | 532 |
| 3643N | 37 | 37 | 4 | 644318 | 4682602 | 440 |
| 3648N | 41 | 39 | 4 | 647354 | 4689813 | 534 |
| 364P | 37 | 37 | 4 | 655074 | 4687753 | 538 |
| 3655N | 41 | 39 | 4 | 653991 | 4684643 | 449 |
| 3674W | 43 | 43 | 4 | 646809 | 4687044 | 531 |
| 3676W | 43 | 43 | 4 | 651656 | 4690256 | 533 |
| 3678N | 37 | 36 | 4 | 653720 | 4688825 | 539 |
| 3682P | 39 | 38 | 4 | 645907 | 4686313 | 490 |
| 3689N | 40 | 38 | 4 | 645689 | 4690755 | 519 |
| 3693P | 32 | 30 | 4 | 644613 | 4683197 | 445 |
| 3700P | 32 | 30 | 4 | 644523 | 4683276 | 446 |
| 3703P | 39 | 38 | 4 | 643391 | 4689045 | 510 |
| 3708P | 44 | 44 | 4 | 653695 | 4686639 | 457 |
| 3711P | 47 | 45 | 4 | 647297 | 4687857 | 562 |
| 3712P | 39 | 37 | 4 | 644841 | 4683482 | 463 |
| 3713N | 36 | 35 | 4 | 655516 | 4683177 | 458 |
| 3717N | 36 | 35 | 4 | 655343 | 4687758 | 520 |
| 371P | 37 | 37 | 4 | 648529 | 4686091 | 559 |
| 3720N | 39 | 37 | 4 | 652391 | 4681418 | 506 |
| 3721N | 39 | 37 | 4 | 644471 | 4685059 | 468 |
| 3722N | 39 | 37 | 4 | 655994 | 4687768 | 479 |
| 3728P | 42 | 41 | 4 | 643714 | 4683219 | 473 |
| 3733P | 40 | 39 | 4 | 652300 | 4681411 | 517 |
| 3734P | 42 | 41 | 4 | 650064 | 4687129 | 635 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 3735P | 42 | 41 | 4 | 653098 | 4690138 | 503 |
| 3736P | 39 | 38 | 4 | 656035 | 4687687 | 480 |
| 3737P | 38 | 37 | 4 | 643375 | 4691087 | 483 |
| 3738P | 47 | 45 | 4 | 645138 | 4690107 | 568 |
| 3739P | 38 | 37 | 4 | 643893 | 4681520 | 434 |
| 3740P | 46 | 44 | 4 | 655406 | 4681751 | 522 |
| 3741P | 46 | 43 | 4 | 645548 | 4689207 | 599 |
| 3742P | 45 | 43 | 4 | 647582 | 4684561 | 560 |
| 3743P | 45 | 43 | 4 | 647651 | 4684020 | 555 |
| 3744P | 45 | 43 | 4 | 645219 | 4689128 | 601 |
| 3765N | 38 | 36 | 4 | 641403 | 4681298 | 475 |
| 3766N | 38 | 36 | 4 | 643487 | 4681240 | 425 |
| 3770N | 38 | 36 | 4 | 644419 | 4682727 | 441 |
| 3771N | 38 | 36 | 4 | 644595 | 4683160 | 444 |
| 3772B | 37 | 35 | 4 | 644250 | 4689242 | 557 |
| 3773B | 36 | 35 | 4 | 653896 | 4684456 | 459 |
| 3774B | 34 | 33 | 4 | 650752 | 4690377 | 454 |
| 3775B | 35 | 34 | 4 | 645149 | 4686422 | 522 |
| 3776B | 35 | 34 | 4 | 647437 | 4690014 | 528 |
| 3777B | 35 | 34 | 4 | 644093 | 4685039 | 479 |
| 3778W | 36 | 35 | 4 | 650250 | 4685251 | 642 |
| 3779W | 34 | 34 | 4 | 646776 | 4683032 | 524 |
| 377B | 39 | 39 | 4 | 652396 | 4681456 | 508 |
| 3780W | 36 | 35 | 4 | 652331 | 4681732 | 540 |
| 3781W | 36 | 35 | 4 | 650131 | 4687313 | 644 |
| 3782W | 36 | 35 | 4 | 655382 | 4687758 | 517 |
| 3783W | 35 | 34 | 4 | 647417 | 4690180 | 527 |
| 3784P | 42 | 41 | 4 | 653422 | 4680705 | 571 |
| 3785P | 39 | 38 | 4 | 643897 | 4681833 | 433 |
| 381B | 40 | 40 | 4 | 647416 | 4690008 | 528 |
| 383B | 32 | 32 | 4 | 643127 | 4686219 | 529 |
| 3843P | 39 | 38 | 4 | 655850 | 4680279 | 504 |
| 3844P | 39 | 38 | 4 | 656033 | 4687694 | 479 |
| 3845P | 40 | 39 | 4 | 651700 | 4683559 | 642 |
| 3846P | 40 | 39 | 4 | 655738 | 4687743 | 500 |
| 3847P | 40 | 39 | 4 | 652256 | 4681291 | 505 |
| 3854P | 42 | 41 | 4 | 653465 | 4684713 | 499 |
| 3856P | 43 | 42 | 4 | 655567 | 4681143 | 528 |
| 3858N | 36 | 35 | 4 | 650345 | 4685175 | 641 |
| 3865B | 37 | 36 | 4 | 641618 | 4685829 | 432 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 3866B | 38 | 37 | 4 | 642203 | 4686189 | 480 |
| 3867N | 38 | 36 | 4 | 643901 | 4681696 | 440 |
| 3868N | 38 | 36 | 4 | 644659 | 4683146 | 445 |
| 3869B | 44 | 42 | 4 | 648560 | 4685182 | 599 |
| 387B | 32 | 32 | 4 | 648416 | 4683319 | 529 |
| 3891P | 41 | 38 | 4 | 652239 | 4681725 | 540 |
| 391B | 42 | 42 | 4 | 653602 | 4689530 | 503 |
| 396P | 38 | 38 | 4 | 642716 | 4686177 | 505 |
| 400B | 40 | 40 | 4 | 655651 | 4680695 | 514 |
| 405B | 43 | 42 | 4 | 645385 | 4686979 | 540 |
| 406P | 38 | 38 | 4 | 647286 | 4682631 | 523 |
| 4178B | 32 | 32 | 4 | 643116 | 4686234 | 528 |
| 4389P | 35 | 35 | 4 | 647418 | 4690156 | 527 |
| 4390P | 35 | 35 | 4 | 654912 | 4684016 | 445 |
| 4395B | 39 | 38 | 4 | 644834 | 4683471 | 463 |
| 4396B | 38 | 38 | 4 | 643925 | 4681943 | 434 |
| 451W | 35 | 35 | 4 | 647930 | 4690057 | 524 |
| 4537P | 38 | 37 | 4 | 642687 | 4686069 | 500 |
| 4539P | 39 | 38 | 4 | 655640 | 4680458 | 519 |
| 4540P | 40 | 38 | 4 | 646306 | 4686541 | 507 |
| 4543B | 39 | 37 | 4 | 643417 | 4685704 | 518 |
| 4544B | 39 | 37 | 4 | 645477 | 4685088 | 484 |
| 4545P | 34 | 33 | 4 | 643431 | 4685732 | 520 |
| 4546P | 33 | 33 | 4 | 656051 | 4687662 | 479 |
| 4547P | 36 | 35 | 4 | 651279 | 4684756 | 621 |
| 4555B | 32 | 30 | 4 | 642731 | 4680989 | 497 |
| 4556B | 32 | 30 | 4 | 641600 | 4681296 | 479 |
| 4557B | 34 | 31 | 4 | 643397 | 4685919 | 531 |
| 4558B | 32 | 31 | 4 | 644611 | 4683207 | 446 |
| 4559P | 37 | 35 | 4 | 652741 | 4689772 | 529 |
| 4560P | 37 | 35 | 4 | 651248 | 4685968 | 621 |
| 4561B | 43 | 41 | 4 | 655190 | 4687756 | 529 |
| 458A | 33 | 31 | 4 | 655294 | 4688916 | 478 |
| 487P | 34 | 32 | 4 | 643350 | 4689412 | 503 |
| 514C | 34 | 31 | 4 | 655459 | 4688698 | 486 |
| 522C | 34 | 31 | 4 | 646198 | 4686464 | 495 |
| 525C | 34 | 31 | 4 | 643276 | 4689531 | 503 |
| 526C | 34 | 31 | 4 | 656270 | 4680860 | 480 |
| 531P | 40 | 40 | 4 | 643787 | 4682982 | 473 |
| 535P | 36 | 34 | 4 | 653699 | 4689243 | 518 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 537P | 41 | 41 | 4 | 653437 | 4690137 | 496 |
| 545C | 34 | 32 | 4 | 650768 | 4690396 | 457 |
| 560B | 37 | 36 | 4 | 650769 | 4688616 | 468 |
| 561P | 34 | 31 | 4 | 643366 | 4689144 | 508 |
| 568B | 37 | 37 | 4 | 645081 | 4690393 | 553 |
| 571P | 35 | 33 | 4 | 645243 | 4686959 | 526 |
| 575P | 34 | 32 | 4 | 646796 | 4683059 | 523 |
| 578C | 34 | 32 | 4 | 645528 | 4684977 | 485 |
| 581P | 35 | 33 | 4 | 646350 | 4686467 | 498 |
| 582P | 35 | 33 | 4 | 654217 | 4685824 | 436 |
| 584P | 35 | 32 | 4 | 645790 | 4684968 | 488 |
| 587P | 35 | 33 | 4 | 655347 | 4680442 | 539 |
| 588N | 31 | 29 | 4 | 644512 | 4683024 | 446 |
| 592N | 34 | 32 | 4 | 648092 | 4690271 | 534 |
| 598B | 37 | 36 | 4 | 644254 | 4689386 | 557 |
| 599N | 33 | 30 | 4 | 650779 | 4690371 | 458 |
| 601C | 35 | 32 | 4 | 645047 | 4686422 | 520 |
| 604N | 34 | 32 | 4 | 650734 | 4690400 | 454 |
| 610C | 35 | 32 | 4 | 645157 | 4686436 | 521 |
| 611C | 35 | 32 | 4 | 649366 | 4684564 | 618 |
| 621P | 36 | 34 | 4 | 653396 | 4684719 | 505 |
| 626P | 43 | 43 | 4 | 647738 | 4686778 | 529 |
| 627B | 37 | 37 | 4 | 645836 | 4691060 | 482 |
| 630C | 35 | 32 | 4 | 647369 | 4690062 | 528 |
| 637B | 37 | 37 | 4 | 640455 | 4683931 | 402 |
| 639B | 36 | 35 | 4 | 652328 | 4681736 | 540 |
| 642C | 35 | 32 | 4 | 645846 | 4686277 | 489 |
| 647B | 36 | 35 | 4 | 655359 | 4682982 | 473 |
| 652P | 43 | 43 | 4 | 644243 | 4689224 | 557 |
| 663C | 35 | 32 | 4 | 646096 | 4685077 | 499 |
| 667B | 38 | 38 | 4 | 647265 | 4682651 | 523 |
| 671C | 35 | 32 | 4 | 654027 | 4684411 | 448 |
| 675P | 43 | 43 | 4 | 646939 | 4687109 | 535 |
| 680B | 38 | 37 | 4 | 644433 | 4682753 | 441 |
| 691B | 37 | 37 | 4 | 644421 | 4682854 | 443 |
| 692N | 37 | 35 | 4 | 655514 | 4686688 | 542 |
| 698B | 38 | 38 | 4 | 642631 | 4686037 | 495 |
| 703P | 44 | 44 | 4 | 648434 | 4685055 | 596 |
| 706N | 36 | 33 | 4 | 653467 | 4684724 | 501 |
| 713B | 39 | 38 | 4 | 643399 | 4689551 | 504 |

| Receiver | Modeled Sound Pressure Level (dBA) | | Relative Height (m) | Coordinates (UTM NAD83 Z17N) | | |
|---|---|---|---|---|---|---|
| | Unmitigated | Mitigated | | X (m) | Y(m) | Z(m) |
| 715B | 39 | 38 | 4 | 642442 | 4681158 | 501 |
| 716B | 39 | 38 | 4 | 643315 | 4690546 | 487 |
| 720P | 44 | 44 | 4 | 646813 | 4685165 | 538 |
| 725N | 38 | 36 | 4 | 644313 | 4682461 | 439 |
| 726N | 37 | 33 | 4 | 645413 | 4687000 | 542 |
| 748N | 37 | 34 | 4 | 647747 | 4684354 | 552 |
| 751N | 37 | 33 | 4 | 647818 | 4684421 | 557 |
| 775N | 36 | 33 | 4 | 653700 | 4689194 | 523 |
| 791P | 44 | 43 | 4 | 642091 | 4684253 | 506 |
| 799N | 34 | 32 | 4 | 641271 | 4684430 | 454 |
| 802P | 42 | 42 | 4 | 646653 | 4686705 | 527 |
| 824P | 38 | 34 | 4 | 642419 | 4686102 | 483 |
| 825P | 42 | 42 | 4 | 650141 | 4686957 | 634 |
| 843P | 42 | 42 | 4 | 655292 | 4683186 | 475 |
| 851N | 35 | 31 | 4 | 653688 | 4689944 | 488 |
| 859P | 42 | 41 | 4 | 653086 | 4690143 | 504 |
| 864P | 42 | 42 | 4 | 642148 | 4685074 | 475 |
| 870N | 35 | 31 | 4 | 654014 | 4684412 | 449 |
| 874N | 43 | 39 | 4 | 653594 | 4689331 | 519 |
| 878P | 38 | 38 | 4 | 641517 | 4681305 | 478 |
| 881P | 37 | 37 | 4 | 644510 | 4682987 | 445 |
| 884N | 36 | 33 | 4 | 644625 | 4688202 | 535 |
| 900P | 40 | 40 | 4 | 654723 | 4683845 | 467 |
| 901N | 36 | 33 | 4 | 654070 | 4686096 | 458 |
| 902N | 35 | 31 | 4 | 645241 | 4686552 | 513 |
| 911N | 37 | 33 | 4 | 647742 | 4684394 | 553 |
| 913P | 42 | 41 | 4 | 647335 | 4689656 | 535 |
| 928N | 37 | 33 | 4 | 650767 | 4688677 | 461 |
| 940P | 40 | 40 | 4 | 655040 | 4684026 | 439 |
| 943P | 38 | 38 | 4 | 641725 | 4685678 | 440 |
| 969N | 45 | 42 | 4 | 642585 | 4685059 | 504 |
| 972N | 35 | 30 | 4 | 645234 | 4686587 | 513 |
| 986N | 34 | 33 | 4 | 655849 | 4680303 | 506 |
| 995P | 40 | 40 | 4 | 650191 | 4685173 | 643 |
| 998N | 31 | 29 | 4 | 646641 | 4682744 | 504 |
| 999N | 34 | 33 | 4 | 650163 | 4690081 | 459 |
| Boutwell ParkingB | 38 | 37 | 1.5 | 646810 | 4682790 | 518 |
| Worst Case TrailB | 45 | 45 | 1.5 | 655424 | 4681474 | 529 |

**TABLE 29: DISCRETE RECEPTOR RESULTS - 1/1 OCTAVE BAND RESULTS - MITIGATED**

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 1013N | 46 | 41 | 36 | 32 | 28 | 21 | 5 | 0 | 0 | 4 | 646495 | 4682699 | 496 |
| 1018N | 45 | 41 | 35 | 32 | 28 | 20 | 5 | 0 | 0 | 4 | 646270 | 4682711 | 488 |
| 1020N | 45 | 40 | 35 | 31 | 28 | 20 | 5 | 0 | 0 | 4 | 646250 | 4682719 | 487 |
| 1023N | 49 | 44 | 37 | 34 | 31 | 24 | 8 | 0 | 0 | 4 | 644419 | 4682727 | 441 |
| 1030N | 46 | 41 | 36 | 32 | 28 | 22 | 9 | 0 | 0 | 4 | 646641 | 4682744 | 504 |
| 1032N | 45 | 41 | 35 | 32 | 28 | 21 | 5 | 0 | 0 | 4 | 646272 | 4682747 | 490 |
| 1033N | 46 | 41 | 35 | 31 | 27 | 19 | 4 | 0 | 0 | 4 | 647963 | 4682750 | 519 |
| 1036N | 49 | 44 | 37 | 34 | 31 | 24 | 8 | 0 | 0 | 4 | 644433 | 4682753 | 441 |
| 1037N | 46 | 41 | 36 | 32 | 28 | 21 | 5 | 0 | 0 | 4 | 646283 | 4682753 | 491 |
| 1038P | 54 | 50 | 43 | 42 | 39 | 34 | 22 | 0 | 0 | 4 | 655460 | 4682753 | 479 |
| 1042N | 46 | 41 | 36 | 32 | 28 | 21 | 6 | 0 | 0 | 4 | 646459 | 4682775 | 504 |
| 1047N | 48 | 43 | 38 | 36 | 32 | 26 | 13 | 0 | 0 | 4 | 646810 | 4682790 | 518 |
| 1048N | 47 | 43 | 36 | 33 | 30 | 23 | 7 | 0 | 0 | 4 | 644442 | 4682791 | 441 |
| 1049N | 46 | 41 | 36 | 32 | 28 | 21 | 7 | 0 | 0 | 4 | 646551 | 4682796 | 508 |
| 1052N | 47 | 42 | 36 | 33 | 29 | 22 | 6 | 0 | 0 | 4 | 644403 | 4682811 | 442 |
| 1055N | 46 | 41 | 36 | 32 | 29 | 21 | 7 | 0 | 0 | 4 | 646432 | 4682822 | 505 |
| 1056N | 47 | 42 | 36 | 33 | 29 | 22 | 6 | 0 | 0 | 4 | 644412 | 4682829 | 442 |
| 1061N | 47 | 42 | 36 | 33 | 29 | 22 | 6 | 0 | 0 | 4 | 644421 | 4682854 | 443 |
| 1069P | 53 | 48 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 655303 | 4682933 | 483 |
| 1077P | 52 | 47 | 41 | 39 | 37 | 31 | 20 | 0 | 0 | 4 | 643787 | 4682982 | 473 |
| 1078P | 54 | 49 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 655359 | 4682982 | 473 |
| 1082P | 53 | 48 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 655270 | 4682986 | 481 |
| 1084N | 46 | 42 | 36 | 33 | 29 | 22 | 6 | 0 | 0 | 4 | 644510 | 4682987 | 445 |
| 1088P | 55 | 50 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 655441 | 4683006 | 474 |
| 1089B | 50 | 46 | 39 | 37 | 35 | 29 | 18 | 0 | 0 | 4 | 646925 | 4683007 | 524 |
| 1093P | 53 | 48 | 43 | 41 | 38 | 33 | 21 | 0 | 0 | 4 | 655305 | 4683009 | 476 |
| 1094B | 50 | 46 | 39 | 37 | 35 | 29 | 17 | 0 | 0 | 4 | 646722 | 4683014 | 526 |
| 1098N | 47 | 42 | 36 | 33 | 30 | 22 | 6 | 0 | 0 | 4 | 644512 | 4683024 | 446 |
| 1099B | 50 | 46 | 39 | 37 | 35 | 30 | 18 | 0 | 0 | 4 | 646899 | 4683028 | 523 |
| 1101B | 51 | 46 | 39 | 37 | 35 | 29 | 18 | 0 | 0 | 4 | 646776 | 4683032 | 524 |
| 1103N | 46 | 42 | 36 | 33 | 30 | 22 | 6 | 0 | 0 | 4 | 644525 | 4683047 | 447 |
| 1107B | 50 | 46 | 39 | 37 | 35 | 30 | 18 | 0 | 0 | 4 | 646796 | 4683059 | 523 |
| 1113P | 53 | 49 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 655348 | 4683094 | 472 |
| 1115N | 45 | 41 | 36 | 33 | 31 | 25 | 10 | 0 | 0 | 4 | 640583 | 4683104 | 414 |
| 1116B | 51 | 47 | 40 | 38 | 36 | 31 | 20 | 0 | 0 | 4 | 647000 | 4683106 | 528 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 1117P | 53 | 49 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 655356 | 4683107 | 472 |
| 1120N | 48 | 43 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 644645 | 4683133 | 445 |
| 1124N | 48 | 43 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 644659 | 4683146 | 445 |
| 1126N | 48 | 43 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 644595 | 4683160 | 444 |
| 1127P | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 655516 | 4683177 | 458 |
| 1131P | 54 | 49 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 655292 | 4683186 | 475 |
| 1135N | 48 | 43 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 644613 | 4683197 | 445 |
| 1136B | 51 | 47 | 40 | 38 | 36 | 32 | 21 | 0 | 0 | 4 | 646964 | 4683200 | 527 |
| 1138N | 48 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 644611 | 4683207 | 446 |
| 1141P | 53 | 48 | 42 | 40 | 38 | 33 | 23 | 0 | 0 | 4 | 643714 | 4683219 | 473 |
| 1154B | 50 | 46 | 39 | 36 | 33 | 27 | 13 | 0 | 0 | 4 | 648286 | 4683266 | 535 |
| 1159N | 49 | 44 | 38 | 35 | 32 | 26 | 13 | 0 | 0 | 4 | 644523 | 4683276 | 446 |
| 1160B | 50 | 46 | 39 | 36 | 33 | 27 | 13 | 0 | 0 | 4 | 648279 | 4683280 | 534 |
| 1161B | 53 | 48 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 647278 | 4683289 | 547 |
| 1162B | 53 | 49 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 647297 | 4683289 | 547 |
| 1166B | 50 | 45 | 38 | 36 | 33 | 26 | 12 | 0 | 0 | 4 | 648416 | 4683319 | 529 |
| 1183B | 57 | 53 | 47 | 45 | 44 | 39 | 32 | 13 | 0 | 4 | 653312 | 4683366 | 531 |
| 1186B | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 652121 | 4683372 | 606 |
| 1189N | 46 | 41 | 35 | 33 | 30 | 24 | 9 | 0 | 0 | 4 | 640523 | 4683376 | 409 |
| 1205B | 54 | 49 | 42 | 39 | 36 | 29 | 13 | 0 | 0 | 4 | 651797 | 4683422 | 636 |
| 1214N | 47 | 43 | 36 | 34 | 31 | 25 | 9 | 0 | 0 | 4 | 640467 | 4683460 | 407 |
| 1216N | 48 | 43 | 36 | 34 | 31 | 25 | 9 | 0 | 0 | 4 | 640471 | 4683469 | 407 |
| 1218N | 51 | 46 | 39 | 37 | 34 | 27 | 11 | 0 | 0 | 4 | 644834 | 4683471 | 463 |
| 1221B | 54 | 49 | 42 | 40 | 37 | 30 | 14 | 0 | 0 | 4 | 651889 | 4683479 | 630 |
| 1222N | 51 | 46 | 39 | 37 | 34 | 27 | 11 | 0 | 0 | 4 | 644841 | 4683482 | 463 |
| 1231B | 54 | 49 | 42 | 39 | 36 | 30 | 13 | 0 | 0 | 4 | 651820 | 4683511 | 634 |
| 1237W | 48 | 44 | 37 | 34 | 31 | 23 | 6 | 0 | 0 | 4 | 645524 | 4683528 | 490 |
| 1241N | 51 | 46 | 39 | 37 | 34 | 27 | 11 | 0 | 0 | 4 | 644833 | 4683546 | 462 |
| 1244N | 51 | 46 | 39 | 37 | 34 | 27 | 11 | 0 | 0 | 4 | 644843 | 4683552 | 462 |
| 1245B | 53 | 49 | 42 | 39 | 36 | 29 | 12 | 0 | 0 | 4 | 651700 | 4683559 | 642 |
| 1278W | 52 | 47 | 41 | 39 | 36 | 31 | 20 | 0 | 0 | 4 | 646051 | 4683766 | 502 |
| 1299N | 57 | 52 | 46 | 45 | 43 | 39 | 32 | 12 | 0 | 4 | 642332 | 4683838 | 511 |
| 1304P | 52 | 47 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654723 | 4683845 | 467 |
| 1326N | 47 | 42 | 35 | 33 | 30 | 24 | 8 | 0 | 0 | 4 | 640455 | 4683931 | 402 |
| 1349B | 52 | 48 | 42 | 40 | 38 | 32 | 20 | 0 | 0 | 4 | 653462 | 4683995 | 486 |
| 1351B | 52 | 48 | 42 | 40 | 37 | 32 | 20 | 0 | 0 | 4 | 653448 | 4683999 | 486 |
| 1365P | 54 | 49 | 42 | 40 | 37 | 30 | 15 | 0 | 0 | 4 | 654912 | 4684016 | 445 |
| 1368B | 56 | 52 | 46 | 43 | 42 | 38 | 30 | 13 | 0 | 4 | 647651 | 4684020 | 555 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 1370P | 53 | 49 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 654696 | 4684021 | 451 |
| 1373P | 53 | 49 | 42 | 39 | 37 | 30 | 14 | 0 | 0 | 4 | 655040 | 4684026 | 439 |
| 1374P | 54 | 49 | 42 | 40 | 37 | 30 | 15 | 0 | 0 | 4 | 654918 | 4684027 | 443 |
| 1376P | 54 | 49 | 42 | 40 | 37 | 30 | 15 | 0 | 0 | 4 | 654927 | 4684033 | 443 |
| 1378P | 54 | 49 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 654696 | 4684034 | 449 |
| 1384P | 54 | 49 | 42 | 40 | 37 | 30 | 15 | 0 | 0 | 4 | 654918 | 4684039 | 442 |
| 1407N | 41 | 36 | 33 | 29 | 26 | 20 | 6 | 0 | 0 | 4 | 640617 | 4684061 | 407 |
| 1411N | 41 | 36 | 33 | 30 | 26 | 20 | 4 | 0 | 0 | 4 | 640678 | 4684065 | 412 |
| 1415N | 41 | 36 | 33 | 30 | 26 | 20 | 5 | 0 | 0 | 4 | 640642 | 4684072 | 409 |
| 1418B | 51 | 47 | 41 | 39 | 36 | 30 | 16 | 0 | 0 | 4 | 653529 | 4684077 | 462 |
| 1433N | 41 | 36 | 33 | 29 | 26 | 19 | 4 | 0 | 0 | 4 | 640631 | 4684098 | 407 |
| 1434B | 51 | 46 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 653526 | 4684099 | 460 |
| 1461B | 56 | 52 | 46 | 44 | 43 | 38 | 30 | 11 | 0 | 4 | 647641 | 4684113 | 559 |
| 1462B | 57 | 53 | 47 | 45 | 44 | 40 | 33 | 16 | 0 | 4 | 647525 | 4684113 | 556 |
| 1465B | 57 | 53 | 47 | 45 | 44 | 40 | 33 | 16 | 0 | 4 | 647524 | 4684122 | 556 |
| 1475N | 41 | 36 | 33 | 30 | 26 | 20 | 4 | 0 | 0 | 4 | 640660 | 4684135 | 409 |
| 1506B | 57 | 52 | 46 | 44 | 43 | 39 | 31 | 12 | 0 | 4 | 647615 | 4684176 | 560 |
| 1515B | 52 | 47 | 42 | 39 | 37 | 32 | 19 | 0 | 0 | 4 | 653548 | 4684188 | 461 |
| 1525B | 52 | 47 | 41 | 39 | 37 | 32 | 19 | 0 | 0 | 4 | 653548 | 4684202 | 461 |
| 1532B | 50 | 45 | 40 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 651269 | 4684220 | 642 |
| 1546B | 51 | 47 | 42 | 39 | 35 | 29 | 13 | 0 | 0 | 4 | 651269 | 4684244 | 644 |
| 1549N | 53 | 48 | 42 | 40 | 37 | 31 | 18 | 0 | 0 | 4 | 653926 | 4684247 | 450 |
| 1550N | 53 | 48 | 42 | 40 | 37 | 31 | 18 | 0 | 0 | 4 | 653933 | 4684248 | 450 |
| 1553N | 52 | 48 | 42 | 40 | 37 | 31 | 18 | 0 | 0 | 4 | 653799 | 4684252 | 454 |
| 1555N | 55 | 50 | 44 | 42 | 41 | 36 | 27 | 2 | 0 | 4 | 642091 | 4684253 | 506 |
| 1561N | 52 | 47 | 42 | 39 | 37 | 31 | 18 | 0 | 0 | 4 | 653800 | 4684259 | 454 |
| 1565B | 52 | 48 | 44 | 42 | 41 | 37 | 28 | 7 | 0 | 4 | 647671 | 4684277 | 554 |
| 1582N | 41 | 36 | 33 | 31 | 28 | 22 | 7 | 0 | 0 | 4 | 640642 | 4684297 | 406 |
| 1585B | 54 | 49 | 42 | 40 | 37 | 30 | 16 | 0 | 0 | 4 | 651368 | 4684304 | 641 |
| 1590N | 55 | 50 | 44 | 43 | 41 | 37 | 27 | 3 | 0 | 4 | 642113 | 4684309 | 505 |
| 1595B | 53 | 48 | 41 | 38 | 35 | 28 | 13 | 0 | 0 | 4 | 649137 | 4684319 | 614 |
| 1596N | 41 | 36 | 33 | 31 | 28 | 23 | 7 | 0 | 0 | 4 | 640661 | 4684321 | 408 |
| 1604P | 56 | 51 | 45 | 44 | 43 | 39 | 31 | 11 | 0 | 4 | 643623 | 4684336 | 498 |
| 1605N | 42 | 38 | 35 | 32 | 29 | 23 | 8 | 0 | 0 | 4 | 640689 | 4684337 | 411 |
| 1617B | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 647747 | 4684354 | 552 |
| 1622N | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654010 | 4684362 | 449 |
| 1624N | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654022 | 4684362 | 449 |
| 1634B | 55 | 50 | 44 | 43 | 41 | 37 | 29 | 6 | 0 | 4 | 647728 | 4684382 | 552 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 1635B | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 647737 | 4684383 | 553 |
| 1638B | 54 | 49 | 43 | 41 | 40 | 35 | 26 | 0 | 0 | 4 | 647889 | 4684386 | 558 |
| 1639B | 52 | 48 | 41 | 39 | 35 | 29 | 14 | 0 | 0 | 4 | 649035 | 4684390 | 613 |
| 1643B | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 647742 | 4684394 | 553 |
| 1655B | 51 | 46 | 40 | 37 | 35 | 28 | 14 | 0 | 0 | 4 | 648932 | 4684410 | 606 |
| 1656N | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 653989 | 4684411 | 450 |
| 1657N | 53 | 48 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 654027 | 4684411 | 448 |
| 1658N | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654014 | 4684412 | 449 |
| 1662B | 51 | 46 | 40 | 37 | 35 | 28 | 14 | 0 | 0 | 4 | 648970 | 4684419 | 608 |
| 1665B | 54 | 50 | 43 | 42 | 40 | 36 | 27 | 2 | 0 | 4 | 647818 | 4684421 | 557 |
| 1671B | 54 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 651291 | 4684428 | 641 |
| 1673W | 50 | 45 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 641271 | 4684430 | 454 |
| 1676B | 51 | 47 | 40 | 38 | 35 | 29 | 15 | 0 | 0 | 4 | 648846 | 4684435 | 609 |
| 1683N | 53 | 49 | 42 | 40 | 38 | 31 | 17 | 0 | 0 | 4 | 653896 | 4684456 | 459 |
| 1708N | 54 | 49 | 43 | 41 | 40 | 35 | 26 | 1 | 0 | 4 | 642027 | 4684485 | 491 |
| 1716B | 54 | 50 | 43 | 40 | 38 | 31 | 17 | 0 | 0 | 4 | 651262 | 4684511 | 642 |
| 1722N | 54 | 49 | 43 | 41 | 40 | 35 | 26 | 0 | 0 | 4 | 642015 | 4684518 | 489 |
| 1728P | 55 | 51 | 45 | 43 | 41 | 37 | 29 | 7 | 0 | 4 | 643614 | 4684526 | 490 |
| 1736B | 56 | 52 | 46 | 44 | 43 | 39 | 31 | 10 | 0 | 4 | 647583 | 4684545 | 559 |
| 1738B | 54 | 50 | 44 | 42 | 41 | 36 | 28 | 3 | 0 | 4 | 647762 | 4684552 | 561 |
| 1749B | 56 | 51 | 46 | 44 | 43 | 39 | 31 | 10 | 0 | 4 | 647582 | 4684561 | 560 |
| 1753B | 52 | 48 | 41 | 38 | 35 | 29 | 14 | 0 | 0 | 4 | 649366 | 4684564 | 618 |
| 1759N | 53 | 48 | 42 | 40 | 38 | 32 | 20 | 0 | 0 | 4 | 653641 | 4684572 | 472 |
| 1761N | 54 | 49 | 42 | 40 | 37 | 30 | 14 | 0 | 0 | 4 | 654321 | 4684573 | 441 |
| 1780N | 53 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 653991 | 4684643 | 449 |
| 1783N | 54 | 49 | 42 | 40 | 37 | 31 | 15 | 0 | 0 | 4 | 654270 | 4684643 | 442 |
| 1784N | 53 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654010 | 4684643 | 449 |
| 1787N | 54 | 49 | 42 | 40 | 37 | 30 | 13 | 0 | 0 | 4 | 654554 | 4684646 | 436 |
| 1791N | 53 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 654001 | 4684656 | 449 |
| 1793N | 53 | 49 | 43 | 40 | 38 | 32 | 21 | 0 | 0 | 4 | 653593 | 4684660 | 477 |
| 1800P | 55 | 51 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 643596 | 4684667 | 484 |
| 1802N | 53 | 49 | 42 | 40 | 38 | 32 | 21 | 0 | 0 | 4 | 653604 | 4684669 | 476 |
| 1821N | 53 | 49 | 42 | 40 | 38 | 32 | 21 | 0 | 0 | 4 | 653627 | 4684697 | 476 |
| 1822N | 54 | 49 | 42 | 40 | 37 | 31 | 15 | 0 | 0 | 4 | 654264 | 4684699 | 441 |
| 1836N | 53 | 49 | 43 | 41 | 38 | 33 | 23 | 0 | 0 | 4 | 653465 | 4684713 | 499 |
| 1840N | 54 | 49 | 43 | 41 | 39 | 34 | 24 | 2 | 0 | 4 | 653396 | 4684719 | 505 |
| 1841N | 53 | 49 | 43 | 41 | 38 | 33 | 24 | 0 | 0 | 4 | 653467 | 4684724 | 501 |
| 1845N | 54 | 49 | 43 | 41 | 39 | 34 | 25 | 3 | 0 | 4 | 653400 | 4684732 | 506 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 1856B | 54 | 50 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 651279 | 4684756 | 621 |
| 1857N | 54 | 49 | 43 | 41 | 39 | 33 | 24 | 1 | 0 | 4 | 653496 | 4684765 | 504 |
| 1860B | 54 | 50 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 651272 | 4684772 | 619 |
| 1866B | 55 | 51 | 45 | 43 | 41 | 37 | 29 | 11 | 0 | 4 | 653100 | 4684784 | 528 |
| 1868P | 55 | 50 | 44 | 42 | 40 | 36 | 27 | 1 | 0 | 4 | 643596 | 4684799 | 486 |
| 1878P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 8 | 0 | 4 | 643382 | 4684821 | 497 |
| 1880P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 9 | 0 | 4 | 643362 | 4684821 | 497 |
| 1884P | 55 | 50 | 44 | 42 | 40 | 36 | 27 | 2 | 0 | 4 | 643540 | 4684843 | 489 |
| 1904N | 52 | 47 | 41 | 39 | 38 | 33 | 22 | 0 | 0 | 4 | 641912 | 4684899 | 462 |
| 1916P | 52 | 48 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 645786 | 4684936 | 489 |
| 191B | 52 | 47 | 41 | 40 | 37 | 32 | 19 | 0 | 0 | 4 | 655347 | 4680442 | 539 |
| 1930N | 54 | 50 | 43 | 41 | 39 | 34 | 24 | 1 | 0 | 4 | 653624 | 4684961 | 504 |
| 1937P | 52 | 48 | 41 | 39 | 36 | 30 | 16 | 0 | 0 | 4 | 645790 | 4684968 | 488 |
| 1939P | 54 | 50 | 43 | 42 | 40 | 36 | 26 | 1 | 0 | 4 | 643467 | 4684976 | 487 |
| 1940C | 52 | 47 | 40 | 38 | 35 | 28 | 13 | 0 | 0 | 4 | 645528 | 4684977 | 485 |
| 1947P | 54 | 50 | 43 | 42 | 40 | 35 | 26 | 1 | 0 | 4 | 643471 | 4684983 | 486 |
| 1952P | 55 | 51 | 45 | 43 | 42 | 38 | 29 | 9 | 0 | 4 | 643224 | 4684991 | 493 |
| 1965P | 55 | 51 | 44 | 43 | 42 | 37 | 29 | 8 | 0 | 4 | 643221 | 4685007 | 492 |
| 1974P | 52 | 48 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 645889 | 4685026 | 489 |
| 1981N | 51 | 46 | 40 | 38 | 36 | 31 | 19 | 0 | 0 | 4 | 641772 | 4685030 | 457 |
| 1982N | 51 | 46 | 40 | 38 | 36 | 31 | 19 | 0 | 0 | 4 | 641792 | 4685031 | 456 |
| 1988P | 52 | 48 | 41 | 39 | 36 | 30 | 18 | 0 | 0 | 4 | 644093 | 4685039 | 479 |
| 1993P | 56 | 51 | 45 | 44 | 42 | 38 | 31 | 13 | 0 | 4 | 646837 | 4685041 | 542 |
| 1995P | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 647725 | 4685042 | 579 |
| 2001A | 52 | 47 | 40 | 38 | 35 | 28 | 13 | 0 | 0 | 4 | 644480 | 4685048 | 468 |
| 2006P | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 647723 | 4685053 | 580 |
| 2009B | 55 | 50 | 44 | 42 | 41 | 36 | 28 | 7 | 0 | 4 | 648434 | 4685055 | 596 |
| 2011C | 52 | 48 | 41 | 38 | 35 | 29 | 15 | 0 | 0 | 4 | 645701 | 4685056 | 485 |
| 2012P | 56 | 51 | 45 | 43 | 42 | 38 | 30 | 10 | 0 | 4 | 643092 | 4685056 | 492 |
| 2013P | 52 | 47 | 41 | 38 | 36 | 29 | 16 | 0 | 0 | 4 | 645800 | 4685056 | 486 |
| 2018B | 56 | 51 | 45 | 43 | 42 | 37 | 29 | 10 | 0 | 4 | 648232 | 4685058 | 595 |
| 2019P | 55 | 51 | 44 | 43 | 42 | 37 | 30 | 10 | 0 | 4 | 642471 | 4685058 | 498 |
| 2020A | 51 | 47 | 40 | 37 | 35 | 28 | 13 | 0 | 0 | 4 | 644471 | 4685059 | 468 |
| 2021P | 56 | 51 | 45 | 44 | 42 | 38 | 31 | 13 | 0 | 4 | 642585 | 4685059 | 504 |
| 202P | 51 | 47 | 40 | 38 | 36 | 30 | 17 | 0 | 0 | 4 | 655636 | 4680451 | 519 |
| 2032P | 56 | 52 | 46 | 44 | 43 | 39 | 32 | 14 | 0 | 4 | 642791 | 4685070 | 505 |
| 2037B | 58 | 53 | 47 | 46 | 44 | 40 | 32 | 13 | 0 | 4 | 652510 | 4685073 | 562 |
| 2038P | 53 | 49 | 42 | 40 | 38 | 33 | 23 | 0 | 0 | 4 | 643655 | 4685073 | 483 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2040P | 53 | 48 | 42 | 40 | 39 | 34 | 24 | 0 | 0 | 4 | 642148 | 4685074 | 475 |
| 2046P | 53 | 48 | 41 | 39 | 37 | 31 | 20 | 0 | 0 | 4 | 646096 | 4685077 | 499 |
| 2047P | 54 | 49 | 43 | 41 | 40 | 35 | 26 | 1 | 0 | 4 | 643369 | 4685077 | 485 |
| 2048P | 56 | 51 | 45 | 44 | 42 | 38 | 31 | 13 | 0 | 4 | 642925 | 4685077 | 496 |
| 2049P | 56 | 52 | 45 | 44 | 42 | 39 | 31 | 13 | 0 | 4 | 642907 | 4685078 | 497 |
| 2053C | 52 | 47 | 40 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 645458 | 4685080 | 484 |
| 2055P | 55 | 50 | 45 | 43 | 41 | 37 | 29 | 10 | 0 | 4 | 646764 | 4685081 | 534 |
| 2063P | 54 | 50 | 44 | 43 | 41 | 37 | 29 | 10 | 0 | 4 | 646751 | 4685085 | 533 |
| 2064P | 53 | 49 | 42 | 40 | 38 | 33 | 23 | 0 | 0 | 4 | 643653 | 4685086 | 483 |
| 2065N | 51 | 46 | 39 | 38 | 36 | 30 | 18 | 0 | 0 | 4 | 641745 | 4685086 | 460 |
| 2067C | 52 | 47 | 40 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 645477 | 4685088 | 484 |
| 2068C | 52 | 47 | 40 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 645535 | 4685088 | 486 |
| 2071P | 54 | 50 | 43 | 42 | 40 | 36 | 27 | 4 | 0 | 4 | 643255 | 4685089 | 485 |
| 2073P | 53 | 48 | 41 | 39 | 37 | 31 | 20 | 0 | 0 | 4 | 646084 | 4685091 | 499 |
| 2084P | 53 | 48 | 41 | 39 | 37 | 31 | 20 | 0 | 0 | 4 | 646076 | 4685099 | 498 |
| 2086B | 55 | 51 | 44 | 42 | 40 | 36 | 26 | 3 | 0 | 4 | 648630 | 4685101 | 601 |
| 2087P | 52 | 48 | 41 | 39 | 36 | 31 | 19 | 0 | 0 | 4 | 643960 | 4685101 | 479 |
| 2088N | 51 | 46 | 39 | 38 | 36 | 30 | 18 | 0 | 0 | 4 | 641746 | 4685102 | 460 |
| 208P | 51 | 47 | 40 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 655640 | 4680458 | 519 |
| 2090P | 53 | 48 | 41 | 39 | 37 | 31 | 20 | 0 | 0 | 4 | 646084 | 4685103 | 499 |
| 2091C | 52 | 47 | 40 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 645539 | 4685104 | 486 |
| 2093P | 56 | 51 | 45 | 43 | 42 | 38 | 30 | 11 | 0 | 4 | 646922 | 4685105 | 543 |
| 2096B | 55 | 51 | 44 | 43 | 41 | 36 | 27 | 5 | 0 | 4 | 648556 | 4685108 | 598 |
| 2099P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 11 | 0 | 4 | 646956 | 4685110 | 544 |
| 2100B | 54 | 50 | 43 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 648818 | 4685111 | 603 |
| 2102P | 51 | 46 | 40 | 37 | 34 | 28 | 12 | 0 | 0 | 4 | 644486 | 4685114 | 470 |
| 2112N | 54 | 50 | 43 | 41 | 38 | 32 | 18 | 0 | 0 | 4 | 654093 | 4685128 | 447 |
| 2120B | 54 | 50 | 43 | 42 | 40 | 35 | 25 | 0 | 0 | 4 | 648823 | 4685135 | 602 |
| 2123P | 52 | 48 | 41 | 38 | 36 | 29 | 15 | 0 | 0 | 4 | 645791 | 4685148 | 485 |
| 2131P | 55 | 50 | 43 | 42 | 40 | 35 | 25 | 1 | 0 | 4 | 646532 | 4685155 | 534 |
| 2132P | 55 | 51 | 45 | 43 | 41 | 37 | 27 | 3 | 0 | 4 | 647463 | 4685155 | 572 |
| 2135P | 52 | 48 | 41 | 38 | 36 | 29 | 15 | 0 | 0 | 4 | 645791 | 4685164 | 485 |
| 2136P | 55 | 50 | 44 | 43 | 41 | 36 | 28 | 7 | 0 | 4 | 646813 | 4685165 | 538 |
| 2141W | 51 | 47 | 42 | 39 | 36 | 29 | 14 | 0 | 0 | 4 | 654908 | 4685167 | 442 |
| 2142B | 55 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650353 | 4685168 | 641 |
| 2150B | 53 | 48 | 42 | 40 | 37 | 30 | 15 | 0 | 0 | 4 | 650191 | 4685173 | 643 |
| 2151B | 55 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650345 | 4685175 | 641 |
| 2153P | 52 | 47 | 40 | 38 | 35 | 29 | 14 | 0 | 0 | 4 | 644262 | 4685177 | 473 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2156P | 54 | 50 | 44 | 42 | 40 | 35 | 27 | 4 | 0 | 4 | 646681 | 4685179 | 532 |
| 2161B | 53 | 49 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 650189 | 4685181 | 643 |
| 2162W | 53 | 49 | 42 | 39 | 37 | 30 | 15 | 0 | 0 | 4 | 654850 | 4685181 | 445 |
| 2164B | 56 | 51 | 45 | 43 | 41 | 37 | 28 | 8 | 0 | 4 | 648560 | 4685182 | 599 |
| 2166P | 56 | 52 | 46 | 44 | 43 | 38 | 31 | 13 | 0 | 4 | 647873 | 4685183 | 588 |
| 2168P | 55 | 50 | 44 | 43 | 41 | 37 | 28 | 6 | 0 | 4 | 647633 | 4685183 | 580 |
| 2172B | 56 | 51 | 45 | 43 | 42 | 37 | 29 | 10 | 0 | 4 | 648492 | 4685187 | 595 |
| 2174B | 56 | 51 | 45 | 43 | 41 | 37 | 28 | 6 | 0 | 4 | 648604 | 4685189 | 600 |
| 2175B | 56 | 51 | 45 | 43 | 41 | 36 | 27 | 5 | 0 | 4 | 648637 | 4685189 | 601 |
| 2185N | 50 | 46 | 39 | 37 | 35 | 30 | 18 | 0 | 0 | 4 | 641775 | 4685201 | 461 |
| 2189P | 56 | 51 | 45 | 44 | 42 | 38 | 29 | 9 | 0 | 4 | 647720 | 4685207 | 584 |
| 2198P | 56 | 52 | 45 | 44 | 42 | 38 | 29 | 10 | 0 | 4 | 647721 | 4685224 | 585 |
| 2199B | 55 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650747 | 4685227 | 636 |
| 219P | 52 | 47 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 655638 | 4680471 | 520 |
| 2201P | 56 | 52 | 45 | 44 | 42 | 38 | 29 | 10 | 0 | 4 | 647704 | 4685232 | 585 |
| 2202B | 54 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650285 | 4685233 | 641 |
| 2203B | 55 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650743 | 4685234 | 636 |
| 2206P | 56 | 52 | 45 | 44 | 42 | 38 | 30 | 11 | 0 | 4 | 647744 | 4685236 | 586 |
| 2208P | 56 | 52 | 45 | 44 | 42 | 38 | 30 | 11 | 0 | 4 | 647730 | 4685238 | 585 |
| 2209B | 54 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650285 | 4685239 | 641 |
| 220B | 53 | 48 | 42 | 40 | 38 | 32 | 20 | 0 | 0 | 4 | 655337 | 4680474 | 541 |
| 2214B | 55 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650733 | 4685244 | 635 |
| 2215B | 54 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650285 | 4685248 | 641 |
| 2217B | 54 | 50 | 43 | 40 | 38 | 31 | 16 | 0 | 0 | 4 | 650250 | 4685251 | 642 |
| 2220W | 53 | 49 | 43 | 41 | 40 | 35 | 26 | 3 | 0 | 4 | 643030 | 4685263 | 479 |
| 2231N | 49 | 44 | 38 | 36 | 34 | 28 | 15 | 0 | 0 | 4 | 641671 | 4685292 | 455 |
| 2263N | 54 | 50 | 43 | 41 | 38 | 32 | 19 | 0 | 0 | 4 | 654093 | 4685389 | 445 |
| 2264N | 54 | 50 | 43 | 41 | 38 | 32 | 19 | 0 | 0 | 4 | 654075 | 4685390 | 444 |
| 2266P | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 646756 | 4685392 | 539 |
| 2285N | 47 | 42 | 37 | 35 | 33 | 27 | 15 | 0 | 0 | 4 | 641770 | 4685476 | 451 |
| 2296B | 49 | 44 | 38 | 35 | 31 | 23 | 6 | 0 | 0 | 4 | 655983 | 4685515 | 438 |
| 2300W | 56 | 52 | 45 | 44 | 42 | 37 | 29 | 10 | 0 | 4 | 647593 | 4685541 | 583 |
| 2308C | 52 | 48 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 646128 | 4685599 | 497 |
| 2317N | 55 | 50 | 44 | 42 | 39 | 34 | 21 | 0 | 0 | 4 | 653958 | 4685675 | 456 |
| 2322N | 48 | 43 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 641725 | 4685678 | 440 |
| 2326N | 55 | 50 | 44 | 42 | 39 | 34 | 21 | 0 | 0 | 4 | 653926 | 4685685 | 454 |
| 2334P | 50 | 46 | 39 | 37 | 35 | 29 | 17 | 0 | 0 | 4 | 643417 | 4685704 | 518 |
| 2337B | 56 | 51 | 45 | 43 | 41 | 36 | 26 | 0 | 0 | 4 | 650910 | 4685707 | 626 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2338B | 56 | 51 | 45 | 43 | 41 | 36 | 26 | 0 | 0 | 4 | 650893 | 4685710 | 626 |
| 2342B | 58 | 54 | 47 | 46 | 45 | 41 | 33 | 15 | 0 | 4 | 648854 | 4685718 | 575 |
| 2347P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643431 | 4685732 | 520 |
| 2349P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643447 | 4685734 | 521 |
| 234P | 50 | 46 | 40 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 655678 | 4680486 | 519 |
| 2352P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643422 | 4685743 | 521 |
| 2353P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643413 | 4685743 | 521 |
| 235P | 51 | 46 | 39 | 37 | 34 | 28 | 12 | 0 | 0 | 4 | 656138 | 4680487 | 493 |
| 2360N | 55 | 50 | 44 | 42 | 39 | 34 | 22 | 0 | 0 | 4 | 654041 | 4685779 | 441 |
| 2361N | 55 | 50 | 44 | 42 | 40 | 34 | 22 | 0 | 0 | 4 | 654028 | 4685787 | 441 |
| 2366P | 49 | 44 | 38 | 36 | 33 | 27 | 13 | 0 | 0 | 4 | 641947 | 4685805 | 453 |
| 2371N | 53 | 48 | 42 | 40 | 37 | 31 | 18 | 0 | 0 | 4 | 654217 | 4685824 | 436 |
| 2374N | 43 | 38 | 35 | 33 | 30 | 24 | 8 | 0 | 0 | 4 | 641618 | 4685829 | 432 |
| 2378N | 42 | 37 | 34 | 31 | 29 | 24 | 8 | 0 | 0 | 4 | 641661 | 4685837 | 434 |
| 2379N | 54 | 50 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 654173 | 4685838 | 438 |
| 2387N | 53 | 49 | 43 | 40 | 37 | 32 | 20 | 0 | 0 | 4 | 654163 | 4685848 | 439 |
| 2397B | 56 | 52 | 45 | 44 | 41 | 36 | 27 | 2 | 0 | 4 | 650826 | 4685872 | 633 |
| 2402P | 52 | 47 | 40 | 37 | 34 | 28 | 14 | 0 | 0 | 4 | 643397 | 4685919 | 531 |
| 2404B | 58 | 54 | 48 | 46 | 45 | 41 | 34 | 15 | 0 | 4 | 648427 | 4685938 | 561 |
| 2411B | 57 | 53 | 47 | 45 | 44 | 39 | 31 | 10 | 0 | 4 | 651096 | 4685952 | 623 |
| 2412P | 49 | 44 | 37 | 35 | 33 | 26 | 12 | 0 | 0 | 4 | 642080 | 4685953 | 463 |
| 2413P | 51 | 47 | 40 | 37 | 34 | 28 | 13 | 0 | 0 | 4 | 643370 | 4685956 | 532 |
| 2414P | 51 | 47 | 40 | 37 | 34 | 28 | 13 | 0 | 0 | 4 | 643382 | 4685957 | 532 |
| 2420P | 49 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 642072 | 4685961 | 464 |
| 2421B | 59 | 54 | 48 | 47 | 45 | 41 | 34 | 15 | 0 | 4 | 651248 | 4685968 | 621 |
| 2421B | 57 | 53 | 46 | 45 | 43 | 39 | 31 | 10 | 0 | 4 | 651060 | 4685963 | 623 |
| 2422P | 49 | 44 | 38 | 36 | 33 | 28 | 14 | 0 | 0 | 4 | 642537 | 4685969 | 480 |
| 2439P | 49 | 44 | 38 | 36 | 33 | 27 | 13 | 0 | 0 | 4 | 642631 | 4686037 | 495 |
| 2447N | 52 | 48 | 41 | 38 | 36 | 29 | 13 | 0 | 0 | 4 | 645713 | 4686057 | 483 |
| 2451P | 49 | 44 | 38 | 35 | 33 | 27 | 13 | 0 | 0 | 4 | 642531 | 4686061 | 488 |
| 2456P | 49 | 44 | 38 | 35 | 33 | 27 | 13 | 0 | 0 | 4 | 642687 | 4686069 | 500 |
| 2458P | 49 | 44 | 38 | 35 | 33 | 27 | 13 | 0 | 0 | 4 | 642527 | 4686072 | 489 |
| 2461P | 48 | 43 | 37 | 34 | 32 | 25 | 10 | 0 | 0 | 4 | 642033 | 4686089 | 467 |
| 2462B | 60 | 55 | 49 | 48 | 47 | 43 | 36 | 19 | 0 | 4 | 648529 | 4686091 | 559 |
| 2467N | 54 | 50 | 44 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 654070 | 4686096 | 458 |
| 2473P | 48 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 642419 | 4686102 | 483 |
| 2478N | 51 | 46 | 40 | 38 | 35 | 29 | 13 | 0 | 0 | 4 | 645859 | 4686110 | 489 |
| 2480N | 51 | 47 | 40 | 38 | 35 | 29 | 13 | 0 | 0 | 4 | 645825 | 4686111 | 486 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2500B | 57 | 53 | 47 | 45 | 44 | 39 | 31 | 10 | 0 | 4 | 648197 | 4686161 | 558 |
| 2501P | 48 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 642683 | 4686162 | 503 |
| 2502P | 48 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 642847 | 4686164 | 507 |
| 2508P | 48 | 44 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 642716 | 4686177 | 505 |
| 2514W | 48 | 43 | 37 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 642203 | 4686189 | 480 |
| 2525P | 52 | 48 | 42 | 40 | 38 | 34 | 24 | 0 | 0 | 4 | 655664 | 4686213 | 547 |
| 2527P | 48 | 44 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 642784 | 4686217 | 509 |
| 2528P | 48 | 44 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 642955 | 4686219 | 519 |
| 2529P | 50 | 45 | 38 | 36 | 33 | 26 | 11 | 0 | 0 | 4 | 643127 | 4686219 | 529 |
| 2533P | 50 | 45 | 39 | 36 | 33 | 26 | 10 | 0 | 0 | 4 | 643210 | 4686227 | 532 |
| 2539P | 49 | 45 | 38 | 36 | 33 | 26 | 10 | 0 | 0 | 4 | 643116 | 4686234 | 528 |
| 2540N | 56 | 51 | 45 | 43 | 41 | 35 | 24 | 0 | 0 | 4 | 653840 | 4686241 | 443 |
| 2542N | 56 | 51 | 45 | 43 | 41 | 35 | 24 | 0 | 0 | 4 | 653888 | 4686246 | 444 |
| 2545N | 55 | 51 | 44 | 42 | 40 | 34 | 24 | 0 | 0 | 4 | 653899 | 4686249 | 444 |
| 2558P | 55 | 51 | 45 | 43 | 42 | 38 | 30 | 11 | 0 | 4 | 655356 | 4686272 | 568 |
| 2559N | 52 | 48 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 645846 | 4686277 | 489 |
| 2561N | 52 | 47 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 645811 | 4686291 | 490 |
| 2568N | 52 | 47 | 41 | 39 | 36 | 30 | 16 | 0 | 0 | 4 | 645907 | 4686313 | 490 |
| 2582P | 52 | 48 | 41 | 39 | 36 | 29 | 13 | 0 | 0 | 4 | 645171 | 4686360 | 524 |
| 2605N | 52 | 47 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 646052 | 4686391 | 492 |
| 2608N | 52 | 47 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 646060 | 4686401 | 492 |
| 2612B | 56 | 52 | 45 | 44 | 42 | 38 | 29 | 5 | 0 | 4 | 648091 | 4686412 | 539 |
| 2614N | 52 | 48 | 41 | 39 | 37 | 31 | 17 | 0 | 0 | 4 | 645917 | 4686420 | 495 |
| 2616P | 51 | 47 | 40 | 38 | 35 | 29 | 13 | 0 | 0 | 4 | 645047 | 4686422 | 520 |
| 2617P | 53 | 48 | 41 | 39 | 36 | 29 | 14 | 0 | 0 | 4 | 645149 | 4686422 | 522 |
| 2618P | 56 | 52 | 45 | 43 | 41 | 36 | 24 | 0 | 0 | 4 | 653718 | 4686423 | 447 |
| 2620P | 56 | 52 | 45 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 653747 | 4686430 | 447 |
| 2625P | 52 | 48 | 41 | 39 | 36 | 29 | 14 | 0 | 0 | 4 | 645157 | 4686436 | 521 |
| 2626P | 56 | 52 | 45 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 653756 | 4686438 | 447 |
| 2631N | 52 | 47 | 41 | 39 | 36 | 31 | 17 | 0 | 0 | 4 | 646275 | 4686450 | 497 |
| 2632N | 49 | 45 | 40 | 37 | 34 | 29 | 16 | 0 | 0 | 4 | 646198 | 4686464 | 495 |
| 2635N | 52 | 47 | 41 | 39 | 36 | 31 | 17 | 0 | 0 | 4 | 646350 | 4686467 | 498 |
| 2637N | 53 | 49 | 42 | 40 | 38 | 32 | 17 | 0 | 0 | 4 | 646511 | 4686469 | 502 |
| 2640N | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 646523 | 4686475 | 501 |
| 2642N | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 646497 | 4686479 | 502 |
| 2644N | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 646490 | 4686484 | 502 |
| 2646N | 50 | 46 | 40 | 38 | 35 | 29 | 15 | 0 | 0 | 4 | 646293 | 4686494 | 499 |
| 2648P | 52 | 47 | 41 | 38 | 36 | 30 | 15 | 0 | 0 | 4 | 645258 | 4686501 | 512 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2653P | 51 | 47 | 40 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 645260 | 4686514 | 511 |
| 2658N | 51 | 47 | 41 | 39 | 36 | 31 | 17 | 0 | 0 | 4 | 646306 | 4686541 | 507 |
| 2659N | 51 | 46 | 41 | 38 | 35 | 29 | 14 | 0 | 0 | 4 | 646725 | 4686543 | 502 |
| 2665P | 52 | 47 | 41 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 645241 | 4686552 | 513 |
| 2671P | 52 | 47 | 41 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 645255 | 4686577 | 512 |
| 2675P | 52 | 47 | 41 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 645234 | 4686587 | 513 |
| 2698P | 57 | 52 | 46 | 44 | 42 | 37 | 25 | 0 | 0 | 4 | 653695 | 4686639 | 457 |
| 2703B | 56 | 52 | 46 | 44 | 42 | 38 | 29 | 5 | 0 | 4 | 648132 | 4686648 | 548 |
| 2707P | 57 | 52 | 46 | 44 | 42 | 37 | 26 | 0 | 0 | 4 | 653693 | 4686653 | 458 |
| 2719P | 55 | 50 | 44 | 43 | 41 | 37 | 29 | 8 | 0 | 4 | 655514 | 4686688 | 542 |
| 2725N | 54 | 49 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 646653 | 4686705 | 527 |
| 2728N | 53 | 49 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 646639 | 4686712 | 526 |
| 2731P | 55 | 50 | 45 | 43 | 42 | 37 | 29 | 8 | 0 | 4 | 655494 | 4686722 | 546 |
| 2735P | 55 | 51 | 45 | 43 | 42 | 37 | 29 | 8 | 0 | 4 | 655492 | 4686741 | 547 |
| 2736P | 55 | 50 | 44 | 43 | 41 | 37 | 29 | 8 | 0 | 4 | 655505 | 4686741 | 546 |
| 2751P | 56 | 52 | 46 | 45 | 43 | 39 | 32 | 13 | 0 | 4 | 655379 | 4686774 | 557 |
| 2754B | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 647738 | 4686778 | 529 |
| 2755N | 58 | 53 | 47 | 45 | 43 | 39 | 29 | 5 | 0 | 4 | 652951 | 4686779 | 483 |
| 2770B | 53 | 48 | 43 | 41 | 38 | 33 | 22 | 0 | 0 | 4 | 647812 | 4686819 | 528 |
| 2775P | 55 | 51 | 44 | 43 | 41 | 37 | 29 | 7 | 0 | 4 | 655494 | 4686825 | 545 |
| 2784B | 56 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650206 | 4686855 | 632 |
| 2786P | 49 | 44 | 39 | 37 | 34 | 30 | 18 | 0 | 0 | 4 | 645243 | 4686859 | 519 |
| 2789B | 56 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650203 | 4686863 | 632 |
| 2793N | 58 | 53 | 47 | 46 | 44 | 39 | 29 | 1 | 0 | 4 | 652065 | 4686876 | 455 |
| 2795N | 58 | 53 | 47 | 46 | 44 | 39 | 29 | 1 | 0 | 4 | 652053 | 4686885 | 455 |
| 2808P | 48 | 44 | 40 | 39 | 36 | 31 | 19 | 0 | 0 | 4 | 645236 | 4686931 | 524 |
| 2815B | 55 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650241 | 4686952 | 632 |
| 2816B | 55 | 51 | 44 | 42 | 39 | 33 | 20 | 0 | 0 | 4 | 650227 | 4686953 | 632 |
| 2817B | 55 | 51 | 44 | 42 | 39 | 33 | 19 | 0 | 0 | 4 | 650141 | 4686957 | 634 |
| 2819P | 49 | 46 | 42 | 40 | 37 | 31 | 20 | 0 | 0 | 4 | 645243 | 4686959 | 526 |
| 2822P | 54 | 50 | 43 | 42 | 39 | 34 | 23 | 0 | 0 | 4 | 645385 | 4686979 | 540 |
| 2824P | 55 | 50 | 43 | 42 | 40 | 34 | 23 | 0 | 0 | 4 | 645396 | 4686985 | 541 |
| 2832P | 55 | 50 | 44 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 645413 | 4687000 | 542 |
| 2836N | 55 | 51 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 646854 | 4687016 | 534 |
| 2844N | 55 | 50 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 646780 | 4687026 | 529 |
| 2847N | 55 | 50 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 646809 | 4687044 | 531 |
| 2865P | 53 | 49 | 43 | 41 | 39 | 33 | 22 | 0 | 0 | 4 | 645178 | 4687079 | 532 |
| 2874N | 58 | 53 | 47 | 45 | 43 | 39 | 28 | 0 | 0 | 4 | 651705 | 4687106 | 465 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 2877N | 55 | 51 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 646939 | 4687109 | 535 |
| 2886B | 55 | 50 | 43 | 41 | 38 | 32 | 18 | 0 | 0 | 4 | 650064 | 4687129 | 635 |
| 2890P | 53 | 49 | 43 | 41 | 40 | 35 | 25 | 0 | 0 | 4 | 655581 | 4687136 | 535 |
| 2894B | 54 | 50 | 43 | 41 | 38 | 32 | 18 | 0 | 0 | 4 | 650055 | 4687147 | 636 |
| 2898P | 54 | 49 | 43 | 41 | 40 | 35 | 25 | 0 | 0 | 4 | 655562 | 4687154 | 536 |
| 2903P | 54 | 49 | 43 | 42 | 40 | 35 | 25 | 0 | 0 | 4 | 655551 | 4687158 | 537 |
| 2905P | 54 | 50 | 43 | 41 | 39 | 35 | 24 | 0 | 0 | 4 | 645238 | 4687162 | 538 |
| 2907N | 55 | 51 | 44 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 646912 | 4687171 | 532 |
| 2908N | 58 | 53 | 47 | 45 | 43 | 39 | 28 | 0 | 0 | 4 | 651705 | 4687175 | 461 |
| 2911N | 58 | 53 | 47 | 45 | 43 | 39 | 28 | 0 | 0 | 4 | 651695 | 4687181 | 461 |
| 2920N | 57 | 53 | 46 | 45 | 43 | 38 | 27 | 0 | 0 | 4 | 651598 | 4687199 | 463 |
| 2923N | 57 | 53 | 47 | 45 | 43 | 38 | 28 | 0 | 0 | 4 | 651664 | 4687207 | 459 |
| 2945B | 53 | 49 | 43 | 40 | 38 | 31 | 17 | 0 | 0 | 4 | 650046 | 4687282 | 639 |
| 2948B | 53 | 49 | 43 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 650059 | 4687289 | 640 |
| 2949P | 55 | 50 | 44 | 42 | 40 | 35 | 25 | 0 | 0 | 4 | 645189 | 4687296 | 538 |
| 2957B | 54 | 50 | 44 | 41 | 38 | 32 | 17 | 0 | 0 | 4 | 650131 | 4687313 | 644 |
| 2975N | 56 | 52 | 45 | 44 | 42 | 37 | 26 | 0 | 0 | 4 | 647018 | 4687367 | 543 |
| 3008W | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 644971 | 4687421 | 526 |
| 300B | 52 | 48 | 43 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 654585 | 4680558 | 535 |
| 3011W | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 644973 | 4687429 | 526 |
| 3018W | 54 | 49 | 43 | 41 | 39 | 34 | 22 | 0 | 0 | 4 | 644923 | 4687444 | 523 |
| 3067N | 57 | 52 | 46 | 44 | 42 | 38 | 27 | 2 | 0 | 4 | 647099 | 4687513 | 553 |
| 3084N | 57 | 52 | 46 | 45 | 43 | 38 | 29 | 5 | 0 | 4 | 647321 | 4687545 | 554 |
| 3087P | 54 | 49 | 43 | 41 | 40 | 35 | 25 | 0 | 0 | 4 | 655310 | 4687558 | 531 |
| 3092N | 56 | 52 | 46 | 44 | 42 | 37 | 26 | 0 | 0 | 4 | 651331 | 4687570 | 460 |
| 3095N | 57 | 52 | 46 | 44 | 42 | 37 | 27 | 0 | 0 | 4 | 651377 | 4687573 | 456 |
| 309B | 53 | 49 | 44 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 654479 | 4680574 | 536 |
| 3107P | 55 | 51 | 45 | 43 | 41 | 37 | 27 | 1 | 0 | 4 | 645179 | 4687607 | 544 |
| 3110P | 55 | 51 | 45 | 43 | 41 | 37 | 27 | 1 | 0 | 4 | 645177 | 4687618 | 544 |
| 3112P | 56 | 52 | 45 | 44 | 42 | 38 | 29 | 8 | 0 | 4 | 655035 | 4687629 | 547 |
| 3124P | 50 | 45 | 39 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 656051 | 4687662 | 479 |
| 3128P | 50 | 45 | 39 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 656035 | 4687687 | 480 |
| 3131P | 50 | 45 | 39 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 656033 | 4687694 | 479 |
| 3132P | 53 | 48 | 42 | 40 | 38 | 32 | 21 | 0 | 0 | 4 | 655559 | 4687696 | 514 |
| 3135P | 53 | 48 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 655478 | 4687699 | 516 |
| 3146P | 51 | 47 | 40 | 38 | 36 | 31 | 18 | 0 | 0 | 4 | 655738 | 4687743 | 500 |
| 3149N | 56 | 52 | 46 | 44 | 42 | 37 | 25 | 0 | 0 | 4 | 651222 | 4687747 | 463 |
| 3150P | 54 | 49 | 43 | 42 | 40 | 35 | 25 | 0 | 0 | 4 | 655196 | 4687749 | 529 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 3151N | 57 | 53 | 47 | 45 | 43 | 39 | 30 | 9 | 0 | 4 | 647212 | 4687750 | 561 |
| 3152P | 51 | 47 | 40 | 38 | 36 | 30 | 18 | 0 | 0 | 4 | 655747 | 4687752 | 499 |
| 3153P | 55 | 51 | 44 | 43 | 41 | 36 | 27 | 4 | 0 | 4 | 655074 | 4687753 | 538 |
| 3156P | 54 | 50 | 43 | 42 | 40 | 35 | 25 | 0 | 0 | 4 | 655190 | 4687756 | 529 |
| 3157P | 52 | 48 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 655382 | 4687758 | 517 |
| 3158P | 53 | 48 | 42 | 40 | 38 | 34 | 23 | 0 | 0 | 4 | 655343 | 4687758 | 520 |
| 3159P | 51 | 47 | 40 | 38 | 36 | 31 | 18 | 0 | 0 | 4 | 655724 | 4687761 | 500 |
| 3161N | 57 | 52 | 46 | 44 | 42 | 37 | 26 | 0 | 0 | 4 | 651263 | 4687767 | 456 |
| 3162P | 50 | 45 | 39 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 655994 | 4687768 | 479 |
| 3179N | 58 | 54 | 47 | 46 | 44 | 40 | 31 | 10 | 0 | 4 | 647297 | 4687857 | 562 |
| 3183P | 55 | 50 | 44 | 42 | 40 | 35 | 25 | 1 | 0 | 4 | 655069 | 4687873 | 529 |
| 3204N | 56 | 52 | 45 | 44 | 42 | 37 | 26 | 0 | 0 | 4 | 651129 | 4687977 | 467 |
| 3206N | 56 | 52 | 45 | 44 | 42 | 37 | 25 | 0 | 0 | 4 | 651113 | 4687991 | 468 |
| 322B | 54 | 50 | 43 | 42 | 40 | 35 | 24 | 0 | 0 | 4 | 654962 | 4680586 | 553 |
| 3238B | 58 | 53 | 47 | 45 | 44 | 40 | 31 | 10 | 0 | 4 | 648505 | 4688164 | 602 |
| 3239N | 56 | 52 | 45 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 651027 | 4688163 | 467 |
| 3247W | 53 | 49 | 42 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 644625 | 4688202 | 535 |
| 3248P | 56 | 52 | 45 | 44 | 42 | 38 | 28 | 3 | 0 | 4 | 645085 | 4688206 | 572 |
| 3250P | 56 | 52 | 45 | 44 | 42 | 38 | 28 | 3 | 0 | 4 | 645076 | 4688208 | 571 |
| 3276P | 52 | 47 | 41 | 38 | 36 | 29 | 15 | 0 | 0 | 4 | 655477 | 4688343 | 496 |
| 3282P | 52 | 47 | 41 | 38 | 36 | 29 | 15 | 0 | 0 | 4 | 655474 | 4688358 | 495 |
| 3293P | 52 | 47 | 40 | 38 | 35 | 28 | 13 | 0 | 0 | 4 | 655534 | 4688450 | 491 |
| 3298P | 52 | 47 | 40 | 38 | 35 | 29 | 13 | 0 | 0 | 4 | 655458 | 4688483 | 492 |
| 3305P | 58 | 53 | 47 | 45 | 44 | 39 | 30 | 7 | 0 | 4 | 653704 | 4688509 | 566 |
| 3316P | 52 | 47 | 40 | 38 | 35 | 28 | 13 | 0 | 0 | 4 | 655464 | 4688550 | 490 |
| 3321N | 55 | 51 | 44 | 43 | 40 | 35 | 23 | 0 | 0 | 4 | 650851 | 4688582 | 455 |
| 3331N | 55 | 51 | 44 | 42 | 40 | 34 | 22 | 0 | 0 | 4 | 650769 | 4688616 | 468 |
| 3343N | 55 | 50 | 44 | 42 | 40 | 34 | 22 | 0 | 0 | 4 | 650767 | 4688677 | 461 |
| 3350N | 55 | 51 | 44 | 42 | 40 | 35 | 22 | 0 | 0 | 4 | 650798 | 4688689 | 459 |
| 3353P | 51 | 47 | 40 | 38 | 35 | 28 | 11 | 0 | 0 | 4 | 655459 | 4688698 | 486 |
| 3359N | 55 | 50 | 44 | 42 | 40 | 35 | 22 | 0 | 0 | 4 | 650787 | 4688721 | 458 |
| 3373P | 54 | 50 | 45 | 43 | 41 | 36 | 26 | 1 | 0 | 4 | 653715 | 4688779 | 544 |
| 3379W | 53 | 49 | 42 | 41 | 39 | 33 | 22 | 0 | 0 | 4 | 644394 | 4688805 | 551 |
| 3382P | 54 | 50 | 44 | 42 | 41 | 36 | 26 | 0 | 0 | 4 | 653720 | 4688825 | 539 |
| 3391B | 57 | 53 | 47 | 45 | 44 | 39 | 31 | 9 | 0 | 4 | 647828 | 4688865 | 553 |
| 3397P | 55 | 51 | 45 | 44 | 42 | 38 | 29 | 6 | 0 | 4 | 645204 | 4688905 | 602 |
| 3406P | 55 | 51 | 44 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 653730 | 4688952 | 537 |
| 3407P | 50 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643736 | 4688955 | 523 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 3425N | 54 | 50 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 650628 | 4689022 | 461 |
| 3434P | 51 | 46 | 39 | 37 | 34 | 28 | 14 | 0 | 0 | 4 | 643391 | 4689045 | 510 |
| 3443P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 9 | 0 | 4 | 645407 | 4689080 | 603 |
| 3448P | 52 | 47 | 41 | 39 | 37 | 31 | 19 | 0 | 0 | 4 | 643793 | 4689092 | 531 |
| 3455P | 56 | 51 | 45 | 44 | 42 | 38 | 29 | 6 | 0 | 4 | 645219 | 4689128 | 601 |
| 3458P | 49 | 44 | 39 | 37 | 34 | 28 | 14 | 0 | 0 | 4 | 643346 | 4689143 | 507 |
| 3459P | 54 | 49 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 653712 | 4689144 | 527 |
| 3460P | 50 | 45 | 39 | 37 | 34 | 28 | 14 | 0 | 0 | 4 | 643366 | 4689144 | 508 |
| 3473P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 11 | 0 | 4 | 646798 | 4689168 | 574 |
| 3484P | 55 | 51 | 45 | 43 | 41 | 36 | 26 | 0 | 0 | 4 | 653503 | 4689183 | 536 |
| 3490P | 54 | 49 | 43 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 653700 | 4689194 | 523 |
| 3492P | 52 | 48 | 43 | 41 | 39 | 34 | 22 | 0 | 0 | 4 | 653711 | 4689197 | 522 |
| 3499N | 55 | 50 | 44 | 43 | 41 | 36 | 27 | 3 | 0 | 4 | 647337 | 4689202 | 538 |
| 3501P | 57 | 53 | 46 | 45 | 43 | 38 | 29 | 8 | 0 | 4 | 645548 | 4689207 | 599 |
| 3503P | 57 | 53 | 47 | 45 | 43 | 39 | 30 | 10 | 0 | 4 | 645961 | 4689210 | 571 |
| 3505P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 10 | 0 | 4 | 645991 | 4689211 | 568 |
| 3513P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 9 | 0 | 4 | 645960 | 4689223 | 571 |
| 3514P | 54 | 50 | 43 | 42 | 40 | 35 | 26 | 1 | 0 | 4 | 644243 | 4689224 | 557 |
| 3517P | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 653715 | 4689226 | 519 |
| 3518P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 10 | 0 | 4 | 646078 | 4689226 | 561 |
| 3519P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 9 | 0 | 4 | 645841 | 4689226 | 579 |
| 3521P | 57 | 52 | 46 | 45 | 43 | 39 | 30 | 11 | 0 | 4 | 646554 | 4689232 | 574 |
| 3522P | 54 | 49 | 43 | 42 | 39 | 34 | 23 | 0 | 0 | 4 | 653688 | 4689235 | 519 |
| 3523P | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 653710 | 4689235 | 518 |
| 3524P | 57 | 52 | 46 | 45 | 43 | 39 | 31 | 11 | 0 | 4 | 646275 | 4689235 | 557 |
| 3526P | 54 | 50 | 44 | 42 | 40 | 36 | 26 | 1 | 0 | 4 | 644262 | 4689237 | 558 |
| 3530P | 54 | 50 | 44 | 42 | 40 | 36 | 26 | 1 | 0 | 4 | 644250 | 4689242 | 557 |
| 3532P | 54 | 49 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 653699 | 4689243 | 518 |
| 3535P | 57 | 52 | 46 | 44 | 43 | 38 | 29 | 6 | 0 | 4 | 645534 | 4689248 | 599 |
| 3541P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643381 | 4689273 | 507 |
| 3544P | 51 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643373 | 4689282 | 507 |
| 3552N | 54 | 49 | 43 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 650488 | 4689310 | 457 |
| 3555N | 54 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 650479 | 4689328 | 458 |
| 3556P | 53 | 48 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 653594 | 4689331 | 519 |
| 3558P | 55 | 51 | 44 | 43 | 41 | 35 | 24 | 0 | 0 | 4 | 653515 | 4689341 | 526 |
| 3560P | 53 | 49 | 43 | 41 | 39 | 34 | 22 | 0 | 0 | 4 | 653686 | 4689346 | 511 |
| 3561P | 53 | 48 | 43 | 41 | 39 | 34 | 23 | 0 | 0 | 4 | 653588 | 4689347 | 518 |
| 3564P | 50 | 45 | 38 | 36 | 34 | 28 | 14 | 0 | 0 | 4 | 643194 | 4689368 | 503 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 3567P | 55 | 51 | 44 | 43 | 41 | 37 | 28 | 5 | 0 | 4 | 644254 | 4689386 | 557 |
| 3571P | 50 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643350 | 4689412 | 503 |
| 3603P | 53 | 49 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 653602 | 4689530 | 503 |
| 3604P | 50 | 46 | 39 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 643276 | 4689531 | 503 |
| 3605N | 53 | 49 | 43 | 41 | 39 | 33 | 22 | 0 | 0 | 4 | 647342 | 4689536 | 536 |
| 3606P | 54 | 49 | 43 | 41 | 39 | 33 | 21 | 0 | 0 | 4 | 653579 | 4689540 | 504 |
| 3612P | 49 | 45 | 38 | 37 | 34 | 29 | 16 | 0 | 0 | 4 | 643302 | 4689548 | 498 |
| 3615P | 46 | 41 | 37 | 35 | 34 | 28 | 16 | 0 | 0 | 4 | 643399 | 4689551 | 504 |
| 3619P | 53 | 49 | 42 | 41 | 38 | 33 | 20 | 0 | 0 | 4 | 653678 | 4689557 | 501 |
| 3620P | 53 | 49 | 42 | 41 | 38 | 33 | 20 | 0 | 0 | 4 | 653687 | 4689557 | 501 |
| 3631N | 53 | 48 | 42 | 39 | 37 | 30 | 15 | 0 | 0 | 4 | 650346 | 4689582 | 457 |
| 3636N | 53 | 48 | 42 | 39 | 37 | 30 | 15 | 0 | 0 | 4 | 650329 | 4689599 | 458 |
| 363B | 46 | 42 | 38 | 35 | 31 | 25 | 11 | 0 | 0 | 4 | 652934 | 4680682 | 534 |
| 3643N | 53 | 48 | 42 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 650325 | 4689623 | 457 |
| 3648N | 53 | 49 | 42 | 41 | 38 | 33 | 21 | 0 | 0 | 4 | 647337 | 4689637 | 534 |
| 364P | 50 | 45 | 40 | 39 | 36 | 31 | 18 | 0 | 0 | 4 | 655660 | 4680685 | 512 |
| 3655N | 53 | 49 | 42 | 40 | 38 | 33 | 20 | 0 | 0 | 4 | 647335 | 4689656 | 535 |
| 3674W | 56 | 51 | 46 | 44 | 42 | 38 | 28 | 0 | 0 | 4 | 652726 | 4689769 | 529 |
| 3676W | 56 | 52 | 46 | 44 | 42 | 38 | 28 | 0 | 0 | 4 | 652741 | 4689772 | 529 |
| 3678N | 52 | 48 | 41 | 39 | 36 | 29 | 13 | 0 | 0 | 4 | 650224 | 4689782 | 459 |
| 3682P | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 653668 | 4689785 | 495 |
| 3689N | 53 | 48 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 647354 | 4689813 | 534 |
| 3693P | 44 | 39 | 36 | 33 | 29 | 24 | 12 | 0 | 0 | 4 | 643320 | 4689835 | 496 |
| 3700P | 44 | 39 | 36 | 33 | 29 | 24 | 12 | 0 | 0 | 4 | 643312 | 4689862 | 495 |
| 3703P | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 653676 | 4689912 | 490 |
| 3708P | 57 | 53 | 46 | 45 | 43 | 39 | 30 | 7 | 0 | 4 | 652267 | 4689937 | 533 |
| 3711P | 57 | 53 | 47 | 45 | 44 | 40 | 32 | 14 | 0 | 4 | 645204 | 4689939 | 577 |
| 3712P | 53 | 48 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 653688 | 4689944 | 488 |
| 3713N | 51 | 47 | 40 | 38 | 35 | 28 | 11 | 0 | 0 | 4 | 650133 | 4689946 | 463 |
| 3717N | 52 | 47 | 41 | 38 | 35 | 28 | 12 | 0 | 0 | 4 | 650176 | 4689983 | 460 |
| 371P | 50 | 46 | 41 | 39 | 37 | 31 | 19 | 0 | 0 | 4 | 655651 | 4680695 | 514 |
| 3720N | 52 | 48 | 41 | 39 | 37 | 31 | 16 | 0 | 0 | 4 | 647422 | 4690000 | 529 |
| 3721N | 52 | 48 | 41 | 39 | 37 | 30 | 16 | 0 | 0 | 4 | 647416 | 4690008 | 528 |
| 3722N | 53 | 48 | 41 | 39 | 37 | 30 | 16 | 0 | 0 | 4 | 647437 | 4690014 | 528 |
| 3728P | 54 | 50 | 44 | 43 | 40 | 36 | 25 | 0 | 0 | 4 | 652630 | 4690044 | 510 |
| 3733P | 54 | 50 | 43 | 41 | 39 | 33 | 20 | 0 | 0 | 4 | 653164 | 4690064 | 502 |
| 3734P | 55 | 50 | 44 | 42 | 41 | 36 | 25 | 0 | 0 | 4 | 652630 | 4690068 | 510 |
| 3735P | 55 | 50 | 44 | 42 | 41 | 36 | 25 | 0 | 0 | 4 | 652622 | 4690076 | 511 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 3736P | 53 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 653479 | 4690082 | 497 |
| 3737P | 53 | 48 | 42 | 40 | 37 | 31 | 16 | 0 | 0 | 4 | 653596 | 4690091 | 491 |
| 3738P | 57 | 53 | 47 | 45 | 44 | 40 | 32 | 14 | 0 | 4 | 645138 | 4690107 | 568 |
| 3739P | 51 | 46 | 40 | 38 | 36 | 31 | 20 | 0 | 0 | 4 | 643410 | 4690205 | 507 |
| 3740P | 56 | 52 | 46 | 44 | 43 | 39 | 31 | 10 | 0 | 4 | 645110 | 4690328 | 556 |
| 3741P | 56 | 52 | 45 | 44 | 43 | 38 | 30 | 10 | 0 | 4 | 645123 | 4690333 | 556 |
| 3742P | 56 | 52 | 45 | 44 | 43 | 38 | 31 | 10 | 0 | 4 | 645081 | 4690393 | 553 |
| 3743P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 9 | 0 | 4 | 645068 | 4690443 | 550 |
| 3744P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 9 | 0 | 4 | 645051 | 4690465 | 549 |
| 3765N | 52 | 47 | 41 | 38 | 36 | 29 | 14 | 0 | 0 | 4 | 647376 | 4690155 | 528 |
| 3766N | 52 | 47 | 41 | 38 | 36 | 29 | 14 | 0 | 0 | 4 | 647366 | 4690164 | 529 |
| 3770N | 52 | 47 | 41 | 38 | 36 | 29 | 14 | 0 | 0 | 4 | 647417 | 4690180 | 527 |
| 3771N | 52 | 47 | 41 | 39 | 36 | 30 | 14 | 0 | 0 | 4 | 647418 | 4690156 | 527 |
| 3772B | 51 | 46 | 40 | 38 | 35 | 29 | 15 | 0 | 0 | 4 | 648092 | 4690271 | 534 |
| 3773B | 51 | 46 | 40 | 37 | 34 | 27 | 13 | 0 | 0 | 4 | 648457 | 4690492 | 541 |
| 3774B | 47 | 42 | 38 | 36 | 32 | 26 | 13 | 0 | 0 | 4 | 648548 | 4690349 | 534 |
| 3775B | 49 | 44 | 39 | 36 | 33 | 28 | 15 | 0 | 0 | 4 | 648533 | 4690320 | 536 |
| 3776B | 50 | 45 | 39 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 648572 | 4690313 | 538 |
| 3777B | 50 | 45 | 39 | 36 | 34 | 28 | 15 | 0 | 0 | 4 | 648574 | 4690326 | 537 |
| 3778W | 51 | 46 | 40 | 37 | 34 | 28 | 15 | 0 | 0 | 4 | 650768 | 4690396 | 457 |
| 3779W | 47 | 43 | 38 | 36 | 33 | 27 | 14 | 0 | 0 | 4 | 650784 | 4690385 | 459 |
| 377B | 52 | 47 | 42 | 41 | 38 | 33 | 21 | 0 | 0 | 4 | 653422 | 4680705 | 571 |
| 3780W | 51 | 46 | 40 | 37 | 35 | 28 | 15 | 0 | 0 | 4 | 650752 | 4690377 | 454 |
| 3781W | 51 | 46 | 40 | 37 | 35 | 29 | 15 | 0 | 0 | 4 | 650734 | 4690400 | 454 |
| 3782W | 51 | 46 | 40 | 37 | 35 | 29 | 15 | 0 | 0 | 4 | 650744 | 4690394 | 455 |
| 3783W | 48 | 43 | 39 | 36 | 34 | 27 | 14 | 0 | 0 | 4 | 650779 | 4690371 | 458 |
| 3784P | 55 | 50 | 44 | 42 | 40 | 36 | 26 | 1 | 0 | 4 | 651656 | 4690256 | 533 |
| 3785P | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 652667 | 4690524 | 489 |
| 381B | 54 | 49 | 43 | 42 | 40 | 34 | 22 | 0 | 0 | 4 | 653487 | 4680709 | 575 |
| 383B | 46 | 42 | 38 | 35 | 31 | 25 | 11 | 0 | 0 | 4 | 652897 | 4680710 | 533 |
| 3843P | 53 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 653437 | 4690137 | 496 |
| 3844P | 53 | 49 | 42 | 40 | 38 | 31 | 17 | 0 | 0 | 4 | 653409 | 4690128 | 498 |
| 3845P | 53 | 49 | 43 | 41 | 38 | 33 | 20 | 0 | 0 | 4 | 653077 | 4690148 | 504 |
| 3846P | 53 | 49 | 43 | 41 | 38 | 33 | 20 | 0 | 0 | 4 | 653086 | 4690143 | 504 |
| 3847P | 53 | 49 | 43 | 41 | 38 | 33 | 20 | 0 | 0 | 4 | 653098 | 4690138 | 503 |
| 3854P | 55 | 51 | 44 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 652505 | 4690111 | 512 |
| 3856P | 55 | 51 | 45 | 43 | 41 | 37 | 28 | 4 | 0 | 4 | 652097 | 4690136 | 528 |
| 3858N | 52 | 47 | 40 | 38 | 35 | 28 | 11 | 0 | 0 | 4 | 650163 | 4690081 | 459 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 3865B | 52 | 47 | 41 | 38 | 36 | 30 | 16 | 0 | 0 | 4 | 647952 | 4690177 | 528 |
| 3866B | 52 | 47 | 41 | 39 | 36 | 30 | 17 | 0 | 0 | 4 | 647930 | 4690057 | 524 |
| 3867N | 52 | 47 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 647369 | 4690062 | 528 |
| 3868N | 51 | 47 | 41 | 38 | 36 | 30 | 15 | 0 | 0 | 4 | 647345 | 4690065 | 528 |
| 3869B | 56 | 51 | 44 | 43 | 41 | 37 | 28 | 4 | 0 | 4 | 645380 | 4690119 | 562 |
| 387B | 46 | 42 | 38 | 35 | 31 | 25 | 11 | 0 | 0 | 4 | 652889 | 4680715 | 532 |
| 3891P | 53 | 48 | 42 | 40 | 38 | 33 | 22 | 0 | 0 | 4 | 655462 | 4687729 | 514 |
| 391B | 56 | 51 | 45 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 653856 | 4680724 | 561 |
| 396P | 52 | 48 | 41 | 40 | 38 | 32 | 20 | 0 | 0 | 4 | 655578 | 4680736 | 521 |
| 400B | 53 | 49 | 43 | 42 | 40 | 34 | 22 | 0 | 0 | 4 | 653440 | 4680750 | 576 |
| 405B | 56 | 52 | 45 | 44 | 42 | 37 | 27 | 0 | 0 | 4 | 653970 | 4680761 | 552 |
| 406P | 52 | 47 | 41 | 40 | 38 | 32 | 21 | 0 | 0 | 4 | 655576 | 4680761 | 522 |
| 4178B | 46 | 42 | 38 | 35 | 31 | 25 | 11 | 0 | 0 | 4 | 652913 | 4680686 | 533 |
| 4389P | 50 | 45 | 39 | 37 | 34 | 28 | 13 | 0 | 0 | 4 | 655850 | 4680279 | 504 |
| 4390P | 50 | 46 | 39 | 37 | 35 | 28 | 13 | 0 | 0 | 4 | 655849 | 4680303 | 506 |
| 4395B | 53 | 49 | 42 | 40 | 38 | 32 | 19 | 0 | 0 | 4 | 654987 | 4680317 | 559 |
| 4396B | 53 | 49 | 42 | 40 | 38 | 32 | 19 | 0 | 0 | 4 | 655016 | 4680319 | 556 |
| 451W | 50 | 46 | 39 | 37 | 35 | 28 | 13 | 0 | 0 | 4 | 656270 | 4680860 | 480 |
| 4537P | 51 | 46 | 40 | 38 | 37 | 32 | 22 | 0 | 0 | 4 | 644077 | 4691089 | 515 |
| 4539P | 51 | 47 | 41 | 39 | 38 | 33 | 23 | 0 | 0 | 4 | 644544 | 4691103 | 528 |
| 4540P | 53 | 48 | 41 | 40 | 38 | 33 | 23 | 0 | 0 | 4 | 644695 | 4691121 | 531 |
| 4543B | 52 | 48 | 41 | 39 | 37 | 31 | 18 | 0 | 0 | 4 | 645767 | 4690654 | 519 |
| 4544B | 52 | 48 | 41 | 39 | 36 | 31 | 18 | 0 | 0 | 4 | 645689 | 4690755 | 519 |
| 4545P | 48 | 43 | 37 | 35 | 33 | 27 | 14 | 0 | 0 | 4 | 643375 | 4691087 | 483 |
| 4546P | 47 | 43 | 37 | 35 | 32 | 27 | 15 | 0 | 0 | 4 | 643376 | 4691011 | 484 |
| 4547P | 49 | 44 | 38 | 36 | 34 | 29 | 18 | 0 | 0 | 4 | 643315 | 4690546 | 487 |
| 4555B | 45 | 40 | 36 | 33 | 29 | 23 | 9 | 0 | 0 | 4 | 645836 | 4691060 | 482 |
| 4556B | 45 | 40 | 36 | 33 | 30 | 24 | 11 | 0 | 0 | 4 | 645862 | 4690951 | 490 |
| 4557B | 45 | 41 | 37 | 34 | 30 | 26 | 13 | 0 | 0 | 4 | 645858 | 4690881 | 497 |
| 4558B | 47 | 42 | 37 | 34 | 31 | 24 | 10 | 0 | 0 | 4 | 648783 | 4690667 | 507 |
| 4559P | 51 | 46 | 40 | 37 | 34 | 27 | 9 | 0 | 0 | 4 | 655308 | 4688952 | 476 |
| 4560P | 51 | 47 | 40 | 37 | 34 | 27 | 10 | 0 | 0 | 4 | 655294 | 4688916 | 478 |
| 4561B | 55 | 50 | 44 | 42 | 40 | 35 | 26 | 4 | 0 | 4 | 653192 | 4684660 | 513 |
| 458A | 47 | 42 | 36 | 33 | 31 | 24 | 10 | 0 | 0 | 4 | 643176 | 4680879 | 455 |
| 487P | 47 | 43 | 36 | 34 | 32 | 26 | 13 | 0 | 0 | 4 | 642731 | 4680989 | 497 |
| 514C | 47 | 42 | 36 | 33 | 31 | 24 | 10 | 0 | 0 | 4 | 643580 | 4681066 | 422 |
| 522C | 46 | 42 | 36 | 33 | 31 | 25 | 10 | 0 | 0 | 4 | 643558 | 4681107 | 422 |
| 525C | 47 | 42 | 36 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 643564 | 4681117 | 423 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 526C | 46 | 41 | 36 | 33 | 31 | 25 | 10 | 0 | 0 | 4 | 643559 | 4681125 | 423 |
| 531P | 53 | 49 | 43 | 41 | 39 | 35 | 25 | 0 | 0 | 4 | 655567 | 4681143 | 528 |
| 535P | 49 | 44 | 38 | 36 | 34 | 28 | 16 | 0 | 0 | 4 | 642442 | 4681158 | 501 |
| 537P | 54 | 49 | 43 | 42 | 40 | 35 | 26 | 0 | 0 | 4 | 655525 | 4681172 | 530 |
| 545C | 47 | 42 | 36 | 34 | 31 | 26 | 12 | 0 | 0 | 4 | 643487 | 4681240 | 425 |
| 560B | 51 | 47 | 40 | 38 | 36 | 30 | 15 | 0 | 0 | 4 | 652262 | 4681283 | 505 |
| 561P | 46 | 42 | 35 | 33 | 31 | 25 | 10 | 0 | 0 | 4 | 641293 | 4681283 | 470 |
| 568B | 52 | 47 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 652256 | 4681291 | 505 |
| 571P | 48 | 44 | 37 | 35 | 32 | 27 | 13 | 0 | 0 | 4 | 641600 | 4681296 | 479 |
| 575P | 48 | 43 | 36 | 34 | 32 | 26 | 11 | 0 | 0 | 4 | 641403 | 4681298 | 475 |
| 578C | 48 | 43 | 36 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 643835 | 4681302 | 440 |
| 581P | 48 | 43 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 641517 | 4681305 | 478 |
| 582P | 48 | 44 | 37 | 35 | 33 | 27 | 13 | 0 | 0 | 4 | 641594 | 4681306 | 479 |
| 584P | 48 | 43 | 36 | 34 | 32 | 26 | 12 | 0 | 0 | 4 | 641435 | 4681309 | 476 |
| 587P | 48 | 43 | 37 | 35 | 33 | 27 | 14 | 0 | 0 | 4 | 641676 | 4681316 | 480 |
| 588N | 41 | 37 | 33 | 31 | 28 | 24 | 11 | 0 | 0 | 4 | 643525 | 4681317 | 426 |
| 592N | 47 | 42 | 36 | 34 | 31 | 26 | 12 | 0 | 0 | 4 | 643644 | 4681326 | 430 |
| 598B | 51 | 47 | 41 | 39 | 36 | 30 | 15 | 0 | 0 | 4 | 652268 | 4681333 | 509 |
| 599N | 41 | 37 | 34 | 31 | 30 | 25 | 11 | 0 | 0 | 4 | 643576 | 4681334 | 428 |
| 601C | 48 | 43 | 36 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 643800 | 4681334 | 438 |
| 604N | 46 | 42 | 36 | 34 | 31 | 26 | 12 | 0 | 0 | 4 | 643621 | 4681339 | 430 |
| 610C | 48 | 43 | 37 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 643805 | 4681347 | 438 |
| 611C | 48 | 44 | 36 | 34 | 31 | 25 | 10 | 0 | 0 | 4 | 643854 | 4681348 | 440 |
| 621P | 49 | 44 | 38 | 36 | 34 | 28 | 16 | 0 | 0 | 4 | 641764 | 4681384 | 486 |
| 626P | 55 | 51 | 45 | 43 | 42 | 37 | 29 | 6 | 0 | 4 | 655450 | 4681395 | 529 |
| 627B | 52 | 47 | 41 | 39 | 37 | 31 | 16 | 0 | 0 | 4 | 652289 | 4681396 | 516 |
| 630C | 48 | 44 | 37 | 34 | 32 | 25 | 11 | 0 | 0 | 4 | 643823 | 4681399 | 438 |
| 637B | 52 | 47 | 41 | 39 | 37 | 31 | 16 | 0 | 0 | 4 | 652300 | 4681411 | 517 |
| 639B | 49 | 45 | 40 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 652391 | 4681418 | 506 |
| 642C | 48 | 44 | 37 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 643820 | 4681427 | 435 |
| 647B | 49 | 45 | 40 | 37 | 35 | 29 | 16 | 0 | 0 | 4 | 652396 | 4681456 | 508 |
| 652P | 56 | 51 | 45 | 44 | 42 | 38 | 30 | 7 | 0 | 4 | 655424 | 4681474 | 529 |
| 663C | 48 | 43 | 37 | 34 | 32 | 26 | 11 | 0 | 0 | 4 | 643893 | 4681520 | 434 |
| 667B | 53 | 48 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 652292 | 4681527 | 529 |
| 671C | 48 | 43 | 37 | 34 | 32 | 26 | 11 | 0 | 0 | 4 | 643888 | 4681533 | 434 |
| 675P | 56 | 51 | 46 | 44 | 42 | 38 | 30 | 7 | 0 | 4 | 655431 | 4681562 | 524 |
| 680B | 51 | 47 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 652261 | 4681587 | 535 |
| 691B | 51 | 47 | 41 | 39 | 36 | 30 | 16 | 0 | 0 | 4 | 652185 | 4681624 | 534 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 692N | 49 | 45 | 38 | 36 | 34 | 29 | 17 | 0 | 0 | 4 | 643488 | 4681627 | 448 |
| 698B | 53 | 49 | 42 | 40 | 38 | 32 | 17 | 0 | 0 | 4 | 652260 | 4681648 | 537 |
| 703P | 56 | 52 | 46 | 44 | 43 | 39 | 30 | 7 | 0 | 4 | 655421 | 4681675 | 523 |
| 706N | 48 | 44 | 37 | 35 | 33 | 26 | 12 | 0 | 0 | 4 | 643901 | 4681696 | 440 |
| 713B | 53 | 49 | 42 | 40 | 38 | 32 | 18 | 0 | 0 | 4 | 652239 | 4681725 | 540 |
| 715B | 53 | 48 | 42 | 40 | 38 | 32 | 19 | 0 | 0 | 4 | 652331 | 4681732 | 540 |
| 716B | 53 | 48 | 42 | 40 | 38 | 32 | 19 | 0 | 0 | 4 | 652328 | 4681736 | 540 |
| 720P | 56 | 52 | 46 | 45 | 43 | 39 | 30 | 8 | 0 | 4 | 655406 | 4681751 | 522 |
| 725N | 51 | 46 | 40 | 38 | 36 | 30 | 20 | 0 | 0 | 4 | 643445 | 4681833 | 462 |
| 726N | 49 | 45 | 38 | 36 | 33 | 27 | 13 | 0 | 0 | 4 | 643897 | 4681833 | 433 |
| 748N | 49 | 45 | 38 | 36 | 33 | 27 | 14 | 0 | 0 | 4 | 643924 | 4681921 | 434 |
| 751N | 49 | 44 | 38 | 35 | 33 | 27 | 14 | 0 | 0 | 4 | 643925 | 4681943 | 434 |
| 775N | 48 | 44 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 644089 | 4682095 | 436 |
| 791P | 54 | 50 | 44 | 43 | 42 | 38 | 30 | 11 | 0 | 4 | 643033 | 4682147 | 506 |
| 799N | 48 | 43 | 37 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 644053 | 4682178 | 434 |
| 802P | 56 | 51 | 45 | 43 | 41 | 37 | 26 | 0 | 0 | 4 | 655493 | 4682185 | 506 |
| 824P | 48 | 44 | 38 | 36 | 34 | 29 | 16 | 0 | 0 | 4 | 643843 | 4682276 | 459 |
| 825P | 56 | 52 | 45 | 44 | 42 | 37 | 27 | 0 | 0 | 4 | 655412 | 4682278 | 505 |
| 843P | 56 | 51 | 45 | 43 | 41 | 36 | 26 | 0 | 0 | 4 | 655467 | 4682323 | 504 |
| 851N | 47 | 43 | 36 | 34 | 30 | 24 | 10 | 0 | 0 | 4 | 644212 | 4682343 | 438 |
| 859P | 56 | 51 | 44 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 655480 | 4682356 | 501 |
| 864P | 56 | 51 | 45 | 43 | 41 | 37 | 26 | 0 | 0 | 4 | 655410 | 4682377 | 502 |
| 870N | 48 | 43 | 37 | 34 | 30 | 24 | 10 | 0 | 0 | 4 | 644250 | 4682387 | 438 |
| 874N | 53 | 49 | 42 | 41 | 39 | 34 | 25 | 0 | 0 | 4 | 643350 | 4682394 | 480 |
| 878P | 53 | 49 | 42 | 40 | 37 | 32 | 17 | 0 | 0 | 4 | 656044 | 4682411 | 474 |
| 881P | 52 | 48 | 41 | 39 | 37 | 31 | 16 | 0 | 0 | 4 | 656125 | 4682420 | 470 |
| 884N | 49 | 44 | 38 | 35 | 32 | 26 | 11 | 0 | 0 | 4 | 644279 | 4682422 | 439 |
| 900P | 54 | 50 | 44 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 655579 | 4682460 | 485 |
| 901N | 49 | 45 | 38 | 35 | 33 | 26 | 11 | 0 | 0 | 4 | 644313 | 4682461 | 439 |
| 902N | 45 | 41 | 36 | 34 | 31 | 25 | 9 | 0 | 0 | 4 | 640673 | 4682464 | 423 |
| 911N | 49 | 45 | 38 | 35 | 33 | 26 | 11 | 0 | 0 | 4 | 644342 | 4682491 | 440 |
| 913P | 55 | 51 | 44 | 43 | 41 | 36 | 25 | 0 | 0 | 4 | 655390 | 4682492 | 497 |
| 928N | 49 | 44 | 38 | 35 | 32 | 26 | 10 | 0 | 0 | 4 | 644429 | 4682519 | 442 |
| 940P | 54 | 50 | 43 | 41 | 39 | 34 | 22 | 0 | 0 | 4 | 655623 | 4682535 | 480 |
| 943P | 54 | 49 | 42 | 40 | 37 | 31 | 17 | 0 | 0 | 4 | 656037 | 4682538 | 476 |
| 969N | 55 | 50 | 44 | 42 | 41 | 37 | 28 | 7 | 0 | 4 | 643172 | 4682599 | 498 |
| 972N | 46 | 41 | 36 | 33 | 29 | 22 | 7 | 0 | 0 | 4 | 644318 | 4682602 | 440 |
| 986N | 49 | 45 | 38 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 647286 | 4682631 | 523 |

| Receptor | 1/1 Octave Band Sound Level (dBZ) | | | | | | | | | Relative Height (m) | Coordinates (UTM NAD83 Z17 N) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | | X (m) | Y (m) | Z (m) |
| 995P | 54 | 50 | 43 | 42 | 40 | 35 | 23 | 0 | 0 | 4 | 655465 | 4682644 | 482 |
| 998N | 46 | 41 | 35 | 32 | 28 | 20 | 4 | 0 | 0 | 4 | 646470 | 4682650 | 492 |
| 999N | 49 | 44 | 38 | 35 | 32 | 26 | 12 | 0 | 0 | 4 | 647265 | 4682651 | 523 |
| Boutwell ParkingB | 55 | 50 | 42 | 38 | 36 | 32 | 18 | 0 | 0 | 1.5 | 650392 | 4685353 | 634 |
| Worst Case TrailB | 58 | 54 | 48 | 44 | 43 | 41 | 35 | 20 | 0 | 1.5 | 648881 | 4689280 | 589 |

# APPENDIX C: STATISTICAL AND ANNUALIZED MODELING RESULTS

**TABLE 30: DISCRETE RECEPTOR RESULTS - ANNUALIZED AND STATISTICAL MODELING**

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1013N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 20 | 21 | 28 |
| 1018N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 20 | 21 | 27 |
| 1020N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 27 | 40 | 20 | 20 | 27 |
| 1023N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 30 | 40 | 25 | 26 | 31 |
| 1030N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 27 | 40 | 20 | 21 | 28 |
| 1032N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 20 | 21 | 27 |
| 1033N | 25 | 24 | 24 | 40 | 38 | 27 | 26 | 26 | 40 | 19 | 20 | 27 |
| 1036N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 30 | 40 | 26 | 26 | 31 |
| 1037N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 28 |
| 1038P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 41 |
| 1042N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 28 |
| 1047N | 25 | 24 | 24 | 40 | 38 | 28 | 28 | 28 | 40 | 23 | 23 | 32 |
| 1048N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 24 | 24 | 29 |
| 1049N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 20 | 21 | 28 |
| 1052N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 23 | 23 | 28 |
| 1055N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 28 |
| 1056N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 23 | 23 | 29 |
| 1061N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 23 | 23 | 29 |
| 1069P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 34 | 35 | 40 |
| 1077P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 31 | 37 |
| 1078P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1082P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1084N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 23 | 24 | 29 |
| 1088P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1089B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 26 | 35 |
| 1093P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1094B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 25 | 35 |
| 1098N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 23 | 24 | 29 |
| 1099B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 25 | 36 |
| 1101B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 26 | 35 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1103N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 23 | 24 | 29 |
| 1107B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 26 | 36 |
| 1113P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1115N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 22 | 23 | 32 |
| 1116B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 30 | 39 | 26 | 26 | 36 |
| 1117P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1120N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1124N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1126N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 26 | 27 | 32 |
| 1127P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 1131P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 1135N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1136B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 29 | 39 | 26 | 27 | 37 |
| 1138N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1141P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 32 | 32 | 38 |
| 1154B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 27 | 33 |
| 1159N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1160B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 27 | 34 |
| 1161B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 34 | 39 | 30 | 29 | 38 |
| 1162B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 34 | 39 | 30 | 29 | 37 |
| 1166B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 26 | 27 | 33 |
| 1183B | 19 | 16 | 19 | 39 | 35 | 43 | 43 | 43 | 41 | 39 | 40 | 45 |
| 1186B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 35 | 39 | 30 | 31 | 38 |
| 1189N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 23 | 31 |
| 1205B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 29 | 30 | 37 |
| 1214N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 28 | 40 | 23 | 24 | 32 |
| 1216N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 28 | 40 | 23 | 24 | 33 |
| 1218N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 28 | 28 | 33 |
| 1221B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 34 | 39 | 29 | 30 | 37 |
| 1222N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 33 | 40 | 28 | 28 | 33 |
| 1231B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 29 | 30 | 37 |
| 1237W | 21 | 18 | 21 | 35 | 35 | 29 | 29 | 29 | 35 | 24 | 25 | 29 |
| 1241N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 28 | 28 | 34 |
| 1244N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 28 | 29 | 33 |
| 1245B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 28 | 29 | 37 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1278W | 21 | 18 | 21 | 35 | 35 | 31 | 30 | 30 | 35 | 27 | 28 | 37 |
| 1299N | 25 | 24 | 24 | 40 | 38 | 43 | 42 | 42 | 41 | 38 | 39 | 44 |
| 1304P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 38 |
| 1326N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 23 | 24 | 31 |
| 1349B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 1351B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 32 | 33 | 37 |
| 1365P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 38 |
| 1368B | 19 | 16 | 19 | 39 | 35 | 42 | 41 | 42 | 40 | 37 | 38 | 43 |
| 1370P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 38 |
| 1373P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 32 | 33 | 37 |
| 1374P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 37 |
| 1376P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 37 |
| 1378P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1384P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 38 |
| 1407N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1411N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1415N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1418B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 30 | 31 | 35 |
| 1433N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 26 | 40 | 18 | 20 | 27 |
| 1434B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 30 | 31 | 35 |
| 1461B | 19 | 16 | 19 | 39 | 35 | 42 | 42 | 42 | 40 | 38 | 38 | 43 |
| 1462B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 43 | 41 | 39 | 39 | 45 |
| 1465B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 44 | 41 | 39 | 39 | 45 |
| 1475N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1506B | 19 | 16 | 19 | 39 | 35 | 43 | 43 | 43 | 40 | 38 | 39 | 44 |
| 1515B | 19 | 16 | 19 | 39 | 35 | 36 | 36 | 36 | 39 | 32 | 33 | 37 |
| 1525B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 39 | 32 | 33 | 37 |
| 1532B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 26 | 27 | 35 |
| 1546B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 27 | 28 | 37 |
| 1549N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 33 | 38 |
| 1550N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 33 | 38 |
| 1553N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 38 |
| 1555N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 38 | 40 | 34 | 35 | 41 |
| 1561N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 37 |
| 1565B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 40 | 40 | 36 | 37 | 42 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1582N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 20 | 22 | 29 |
| 1585B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 32 | 39 | 28 | 29 | 38 |
| 1590N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 42 |
| 1595B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 28 | 28 | 35 |
| 1596N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 21 | 22 | 29 |
| 1604P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 45 |
| 1605N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 21 | 23 | 30 |
| 1617B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 36 | 37 | 42 |
| 1622N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 37 |
| 1624N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1634B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 37 | 42 |
| 1635B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 37 | 42 |
| 1638B | 19 | 16 | 19 | 39 | 35 | 39 | 39 | 39 | 40 | 35 | 35 | 40 |
| 1639B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 32 | 39 | 29 | 29 | 35 |
| 1643B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 36 | 37 | 42 |
| 1655B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 27 | 27 | 34 |
| 1656N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1657N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1658N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1662B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 27 | 27 | 35 |
| 1665B | 19 | 16 | 19 | 39 | 35 | 40 | 39 | 40 | 40 | 35 | 36 | 41 |
| 1671B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 31 | 39 | 28 | 29 | 38 |
| 1673W | 21 | 18 | 21 | 35 | 35 | 33 | 32 | 32 | 35 | 28 | 29 | 35 |
| 1676B | 19 | 16 | 19 | 39 | 35 | 32 | 30 | 31 | 39 | 27 | 28 | 35 |
| 1683N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 33 | 38 |
| 1708N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 40 |
| 1716B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 31 | 39 | 28 | 29 | 38 |
| 1722N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 1728P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 38 | 43 |
| 1736B | 19 | 16 | 19 | 39 | 35 | 43 | 42 | 43 | 40 | 38 | 39 | 44 |
| 1738B | 19 | 16 | 19 | 39 | 35 | 40 | 40 | 40 | 40 | 36 | 37 | 41 |
| 1749B | 19 | 16 | 19 | 39 | 35 | 43 | 43 | 43 | 41 | 39 | 39 | 44 |
| 1753B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 32 | 39 | 29 | 29 | 35 |
| 1759N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1761N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 37 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1780N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1783N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1784N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1787N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 32 | 37 |
| 1791N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1793N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 37 |
| 1800P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 41 | 49 | 37 | 38 | 42 |
| 1802N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 33 | 37 |
| 1821N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1822N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1836N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 1840N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 1841N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 1845N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 33 | 34 | 39 |
| 1856B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 31 | 39 | 29 | 30 | 40 |
| 1857N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 38 |
| 1860B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 31 | 39 | 29 | 30 | 39 |
| 1866B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 35 | 42 |
| 1868P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 36 | 37 | 42 |
| 1878P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 1880P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 39 | 44 |
| 1884P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 1904N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 31 | 32 | 39 |
| 1916P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 29 | 30 | 36 |
| 191B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 34 | 39 | 29 | 29 | 38 |
| 1930N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 38 | 41 | 34 | 35 | 40 |
| 1937P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 29 | 30 | 36 |
| 1939P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 41 |
| 1940C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 28 | 29 | 35 |
| 1947P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 41 |
| 1952P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 1965P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 1974P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 29 | 30 | 36 |
| 1981N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 30 | 31 | 37 |
| 1982N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 31 | 37 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1988P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 32 | 33 | 37 |
| 1993P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 42 | 49 | 38 | 39 | 44 |
| 1995P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 41 |
| 2001A | 27 | 23 | 32 | 48 | 42 | 35 | 34 | 36 | 48 | 30 | 31 | 35 |
| 2006P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 41 |
| 2009B | 19 | 16 | 19 | 39 | 35 | 38 | 36 | 37 | 40 | 33 | 34 | 41 |
| 2011C | 29 | 27 | 28 | 49 | 36 | 35 | 33 | 34 | 49 | 28 | 30 | 35 |
| 2012P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 42 | 49 | 38 | 39 | 43 |
| 2013P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 36 |
| 2018B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 35 | 42 |
| 2019P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 38 | 43 |
| 2020A | 27 | 23 | 32 | 48 | 42 | 35 | 34 | 36 | 48 | 30 | 31 | 35 |
| 2021P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 202P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 29 | 37 |
| 2032P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 44 |
| 2037B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 40 | 40 | 36 | 37 | 44 |
| 2038P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 39 |
| 2040P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 37 | 49 | 32 | 34 | 40 |
| 2046P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 30 | 31 | 38 |
| 2047P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 41 |
| 2048P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 44 |
| 2049P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 2053C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 33 | 49 | 28 | 29 | 35 |
| 2055P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 36 | 38 | 43 |
| 2063P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 36 | 37 | 42 |
| 2064P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 39 |
| 2065N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 30 | 37 |
| 2067C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 28 | 29 | 35 |
| 2068C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 28 | 29 | 35 |
| 2071P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 2073P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 30 | 31 | 37 |
| 2084P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 30 | 31 | 37 |
| 2086B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 33 | 40 |
| 2087P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 32 | 33 | 37 |
| 2088N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 29 | 30 | 36 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 208P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 29 | 29 | 36 |
| 2090P | 25 | 24 | 24 | 49 | 35 | 36 | 34 | 35 | 49 | 30 | 31 | 37 |
| 2091C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 28 | 29 | 34 |
| 2093P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 37 | 38 | 43 |
| 2096B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 37 | 40 | 34 | 34 | 40 |
| 2099P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 2100B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 33 | 39 |
| 2102P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 30 | 30 | 35 |
| 2112N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 38 |
| 2120B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 33 | 39 |
| 2123P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 29 | 30 | 35 |
| 2131P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 34 | 35 | 41 |
| 2132P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 2135P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 29 | 30 | 36 |
| 2136P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 42 |
| 2141W | 21 | 18 | 21 | 35 | 35 | 34 | 34 | 34 | 36 | 30 | 31 | 36 |
| 2142B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 30 | 37 |
| 2150B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 29 | 30 | 36 |
| 2151B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 30 | 38 |
| 2153P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 35 |
| 2156P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 41 |
| 2161B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 30 | 37 |
| 2162W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 34 | 36 | 31 | 31 | 37 |
| 2164B | 19 | 16 | 19 | 39 | 35 | 39 | 37 | 38 | 40 | 34 | 34 | 41 |
| 2166P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 43 |
| 2168P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 41 |
| 2172B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 35 | 42 |
| 2174B | 19 | 16 | 19 | 39 | 35 | 39 | 39 | 39 | 40 | 35 | 35 | 41 |
| 2175B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 34 | 35 | 41 |
| 2185N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 30 | 36 |
| 2189P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 42 |
| 2198P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 43 |
| 2199B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 40 |
| 219P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 29 | 37 |
| 2201P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2202B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 30 | 37 |
| 2203B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 39 |
| 2206P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 43 |
| 2208P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 36 | 42 |
| 2209B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 30 | 37 |
| 220B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 39 | 30 | 30 | 38 |
| 2214B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 39 |
| 2215B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 37 |
| 2217B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 37 |
| 2220W | 21 | 18 | 21 | 35 | 35 | 40 | 40 | 40 | 37 | 36 | 36 | 41 |
| 2231N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 33 | 40 | 28 | 29 | 35 |
| 2263N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 33 | 38 |
| 2264N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 33 | 38 |
| 2266P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 33 | 35 | 39 |
| 2285N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 26 | 28 | 33 |
| 2296B | 19 | 16 | 19 | 39 | 35 | 30 | 30 | 30 | 39 | 26 | 26 | 32 |
| 2300W | 21 | 18 | 21 | 35 | 35 | 39 | 38 | 38 | 37 | 35 | 36 | 43 |
| 2308C | 29 | 27 | 28 | 49 | 36 | 35 | 34 | 34 | 49 | 29 | 30 | 35 |
| 2317N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 2322N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 26 | 27 | 33 |
| 2326N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 2334P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 32 | 36 |
| 2337B | 19 | 16 | 19 | 39 | 35 | 35 | 35 | 35 | 40 | 32 | 34 | 42 |
| 2338B | 19 | 16 | 19 | 39 | 35 | 35 | 35 | 35 | 40 | 32 | 34 | 42 |
| 2347P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 2349P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 36 |
| 234P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 29 | 36 |
| 2352P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 35 |
| 2353P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 235P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 28 | 28 | 35 |
| 2360N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 38 |
| 2361N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 38 |
| 2366P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2371N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 31 | 32 | 36 |
| 2374N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 30 | 40 | 24 | 25 | 31 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2378N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 23 | 24 | 30 |
| 2379N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 38 |
| 2387N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 32 | 36 |
| 2397B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 40 | 33 | 34 | 42 |
| 2402P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 30 | 31 | 35 |
| 2411B | 19 | 16 | 19 | 39 | 35 | 39 | 39 | 38 | 40 | 35 | 36 | 44 |
| 2412P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2413P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 30 | 30 | 35 |
| 2414P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 30 | 31 | 35 |
| 2420P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2421B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 38 | 40 | 35 | 36 | 44 |
| 2422P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 35 |
| 2439P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 28 | 29 | 34 |
| 2447N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2451P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2456P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2458P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2461P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 32 | 49 | 27 | 28 | 33 |
| 2467N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 37 |
| 2473P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2478N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 34 |
| 2480N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 31 | 40 | 27 | 28 | 35 |
| 2500B | 19 | 16 | 19 | 39 | 35 | 41 | 41 | 41 | 40 | 37 | 38 | 44 |
| 2501P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2502P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2508P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2514W | 21 | 18 | 21 | 35 | 35 | 32 | 31 | 32 | 35 | 27 | 28 | 32 |
| 2525P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 33 | 33 | 39 |
| 2527P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 27 | 29 | 33 |
| 2528P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 33 |
| 2529P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2533P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2539P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 33 |
| 2540N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 41 | 34 | 35 | 40 |
| 2542N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 41 | 34 | 35 | 40 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2545N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 33 | 34 | 39 |
| 2558P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 37 | 43 |
| 2559N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2561N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2568N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 27 | 28 | 36 |
| 2582P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2605N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 28 | 36 |
| 2608N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 31 | 40 | 28 | 28 | 36 |
| 2612B | 19 | 16 | 19 | 39 | 35 | 40 | 39 | 40 | 40 | 36 | 37 | 43 |
| 2614N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 37 |
| 2616P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 35 |
| 2617P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2618P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 35 | 35 | 40 |
| 2620P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 35 | 35 | 41 |
| 2625P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2626P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 35 | 35 | 41 |
| 2631N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 33 | 40 | 29 | 30 | 36 |
| 2632N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 28 | 34 |
| 2635N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 33 | 40 | 29 | 29 | 36 |
| 2637N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 30 | 31 | 38 |
| 2640N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 30 | 30 | 37 |
| 2642N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 30 | 31 | 37 |
| 2644N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 30 | 31 | 37 |
| 2646N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 35 |
| 2648P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 27 | 28 | 36 |
| 2653P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 27 | 28 | 36 |
| 2658N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 33 | 40 | 29 | 30 | 36 |
| 2659N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 28 | 35 |
| 2665P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 27 | 28 | 36 |
| 2671P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 27 | 28 | 36 |
| 2675P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 27 | 28 | 36 |
| 2698P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 41 |
| 2703B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 40 | 40 | 36 | 37 | 43 |
| 2707P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 41 |
| 2719P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 38 | 43 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2725N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 31 | 32 | 38 |
| 2728N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 31 | 32 | 39 |
| 2731P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 37 | 38 | 43 |
| 2735P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 37 | 38 | 43 |
| 2736P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 38 | 43 |
| 2751P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 39 | 45 |
| 2754B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 40 | 33 | 34 | 39 |
| 2755N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 37 | 44 |
| 2770B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 39 | 32 | 33 | 39 |
| 2775P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 37 | 38 | 43 |
| 2784B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 35 | 39 |
| 2786P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 26 | 27 | 35 |
| 2789B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 37 | 40 | 34 | 35 | 39 |
| 2793N | 25 | 24 | 24 | 40 | 38 | 42 | 42 | 42 | 41 | 38 | 39 | 44 |
| 2795N | 25 | 24 | 24 | 40 | 38 | 42 | 42 | 42 | 41 | 38 | 39 | 43 |
| 2808P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 27 | 28 | 37 |
| 2815B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 33 | 34 | 39 |
| 2816B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 33 | 34 | 39 |
| 2817B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 37 | 40 | 34 | 34 | 39 |
| 2819P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 28 | 28 | 38 |
| 2822P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 32 | 49 | 30 | 31 | 40 |
| 2824P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 30 | 31 | 40 |
| 2832P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 30 | 31 | 41 |
| 2836N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 40 |
| 2844N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 39 |
| 2847N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 33 | 33 | 40 |
| 2865P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 32 | 49 | 29 | 30 | 39 |
| 2874N | 25 | 24 | 24 | 40 | 38 | 41 | 41 | 40 | 41 | 37 | 38 | 43 |
| 2877N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 34 | 39 |
| 2886B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 2890P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 35 | 36 | 41 |
| 2894B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 33 | 34 | 38 |
| 2898P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 2903P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 2905P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 32 | 49 | 30 | 31 | 40 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2907N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 34 | 39 |
| 2908N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 40 | 41 | 36 | 37 | 44 |
| 2911N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 40 | 41 | 36 | 37 | 44 |
| 2920N | 25 | 24 | 24 | 40 | 38 | 40 | 40 | 40 | 41 | 36 | 37 | 43 |
| 2923N | 25 | 24 | 24 | 40 | 38 | 40 | 40 | 40 | 41 | 36 | 37 | 43 |
| 2945B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 40 | 33 | 33 | 37 |
| 2948B | 19 | 16 | 19 | 39 | 35 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 2949P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 32 | 49 | 30 | 31 | 41 |
| 2957B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 36 | 40 | 32 | 33 | 37 |
| 2975N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 41 | 35 | 35 | 41 |
| 3008W | 21 | 18 | 21 | 35 | 35 | 32 | 32 | 31 | 35 | 29 | 31 | 39 |
| 300B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 35 | 39 | 30 | 31 | 39 |
| 3011W | 21 | 18 | 21 | 35 | 35 | 32 | 32 | 31 | 35 | 29 | 31 | 39 |
| 3018W | 21 | 18 | 21 | 35 | 35 | 32 | 31 | 31 | 35 | 29 | 30 | 39 |
| 3067N | 25 | 24 | 24 | 40 | 38 | 40 | 39 | 39 | 41 | 35 | 36 | 41 |
| 3084N | 25 | 24 | 24 | 40 | 38 | 40 | 39 | 39 | 41 | 35 | 36 | 43 |
| 3087P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 3092N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 34 | 35 | 42 |
| 3095N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 40 | 34 | 36 | 43 |
| 309B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 35 | 39 | 31 | 31 | 40 |
| 3107P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 33 | 49 | 32 | 33 | 43 |
| 3110P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 33 | 49 | 32 | 33 | 43 |
| 3112P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 42 | 49 | 38 | 39 | 43 |
| 3124P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 36 |
| 3128P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 31 | 35 |
| 3131P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 35 |
| 3132P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 3135P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3146P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 32 | 33 | 37 |
| 3149N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 35 | 42 |
| 3150P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 3151N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 37 | 43 |
| 3152P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 36 | 49 | 32 | 33 | 37 |
| 3153P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3156P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3157P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 40 |
| 3158P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 3159P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 36 | 49 | 32 | 33 | 37 |
| 3161N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 43 |
| 3162P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 36 |
| 3179N | 25 | 24 | 24 | 40 | 38 | 42 | 42 | 42 | 42 | 38 | 39 | 44 |
| 3183P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 3204N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 34 | 35 | 42 |
| 3206N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 35 | 43 |
| 322B | 19 | 16 | 19 | 39 | 35 | 38 | 36 | 37 | 39 | 32 | 32 | 40 |
| 3239N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 35 | 42 |
| 3247W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 34 | 35 | 30 | 31 | 39 |
| 3248P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 38 | 49 | 34 | 35 | 43 |
| 3250P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 38 | 49 | 34 | 35 | 43 |
| 3276P | 25 | 24 | 24 | 49 | 35 | 36 | 36 | 36 | 49 | 32 | 32 | 37 |
| 3282P | 25 | 24 | 24 | 49 | 35 | 36 | 36 | 36 | 49 | 32 | 32 | 36 |
| 3293P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 36 |
| 3298P | 25 | 24 | 24 | 49 | 35 | 36 | 36 | 36 | 49 | 31 | 32 | 36 |
| 3305P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 39 | 40 | 45 |
| 3316P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 36 |
| 3321N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 3331N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 36 | 40 | 32 | 34 | 41 |
| 3343N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 36 | 40 | 32 | 33 | 40 |
| 3350N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 3353P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 3359N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 3373P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3379W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 34 | 35 | 30 | 31 | 39 |
| 3382P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3391B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 43 | 41 | 39 | 40 | 45 |
| 3397P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 36 | 37 | 43 |
| 3406P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3407P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 28 | 36 |
| 3425N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 40 |
| 3434P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 27 | 35 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3443P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 42 | 49 | 38 | 39 | 44 |
| 3448P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 32 | 49 | 28 | 29 | 37 |
| 3455P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 37 | 37 | 42 |
| 3458P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 25 | 27 | 35 |
| 3459P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 3460P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 27 | 35 |
| 3473P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3484P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 38 | 42 |
| 3490P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 3492P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3499N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 37 | 42 |
| 3501P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 3503P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 45 |
| 3505P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3513P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 45 |
| 3514P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 32 | 40 |
| 3517P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 41 |
| 3518P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 39 | 40 | 45 |
| 3519P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 45 |
| 3521P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3522P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 35 | 36 | 41 |
| 3523P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 40 |
| 3524P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3526P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 32 | 41 |
| 3530P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 32 | 41 |
| 3532P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 40 |
| 3535P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 3541P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 30 | 49 | 26 | 27 | 36 |
| 3544P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 26 | 27 | 35 |
| 3552N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 31 | 32 | 39 |
| 3555N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 31 | 32 | 39 |
| 3556P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 40 |
| 3558P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3560P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 3561P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 40 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3564P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 25 | 27 | 34 |
| 3567P | 25 | 24 | 24 | 49 | 35 | 36 | 36 | 35 | 49 | 32 | 33 | 42 |
| 3571P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 30 | 49 | 26 | 27 | 36 |
| 3603P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 3604P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 27 | 35 |
| 3605N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 40 | 34 | 35 | 40 |
| 3606P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 3612P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 25 | 26 | 35 |
| 3615P | 25 | 24 | 24 | 49 | 35 | 30 | 29 | 29 | 49 | 24 | 26 | 34 |
| 3619P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 34 | 35 | 40 |
| 3620P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 39 |
| 3631N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 30 | 32 | 38 |
| 3636N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 30 | 32 | 37 |
| 363B | 19 | 16 | 19 | 39 | 35 | 26 | 24 | 24 | 39 | 22 | 23 | 32 |
| 3643N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 30 | 31 | 37 |
| 3648N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 40 | 34 | 35 | 40 |
| 364P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 29 | 29 | 36 |
| 3655N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 40 | 34 | 35 | 40 |
| 3674W | 21 | 18 | 21 | 35 | 35 | 43 | 42 | 43 | 38 | 38 | 39 | 44 |
| 3676W | 21 | 18 | 21 | 35 | 35 | 43 | 43 | 43 | 38 | 38 | 39 | 44 |
| 3678N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 30 | 31 | 37 |
| 3682P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 3689N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 38 |
| 3693P | 25 | 24 | 24 | 49 | 35 | 29 | 28 | 28 | 49 | 21 | 23 | 31 |
| 3700P | 25 | 24 | 24 | 49 | 35 | 29 | 28 | 28 | 49 | 21 | 23 | 31 |
| 3703P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 33 | 34 | 39 |
| 3708P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 39 | 40 | 45 |
| 3711P | 25 | 24 | 24 | 49 | 35 | 44 | 44 | 44 | 49 | 40 | 40 | 45 |
| 3712P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 33 | 34 | 38 |
| 3713N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 30 | 36 |
| 3717N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 30 | 36 |
| 371P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 30 | 30 | 38 |
| 3720N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 38 |
| 3721N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 38 |
| 3722N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 38 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3728P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3733P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3734P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3735P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 3736P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 3737P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 33 | 34 | 38 |
| 3738P | 25 | 24 | 24 | 49 | 35 | 44 | 44 | 44 | 49 | 40 | 40 | 45 |
| 3739P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 28 | 29 | 37 |
| 3740P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3741P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 44 |
| 3742P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3743P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 44 |
| 3744P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 44 |
| 3765N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 31 | 32 | 37 |
| 3766N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 35 | 40 | 31 | 32 | 37 |
| 3770N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 31 | 32 | 37 |
| 3771N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 31 | 32 | 37 |
| 3772B | 19 | 16 | 19 | 39 | 35 | 35 | 35 | 35 | 39 | 31 | 32 | 36 |
| 3773B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 34 | 39 | 30 | 31 | 36 |
| 3774B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 33 | 39 | 28 | 29 | 34 |
| 3775B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 29 | 30 | 35 |
| 3776B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 30 | 30 | 35 |
| 3777B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 29 | 30 | 35 |
| 3778W | 21 | 18 | 21 | 35 | 35 | 34 | 34 | 34 | 35 | 29 | 30 | 36 |
| 3779W | 21 | 18 | 21 | 35 | 35 | 33 | 33 | 33 | 35 | 28 | 29 | 34 |
| 377B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 29 | 39 | 28 | 29 | 39 |
| 3780W | 21 | 18 | 21 | 35 | 35 | 34 | 34 | 34 | 35 | 29 | 30 | 36 |
| 3781W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 34 | 35 | 29 | 31 | 36 |
| 3782W | 21 | 18 | 21 | 35 | 35 | 34 | 34 | 34 | 35 | 29 | 31 | 36 |
| 3783W | 21 | 18 | 21 | 35 | 35 | 33 | 33 | 33 | 35 | 28 | 29 | 35 |
| 3784P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 42 |
| 3785P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 381B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 30 | 39 | 29 | 30 | 40 |
| 383B | 19 | 16 | 19 | 39 | 35 | 25 | 24 | 24 | 39 | 21 | 23 | 33 |
| 3843P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3844P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 3845P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 34 | 35 | 40 |
| 3846P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 35 | 40 |
| 3847P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 34 | 35 | 40 |
| 3854P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3856P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 38 | 43 |
| 3858N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 29 | 30 | 36 |
| 3865B | 19 | 16 | 19 | 39 | 35 | 36 | 36 | 36 | 39 | 31 | 32 | 37 |
| 3866B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 39 | 32 | 33 | 37 |
| 3867N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 32 | 37 |
| 3868N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 31 | 32 | 37 |
| 3869B | 19 | 16 | 19 | 39 | 35 | 41 | 41 | 41 | 40 | 37 | 38 | 42 |
| 387B | 19 | 16 | 19 | 39 | 35 | 25 | 24 | 24 | 39 | 22 | 23 | 32 |
| 3891P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 38 | 49 | 34 | 35 | 39 |
| 391B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 34 | 39 | 31 | 32 | 42 |
| 396P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 31 | 38 |
| 400B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 30 | 39 | 29 | 30 | 40 |
| 405B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 34 | 39 | 32 | 32 | 42 |
| 406P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 31 | 38 |
| 4178B | 19 | 16 | 19 | 39 | 35 | 25 | 24 | 24 | 39 | 22 | 23 | 32 |
| 4389P | 25 | 24 | 24 | 49 | 35 | 33 | 31 | 32 | 49 | 27 | 27 | 35 |
| 4390P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 28 | 35 |
| 4395B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 35 | 39 | 30 | 30 | 38 |
| 4396B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 39 | 30 | 30 | 38 |
| 451W | 21 | 18 | 21 | 35 | 35 | 34 | 34 | 34 | 35 | 29 | 29 | 35 |
| 4537P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 32 | 33 | 38 |
| 4539P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 33 | 34 | 39 |
| 4540P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 39 |
| 4543B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 39 | 32 | 33 | 37 |
| 4544B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 39 | 32 | 33 | 38 |
| 4545P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 32 | 49 | 26 | 27 | 34 |
| 4546P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 32 | 49 | 26 | 27 | 34 |
| 4547P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 27 | 29 | 36 |
| 4555B | 19 | 16 | 19 | 39 | 35 | 30 | 30 | 30 | 39 | 25 | 26 | 31 |
| 4556B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 26 | 27 | 31 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4557B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 31 | 39 | 27 | 28 | 32 |
| 4558B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 31 | 39 | 27 | 28 | 32 |
| 4559P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 35 |
| 4560P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 30 | 31 | 35 |
| 4561B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 34 | 40 |
| 458A | 27 | 23 | 32 | 48 | 42 | 30 | 28 | 33 | 48 | 22 | 22 | 30 |
| 487P | 25 | 24 | 24 | 49 | 35 | 30 | 28 | 30 | 49 | 23 | 23 | 32 |
| 514C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 23 | 23 | 31 |
| 522C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 23 | 23 | 31 |
| 525C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 23 | 23 | 32 |
| 526C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 23 | 23 | 31 |
| 531P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 34 | 34 | 41 |
| 535P | 25 | 24 | 24 | 49 | 35 | 30 | 28 | 29 | 49 | 23 | 24 | 34 |
| 537P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 34 | 34 | 41 |
| 545C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 23 | 23 | 31 |
| 560B | 19 | 16 | 19 | 39 | 35 | 28 | 28 | 27 | 39 | 26 | 27 | 36 |
| 561P | 25 | 24 | 24 | 49 | 35 | 27 | 26 | 26 | 49 | 20 | 21 | 31 |
| 568B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 27 | 39 | 26 | 27 | 37 |
| 571P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 26 | 49 | 22 | 23 | 33 |
| 575P | 25 | 24 | 24 | 49 | 35 | 27 | 26 | 26 | 49 | 21 | 22 | 33 |
| 578C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 24 | 24 | 32 |
| 581P | 25 | 24 | 24 | 49 | 35 | 28 | 26 | 26 | 49 | 21 | 22 | 33 |
| 582P | 25 | 24 | 24 | 49 | 35 | 28 | 26 | 26 | 49 | 22 | 23 | 33 |
| 584P | 25 | 24 | 24 | 49 | 35 | 27 | 26 | 26 | 49 | 21 | 22 | 33 |
| 587P | 25 | 24 | 24 | 49 | 35 | 27 | 26 | 26 | 49 | 22 | 23 | 33 |
| 588N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 28 | 40 | 21 | 21 | 30 |
| 592N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 24 | 24 | 32 |
| 598B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 27 | 39 | 26 | 27 | 36 |
| 599N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 22 | 22 | 30 |
| 601C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 24 | 24 | 32 |
| 604N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 30 | 40 | 24 | 24 | 32 |
| 610C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 24 | 24 | 32 |
| 611C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 31 | 49 | 24 | 24 | 32 |
| 621P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 27 | 49 | 23 | 24 | 35 |
| 626P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 37 | 43 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 627B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 28 | 39 | 26 | 28 | 37 |
| 630C | 29 | 27 | 28 | 49 | 36 | 33 | 31 | 32 | 49 | 25 | 25 | 32 |
| 637B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 28 | 39 | 27 | 28 | 37 |
| 639B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 26 | 39 | 25 | 26 | 35 |
| 642C | 29 | 27 | 28 | 49 | 36 | 33 | 32 | 32 | 49 | 26 | 26 | 32 |
| 647B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 26 | 39 | 25 | 26 | 36 |
| 652P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 42 | 49 | 38 | 38 | 44 |
| 663C | 29 | 27 | 28 | 49 | 36 | 33 | 31 | 32 | 49 | 26 | 26 | 33 |
| 667B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 28 | 39 | 27 | 29 | 38 |
| 671C | 29 | 27 | 28 | 49 | 36 | 33 | 32 | 32 | 49 | 26 | 26 | 32 |
| 675P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 38 | 43 |
| 680B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 28 | 39 | 27 | 28 | 38 |
| 691B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 28 | 39 | 27 | 28 | 37 |
| 692N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 27 | 26 | 35 |
| 698B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 29 | 39 | 28 | 29 | 38 |
| 703P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 38 | 39 | 44 |
| 706N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 26 | 26 | 33 |
| 713B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 29 | 39 | 28 | 29 | 39 |
| 715B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 29 | 39 | 28 | 29 | 39 |
| 716B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 29 | 39 | 28 | 29 | 38 |
| 720P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 44 |
| 725N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 30 | 36 |
| 726N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 34 |
| 748N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 27 | 27 | 34 |
| 751N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 34 |
| 775N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 26 | 27 | 33 |
| 791P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 36 | 36 | 43 |
| 799N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 26 | 26 | 32 |
| 802P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 41 | 49 | 37 | 38 | 42 |
| 824P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 28 | 29 | 35 |
| 825P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 38 | 43 |
| 843P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 851N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 24 | 24 | 30 |
| 859P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 864P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 41 | 49 | 37 | 38 | 43 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 870N | 25 | 24 | 24 | 40 | 38 | 30 | 30 | 30 | 40 | 24 | 25 | 31 |
| 874N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 40 | 33 | 34 | 39 |
| 878P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 33 | 34 | 39 |
| 881P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 33 | 38 |
| 884N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 26 | 27 | 32 |
| 900P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 901N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 26 | 27 | 33 |
| 902N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 26 | 40 | 21 | 22 | 32 |
| 911N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 27 | 27 | 33 |
| 913P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 37 | 42 |
| 928N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 26 | 26 | 33 |
| 940P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 41 |
| 943P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 33 | 34 | 38 |
| 969N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 40 | 41 | 36 | 37 | 42 |
| 972N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 23 | 23 | 29 |
| 986N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 24 | 24 | 32 |
| 995P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 998N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 20 | 21 | 28 |
| 999N | 25 | 24 | 24 | 40 | 38 | 31 | 29 | 30 | 40 | 24 | 24 | 32 |
| Boutwell ParkingB | 19 | 16 | 19 | 39 | 35 | 33 | 33 | 33 | 39 | 29 | 30 | 36 |
| Worst Case TrailB | 19 | 16 | 19 | 39 | 35 | 45 | 45 | 45 | 41 | 41 | 41 | 46 |

### TABLE 31: DISCRETE RECEPTOR RESULTS - ANNUALIZED AND STATISTICAL MODELING - ZEROES NOT AVERAGED

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1013N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 27 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1018N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 27 |
| 1020N | 25 | 24 | 24 | 40 | 38 | 27 | 27 | 27 | 40 | 20 | 21 | 27 |
| 1023N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 31 | 40 | 26 | 26 | 32 |
| 1030N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 28 |
| 1032N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 27 |
| 1033N | 25 | 24 | 24 | 40 | 38 | 27 | 26 | 27 | 40 | 20 | 20 | 27 |
| 1036N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 31 | 40 | 26 | 27 | 32 |
| 1037N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 22 | 27 |
| 1038P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 1042N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 22 | 28 |
| 1047N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 23 | 24 | 32 |
| 1048N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 24 | 25 | 30 |
| 1049N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 22 | 28 |
| 1052N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 23 | 24 | 30 |
| 1055N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 22 | 28 |
| 1056N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 23 | 24 | 30 |
| 1061N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 24 | 24 | 30 |
| 1069P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1077P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 31 | 31 | 38 |
| 1078P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1082P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1084N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 24 | 24 | 30 |
| 1088P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 41 |
| 1089B | 19 | 16 | 19 | 39 | 35 | 29 | 27 | 28 | 39 | 25 | 26 | 35 |
| 1093P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1094B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 28 | 39 | 25 | 26 | 35 |
| 1098N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 24 | 24 | 30 |
| 1099B | 19 | 16 | 19 | 39 | 35 | 29 | 27 | 28 | 39 | 25 | 26 | 35 |
| 1101B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 28 | 39 | 25 | 26 | 35 |
| 1103N | 25 | 24 | 24 | 40 | 38 | 29 | 29 | 29 | 40 | 24 | 24 | 30 |
| 1107B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 28 | 39 | 25 | 26 | 35 |
| 1113P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1115N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 23 | 24 | 32 |
| 1116B | 19 | 16 | 19 | 39 | 35 | 31 | 29 | 30 | 39 | 27 | 27 | 35 |
| 1117P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1120N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 28 | 33 |
| 1124N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 28 | 33 |
| 1126N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 27 | 33 |
| 1127P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 40 |
| 1131P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 1135N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 28 | 34 |
| 1136B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 30 | 39 | 27 | 28 | 37 |
| 1138N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 28 | 34 |
| 1141P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 37 | 49 | 32 | 32 | 39 |
| 1154B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 28 | 34 |
| 1159N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 27 | 28 | 33 |
| 1160B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 28 | 34 |
| 1161B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 35 | 39 | 30 | 30 | 38 |
| 1162B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 35 | 39 | 30 | 30 | 38 |
| 1166B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 27 | 34 |
| 1183B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 44 | 41 | 39 | 40 | 45 |
| 1186B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 36 | 39 | 30 | 32 | 37 |
| 1189N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 28 | 40 | 22 | 23 | 31 |
| 1205B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 35 | 39 | 29 | 30 | 36 |
| 1214N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 23 | 24 | 32 |
| 1216N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 29 | 40 | 23 | 25 | 32 |
| 1218N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 33 | 40 | 28 | 29 | 34 |
| 1221B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 39 | 30 | 31 | 36 |
| 1222N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 29 | 29 | 34 |
| 1231B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 35 | 39 | 29 | 30 | 36 |
| 1237W | 21 | 18 | 21 | 35 | 35 | 29 | 29 | 29 | 35 | 25 | 25 | 30 |
| 1241N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 29 | 29 | 34 |
| 1244N | 25 | 24 | 24 | 40 | 38 | 33 | 33 | 33 | 40 | 29 | 29 | 34 |
| 1245B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 29 | 30 | 36 |
| 1278W | 21 | 18 | 21 | 35 | 35 | 31 | 30 | 30 | 35 | 28 | 29 | 36 |
| 1299N | 25 | 24 | 24 | 40 | 38 | 43 | 42 | 43 | 42 | 39 | 40 | 44 |
| 1304P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1326N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 30 | 40 | 23 | 25 | 31 |
| 1349B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 1351B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1365P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1368B | 19 | 16 | 19 | 39 | 35 | 42 | 41 | 42 | 41 | 38 | 38 | 44 |
| 1370P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1373P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 34 | 38 |
| 1374P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1376P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1378P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 37 | 49 | 33 | 34 | 39 |
| 1384P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 38 |
| 1407N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1411N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1415N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1418B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 40 | 31 | 32 | 35 |
| 1433N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1434B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 34 | 40 | 31 | 32 | 35 |
| 1461B | 19 | 16 | 19 | 39 | 35 | 43 | 42 | 43 | 40 | 38 | 39 | 44 |
| 1462B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 44 | 41 | 39 | 40 | 46 |
| 1465B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 44 | 41 | 40 | 40 | 46 |
| 1475N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 19 | 20 | 27 |
| 1506B | 19 | 16 | 19 | 39 | 35 | 43 | 43 | 43 | 41 | 39 | 39 | 45 |
| 1515B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 1525B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 1532B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 27 | 28 | 35 |
| 1546B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 27 | 28 | 36 |
| 1549N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 33 | 34 | 38 |
| 1550N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 33 | 34 | 38 |
| 1553N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1555N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 38 | 40 | 34 | 36 | 41 |
| 1561N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 1565B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 37 | 42 |
| 1582N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 21 | 22 | 29 |
| 1585B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 32 | 39 | 29 | 30 | 37 |
| 1590N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 40 | 34 | 35 | 42 |
| 1595B | 19 | 16 | 19 | 39 | 35 | 33 | 31 | 33 | 39 | 29 | 29 | 36 |
| 1596N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 28 | 40 | 21 | 23 | 29 |
| 1604P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 45 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1605N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 22 | 23 | 30 |
| 1617B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 38 | 42 |
| 1622N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1624N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1634B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 41 | 37 | 38 | 43 |
| 1635B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 38 | 43 |
| 1638B | 19 | 16 | 19 | 39 | 35 | 39 | 39 | 39 | 40 | 35 | 36 | 41 |
| 1639B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 33 | 39 | 29 | 29 | 36 |
| 1643B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 38 | 42 |
| 1655B | 19 | 16 | 19 | 39 | 35 | 32 | 30 | 32 | 39 | 27 | 28 | 34 |
| 1656N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1657N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1658N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1662B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 27 | 27 | 34 |
| 1665B | 19 | 16 | 19 | 39 | 35 | 40 | 39 | 40 | 40 | 36 | 36 | 41 |
| 1671B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 32 | 39 | 29 | 30 | 37 |
| 1673W | 21 | 18 | 21 | 35 | 35 | 33 | 32 | 33 | 35 | 28 | 30 | 36 |
| 1676B | 19 | 16 | 19 | 39 | 35 | 32 | 30 | 32 | 39 | 28 | 28 | 34 |
| 1683N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1708N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 40 |
| 1716B | 19 | 16 | 19 | 39 | 35 | 32 | 32 | 32 | 39 | 29 | 30 | 37 |
| 1722N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 1728P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 1736B | 19 | 16 | 19 | 39 | 35 | 43 | 42 | 43 | 41 | 39 | 39 | 44 |
| 1738B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 37 | 42 |
| 1749B | 19 | 16 | 19 | 39 | 35 | 43 | 43 | 43 | 41 | 39 | 40 | 45 |
| 1753B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 33 | 39 | 29 | 29 | 36 |
| 1759N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1761N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1780N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1783N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1784N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1787N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 1791N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1793N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1800P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 1802N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1821N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 1822N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 1836N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 34 | 34 | 39 |
| 1840N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 34 | 34 | 39 |
| 1841N | 25 | 24 | 24 | 40 | 38 | 37 | 37 | 37 | 41 | 34 | 34 | 39 |
| 1845N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 34 | 40 |
| 1856B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 32 | 39 | 29 | 30 | 39 |
| 1857N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 41 | 34 | 34 | 39 |
| 1860B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 31 | 39 | 29 | 30 | 39 |
| 1866B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 40 | 40 | 36 | 36 | 42 |
| 1868P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 38 | 42 |
| 1878P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 40 | 44 |
| 1880P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 40 | 44 |
| 1884P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 1904N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 31 | 33 | 38 |
| 1916P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 31 | 36 |
| 191B | 19 | 16 | 19 | 39 | 35 | 35 | 33 | 36 | 39 | 30 | 30 | 38 |
| 1930N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 41 | 35 | 35 | 40 |
| 1937P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 29 | 31 | 36 |
| 1939P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 37 | 42 |
| 1940C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 29 | 30 | 35 |
| 1947P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 37 | 42 |
| 1952P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 39 | 44 |
| 1965P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 43 | 49 | 38 | 39 | 43 |
| 1974P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 31 | 36 |
| 1981N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 30 | 31 | 37 |
| 1982N | 25 | 24 | 24 | 40 | 38 | 36 | 34 | 36 | 40 | 30 | 31 | 37 |
| 1988P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 33 | 38 |
| 1993P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 43 |
| 1995P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 2001A | 27 | 23 | 32 | 48 | 42 | 35 | 34 | 36 | 48 | 31 | 31 | 35 |
| 2006P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 2009B | 19 | 16 | 19 | 39 | 35 | 38 | 36 | 38 | 40 | 34 | 34 | 41 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011C | 29 | 27 | 28 | 49 | 36 | 35 | 33 | 35 | 49 | 29 | 30 | 35 |
| 2012P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 39 | 44 |
| 2013P | 25 | 24 | 24 | 49 | 35 | 35 | 33 | 34 | 49 | 29 | 30 | 35 |
| 2018B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 40 | 40 | 35 | 36 | 42 |
| 2019P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 39 | 43 |
| 2020A | 27 | 23 | 32 | 48 | 42 | 35 | 34 | 36 | 48 | 31 | 31 | 35 |
| 2021P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 202P | 25 | 24 | 24 | 49 | 35 | 35 | 33 | 35 | 49 | 29 | 29 | 38 |
| 2032P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 39 | 40 | 45 |
| 2037B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 37 | 37 | 44 |
| 2038P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 35 | 40 |
| 2040P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 33 | 34 | 40 |
| 2046P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 37 |
| 2047P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 37 | 42 |
| 2048P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 2049P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 2053C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 28 | 29 | 34 |
| 2055P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 2063P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 2064P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 40 |
| 2065N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 31 | 37 |
| 2067C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 29 | 29 | 34 |
| 2068C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2071P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 2073P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 37 |
| 2084P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 37 |
| 2086B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 34 | 40 |
| 2087P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 34 | 38 |
| 2088N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 31 | 36 |
| 208P | 25 | 24 | 24 | 49 | 35 | 35 | 33 | 35 | 49 | 29 | 29 | 38 |
| 2090P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 30 | 32 | 37 |
| 2091C | 29 | 27 | 28 | 49 | 36 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2093P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 43 |
| 2096B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 34 | 41 |
| 2099P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2100B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 39 |
| 2102P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 30 | 31 | 35 |
| 2112N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 2120B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 39 |
| 2123P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 35 |
| 2131P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 40 |
| 2132P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 37 | 37 | 41 |
| 2135P | 25 | 24 | 24 | 49 | 35 | 35 | 33 | 34 | 49 | 29 | 30 | 35 |
| 2136P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 36 | 38 | 42 |
| 2141W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 36 | 31 | 31 | 37 |
| 2142B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 37 |
| 2150B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 30 | 31 | 36 |
| 2151B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 37 |
| 2153P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 2156P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 2161B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 36 |
| 2162W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 36 | 31 | 32 | 38 |
| 2164B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 35 | 42 |
| 2166P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 36 | 36 | 42 |
| 2168P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 2172B | 19 | 16 | 19 | 39 | 35 | 40 | 38 | 40 | 40 | 36 | 36 | 42 |
| 2174B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 36 | 41 |
| 2175B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 35 | 41 |
| 2185N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 29 | 31 | 36 |
| 2189P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |
| 2198P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |
| 2199B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 31 | 32 | 39 |
| 219P | 25 | 24 | 24 | 49 | 35 | 35 | 33 | 35 | 49 | 30 | 30 | 38 |
| 2201P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |
| 2202B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 37 |
| 2203B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 31 | 32 | 39 |
| 2206P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |
| 2208P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 42 |
| 2209B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 37 |
| 220B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 36 | 39 | 30 | 30 | 39 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2214B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 33 | 39 | 31 | 32 | 39 |
| 2215B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 37 |
| 2217B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 36 |
| 2220W | 21 | 18 | 21 | 35 | 35 | 40 | 40 | 40 | 37 | 36 | 37 | 41 |
| 2231N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 34 | 40 | 28 | 29 | 35 |
| 2263N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 2264N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 2266P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 2285N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 33 | 40 | 27 | 28 | 34 |
| 2296B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 26 | 27 | 33 |
| 2300W | 21 | 18 | 21 | 35 | 35 | 39 | 38 | 39 | 38 | 35 | 36 | 42 |
| 2308C | 29 | 27 | 28 | 49 | 36 | 35 | 34 | 35 | 49 | 30 | 31 | 35 |
| 2317N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 34 | 39 |
| 2322N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 26 | 27 | 33 |
| 2326N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 34 | 39 |
| 2334P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 32 | 36 |
| 2337B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 35 | 40 | 33 | 34 | 41 |
| 2338B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 35 | 40 | 33 | 34 | 41 |
| 2347P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 2349P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 234P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 35 | 49 | 29 | 29 | 37 |
| 2352P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 2353P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 235P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 29 | 36 |
| 2360N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 39 |
| 2361N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 39 |
| 2366P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2371N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 32 | 37 |
| 2374N | 25 | 24 | 24 | 40 | 38 | 31 | 30 | 31 | 40 | 24 | 26 | 31 |
| 2378N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 30 | 40 | 23 | 25 | 30 |
| 2379N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 33 | 38 |
| 2387N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 33 | 37 |
| 2397B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 34 | 35 | 42 |
| 2402P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 31 | 35 |
| 2411B | 19 | 16 | 19 | 39 | 35 | 40 | 39 | 39 | 40 | 35 | 37 | 44 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2412P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2413P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 34 | 49 | 30 | 31 | 35 |
| 2414P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 30 | 31 | 35 |
| 2420P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2421B | 19 | 16 | 19 | 39 | 35 | 39 | 38 | 39 | 40 | 35 | 36 | 44 |
| 2422P | 25 | 24 | 24 | 49 | 35 | 34 | 34 | 34 | 49 | 29 | 30 | 34 |
| 2439P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2447N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 35 |
| 2451P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2456P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 30 | 34 |
| 2458P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 28 | 30 | 34 |
| 2461P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 27 | 29 | 33 |
| 2467N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 38 |
| 2473P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 33 |
| 2478N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 34 |
| 2480N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 34 |
| 2500B | 19 | 16 | 19 | 39 | 35 | 41 | 41 | 41 | 41 | 38 | 39 | 44 |
| 2501P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2502P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 28 | 29 | 34 |
| 2508P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 34 |
| 2514W | 21 | 18 | 21 | 35 | 35 | 32 | 31 | 32 | 35 | 27 | 28 | 32 |
| 2525P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 34 | 40 |
| 2527P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 33 |
| 2528P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 33 |
| 2529P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 29 | 29 | 34 |
| 2533P | 25 | 24 | 24 | 49 | 35 | 33 | 33 | 33 | 49 | 29 | 30 | 33 |
| 2539P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 28 | 29 | 33 |
| 2540N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 41 | 35 | 35 | 40 |
| 2542N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 41 | 35 | 35 | 40 |
| 2545N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 41 | 34 | 35 | 39 |
| 2558P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 37 | 44 |
| 2559N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 29 | 29 | 36 |
| 2561N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2568N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 31 | 40 | 28 | 29 | 36 |
| 2582P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 32 | 49 | 28 | 29 | 35 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2605N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2608N | 25 | 24 | 24 | 40 | 38 | 32 | 32 | 32 | 40 | 28 | 29 | 36 |
| 2612B | 19 | 16 | 19 | 39 | 35 | 41 | 39 | 40 | 40 | 36 | 37 | 43 |
| 2614N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 29 | 30 | 36 |
| 2616P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 35 |
| 2617P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 32 | 49 | 28 | 29 | 36 |
| 2618P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 41 |
| 2620P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 41 |
| 2625P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 32 | 49 | 28 | 29 | 36 |
| 2626P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 41 |
| 2631N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 34 | 40 | 30 | 30 | 36 |
| 2632N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 28 | 28 | 34 |
| 2635N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 34 | 40 | 29 | 30 | 36 |
| 2637N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 31 | 31 | 37 |
| 2640N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 34 | 40 | 30 | 31 | 37 |
| 2642N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 31 | 31 | 37 |
| 2644N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 31 | 31 | 37 |
| 2646N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 34 |
| 2648P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2653P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2658N | 25 | 24 | 24 | 40 | 38 | 34 | 33 | 34 | 40 | 30 | 30 | 36 |
| 2659N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 28 | 29 | 35 |
| 2665P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2671P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2675P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 31 | 49 | 27 | 28 | 36 |
| 2698P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 41 |
| 2703B | 19 | 16 | 19 | 39 | 35 | 41 | 40 | 41 | 40 | 36 | 38 | 42 |
| 2707P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 36 | 37 | 41 |
| 2719P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 2725N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 32 | 38 |
| 2728N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 32 | 38 |
| 2731P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 2735P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 44 |
| 2736P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 2751P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 40 | 45 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2754B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 39 |
| 2755N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 42 | 42 | 38 | 38 | 44 |
| 2770B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 39 |
| 2775P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 2784B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 35 | 39 |
| 2786P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 26 | 27 | 35 |
| 2789B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 35 | 39 |
| 2793N | 25 | 24 | 24 | 40 | 38 | 42 | 42 | 42 | 42 | 39 | 40 | 43 |
| 2795N | 25 | 24 | 24 | 40 | 38 | 42 | 42 | 42 | 42 | 39 | 40 | 43 |
| 2808P | 25 | 24 | 24 | 49 | 35 | 31 | 31 | 31 | 49 | 27 | 28 | 37 |
| 2815B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 35 | 38 |
| 2816B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 37 | 40 | 34 | 35 | 38 |
| 2817B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 34 | 35 | 38 |
| 2819P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 28 | 29 | 37 |
| 2822P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 30 | 31 | 40 |
| 2824P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 30 | 31 | 40 |
| 2832P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 31 | 32 | 40 |
| 2836N | 25 | 24 | 24 | 40 | 38 | 38 | 36 | 37 | 41 | 33 | 34 | 40 |
| 2844N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 41 | 33 | 34 | 40 |
| 2847N | 25 | 24 | 24 | 40 | 38 | 38 | 36 | 38 | 41 | 33 | 34 | 40 |
| 2865P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 32 | 49 | 30 | 31 | 39 |
| 2874N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 38 | 43 |
| 2877N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 41 | 34 | 35 | 40 |
| 2886B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 34 | 34 | 38 |
| 2890P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 36 | 41 |
| 2894B | 19 | 16 | 19 | 39 | 35 | 37 | 37 | 37 | 40 | 34 | 34 | 38 |
| 2898P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 2903P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 42 |
| 2905P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 30 | 31 | 40 |
| 2907N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 41 | 34 | 35 | 40 |
| 2908N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 38 | 43 |
| 2911N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 40 | 41 | 37 | 38 | 43 |
| 2920N | 25 | 24 | 24 | 40 | 38 | 40 | 40 | 40 | 41 | 36 | 37 | 43 |
| 2923N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 40 | 41 | 37 | 38 | 43 |
| 2945B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 37 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2948B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 37 |
| 2949P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 31 | 32 | 40 |
| 2957B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 37 |
| 2975N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 41 | 35 | 36 | 41 |
| 3008W | 21 | 18 | 21 | 35 | 35 | 33 | 32 | 32 | 36 | 30 | 31 | 39 |
| 300B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 36 | 39 | 31 | 31 | 39 |
| 3011W | 21 | 18 | 21 | 35 | 35 | 33 | 32 | 32 | 36 | 30 | 31 | 39 |
| 3018W | 21 | 18 | 21 | 35 | 35 | 32 | 32 | 31 | 36 | 30 | 31 | 39 |
| 3067N | 25 | 24 | 24 | 40 | 38 | 40 | 39 | 40 | 41 | 36 | 36 | 42 |
| 3084N | 25 | 24 | 24 | 40 | 38 | 40 | 39 | 39 | 41 | 36 | 37 | 42 |
| 3087P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 40 | 49 | 36 | 37 | 42 |
| 3092N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 34 | 35 | 42 |
| 3095N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 38 | 41 | 35 | 36 | 43 |
| 309B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 36 | 39 | 31 | 31 | 39 |
| 3107P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 34 | 49 | 32 | 34 | 42 |
| 3110P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 34 | 49 | 32 | 34 | 42 |
| 3112P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 39 | 44 |
| 3124P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 3128P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 3131P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 3132P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3135P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 35 | 40 |
| 3146P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 33 | 38 |
| 3149N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 42 |
| 3150P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 3151N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 42 | 37 | 38 | 43 |
| 3152P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 33 | 38 |
| 3153P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 43 |
| 3156P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 3157P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 35 | 40 |
| 3158P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3159P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 33 | 33 | 38 |
| 3161N | 25 | 24 | 24 | 40 | 38 | 39 | 37 | 38 | 40 | 34 | 36 | 42 |
| 3162P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 31 | 36 |
| 3179N | 25 | 24 | 24 | 40 | 38 | 43 | 42 | 42 | 42 | 39 | 40 | 44 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3183P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 37 | 42 |
| 3204N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 42 |
| 3206N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 42 |
| 322B | 19 | 16 | 19 | 39 | 35 | 38 | 36 | 38 | 39 | 33 | 32 | 41 |
| 3239N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 34 | 35 | 42 |
| 3247W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 36 | 30 | 32 | 39 |
| 3248P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 43 |
| 3250P | 25 | 24 | 24 | 49 | 35 | 40 | 38 | 39 | 49 | 35 | 36 | 43 |
| 3276P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 37 | 49 | 32 | 33 | 38 |
| 3282P | 25 | 24 | 24 | 49 | 35 | 36 | 36 | 36 | 49 | 32 | 33 | 37 |
| 3293P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 32 | 32 | 37 |
| 3298P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 32 | 32 | 37 |
| 3305P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 45 |
| 3316P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 32 | 32 | 37 |
| 3321N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 33 | 34 | 41 |
| 3331N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 41 |
| 3343N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 37 | 40 | 33 | 34 | 40 |
| 3350N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 33 | 34 | 41 |
| 3353P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 3359N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 40 | 33 | 34 | 41 |
| 3373P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 38 | 38 | 43 |
| 3379W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 36 | 30 | 32 | 38 |
| 3382P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3391B | 19 | 16 | 19 | 39 | 35 | 44 | 43 | 44 | 41 | 40 | 41 | 45 |
| 3397P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 36 | 38 | 43 |
| 3406P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3407P | 25 | 24 | 24 | 49 | 35 | 33 | 31 | 32 | 49 | 27 | 28 | 35 |
| 3425N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 34 | 40 |
| 3434P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 32 | 49 | 26 | 28 | 35 |
| 3443P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 40 | 44 |
| 3448P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 33 | 49 | 28 | 30 | 37 |
| 3455P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 38 | 42 |
| 3458P | 25 | 24 | 24 | 49 | 35 | 32 | 30 | 31 | 49 | 26 | 27 | 34 |
| 3459P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 42 |
| 3460P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 27 | 35 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3473P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 40 | 44 |
| 3484P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 39 | 43 |
| 3490P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 3492P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3499N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 38 | 42 |
| 3501P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 40 | 44 |
| 3503P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 45 |
| 3505P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 45 |
| 3513P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 40 | 45 |
| 3514P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 32 | 40 |
| 3517P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3518P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 45 |
| 3519P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 39 | 40 | 44 |
| 3521P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 40 | 45 |
| 3522P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 37 | 41 |
| 3523P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3524P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 44 |
| 3526P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 31 | 33 | 40 |
| 3530P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 35 | 49 | 32 | 33 | 40 |
| 3532P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3535P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 39 | 39 | 43 |
| 3541P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 28 | 35 |
| 3544P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 27 | 35 |
| 3552N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 32 | 33 | 39 |
| 3555N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 36 | 40 | 32 | 33 | 39 |
| 3556P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3558P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3560P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 41 |
| 3561P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 3564P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 31 | 49 | 26 | 27 | 34 |
| 3567P | 25 | 24 | 24 | 49 | 35 | 37 | 36 | 36 | 49 | 32 | 34 | 42 |
| 3571P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 28 | 35 |
| 3603P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 41 |
| 3604P | 25 | 24 | 24 | 49 | 35 | 32 | 31 | 31 | 49 | 26 | 28 | 35 |
| 3605N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 41 | 35 | 36 | 40 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3606P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 39 | 49 | 35 | 36 | 41 |
| 3612P | 25 | 24 | 24 | 49 | 35 | 31 | 30 | 30 | 49 | 26 | 27 | 35 |
| 3615P | 25 | 24 | 24 | 49 | 35 | 30 | 29 | 29 | 49 | 25 | 26 | 34 |
| 3619P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 36 | 40 |
| 3620P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 35 | 40 |
| 3631N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 31 | 32 | 37 |
| 3636N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 31 | 32 | 37 |
| 363B | 19 | 16 | 19 | 39 | 35 | 26 | 24 | 25 | 39 | 22 | 23 | 32 |
| 3643N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 31 | 32 | 37 |
| 3648N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 41 | 34 | 35 | 39 |
| 364P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 35 | 49 | 30 | 30 | 38 |
| 3655N | 25 | 24 | 24 | 40 | 38 | 38 | 38 | 38 | 41 | 34 | 35 | 39 |
| 3674W | 21 | 18 | 21 | 35 | 35 | 43 | 42 | 43 | 39 | 39 | 40 | 44 |
| 3676W | 21 | 18 | 21 | 35 | 35 | 43 | 42 | 43 | 39 | 39 | 40 | 44 |
| 3678N | 25 | 24 | 24 | 40 | 38 | 36 | 34 | 36 | 40 | 30 | 31 | 37 |
| 3682P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 40 |
| 3689N | 25 | 24 | 24 | 40 | 38 | 38 | 37 | 38 | 41 | 34 | 34 | 38 |
| 3693P | 25 | 24 | 24 | 49 | 35 | 29 | 27 | 28 | 49 | 22 | 23 | 30 |
| 3700P | 25 | 24 | 24 | 49 | 35 | 29 | 27 | 28 | 49 | 22 | 23 | 31 |
| 3703P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3708P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 41 | 45 |
| 3711P | 25 | 24 | 24 | 49 | 35 | 44 | 44 | 44 | 49 | 40 | 41 | 46 |
| 3712P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 34 | 35 | 39 |
| 3713N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 31 | 36 |
| 3717N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 31 | 36 |
| 371P | 25 | 24 | 24 | 49 | 35 | 35 | 34 | 36 | 49 | 30 | 30 | 38 |
| 3720N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 3721N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 33 | 38 |
| 3722N | 25 | 24 | 24 | 40 | 38 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 3728P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 37 | 38 | 42 |
| 3733P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 36 | 41 |
| 3734P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3735P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 42 |
| 3736P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3737P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 34 | 34 | 39 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3738P | 25 | 24 | 24 | 49 | 35 | 44 | 44 | 44 | 49 | 40 | 41 | 45 |
| 3739P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 28 | 30 | 37 |
| 3740P | 25 | 24 | 24 | 49 | 35 | 44 | 43 | 44 | 49 | 40 | 40 | 45 |
| 3741P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3742P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 44 | 49 | 40 | 40 | 44 |
| 3743P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3744P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 44 |
| 3765N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 33 | 37 |
| 3766N | 25 | 24 | 24 | 40 | 38 | 36 | 35 | 36 | 40 | 32 | 33 | 37 |
| 3770N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 3771N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 3772B | 19 | 16 | 19 | 39 | 35 | 35 | 35 | 35 | 39 | 31 | 32 | 36 |
| 3773B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 39 | 30 | 31 | 35 |
| 3774B | 19 | 16 | 19 | 39 | 35 | 33 | 32 | 33 | 39 | 29 | 30 | 34 |
| 3775B | 19 | 16 | 19 | 39 | 35 | 34 | 33 | 34 | 39 | 30 | 31 | 35 |
| 3776B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 30 | 31 | 35 |
| 3777B | 19 | 16 | 19 | 39 | 35 | 34 | 34 | 34 | 39 | 30 | 31 | 35 |
| 3778W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 31 | 36 |
| 3779W | 21 | 18 | 21 | 35 | 35 | 33 | 33 | 33 | 35 | 29 | 30 | 34 |
| 377B | 19 | 16 | 19 | 39 | 35 | 32 | 30 | 30 | 39 | 28 | 29 | 39 |
| 3780W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 31 | 36 |
| 3781W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 31 | 36 |
| 3782W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 31 | 36 |
| 3783W | 21 | 18 | 21 | 35 | 35 | 34 | 33 | 34 | 35 | 29 | 30 | 35 |
| 3784P | 25 | 24 | 24 | 49 | 35 | 41 | 40 | 41 | 49 | 36 | 37 | 42 |
| 3785P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 381B | 19 | 16 | 19 | 39 | 35 | 33 | 31 | 31 | 39 | 29 | 30 | 40 |
| 383B | 19 | 16 | 19 | 39 | 35 | 26 | 24 | 25 | 39 | 22 | 23 | 32 |
| 3843P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3844P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 3845P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3846P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3847P | 25 | 24 | 24 | 49 | 35 | 39 | 39 | 39 | 49 | 35 | 36 | 40 |
| 3854P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 43 |
| 3856P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 39 | 43 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3858N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 29 | 31 | 36 |
| 3865B | 19 | 16 | 19 | 39 | 35 | 36 | 35 | 36 | 39 | 32 | 33 | 37 |
| 3866B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 33 | 38 |
| 3867N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 3868N | 25 | 24 | 24 | 40 | 38 | 36 | 36 | 36 | 40 | 32 | 33 | 37 |
| 3869B | 19 | 16 | 19 | 39 | 35 | 42 | 41 | 42 | 41 | 38 | 38 | 43 |
| 387B | 19 | 16 | 19 | 39 | 35 | 26 | 24 | 25 | 39 | 22 | 23 | 32 |
| 3891P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 35 | 35 | 40 |
| 391B | 19 | 16 | 19 | 39 | 35 | 35 | 34 | 35 | 39 | 32 | 32 | 41 |
| 396P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 31 | 39 |
| 400B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 31 | 39 | 29 | 30 | 40 |
| 405B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 35 | 39 | 32 | 33 | 42 |
| 406P | 25 | 24 | 24 | 49 | 35 | 36 | 35 | 36 | 49 | 31 | 31 | 39 |
| 4178B | 19 | 16 | 19 | 39 | 35 | 26 | 24 | 25 | 39 | 22 | 23 | 32 |
| 4389P | 25 | 24 | 24 | 49 | 35 | 33 | 31 | 33 | 49 | 28 | 28 | 36 |
| 4390P | 25 | 24 | 24 | 49 | 35 | 34 | 32 | 34 | 49 | 29 | 28 | 36 |
| 4395B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 36 | 39 | 31 | 30 | 39 |
| 4396B | 19 | 16 | 19 | 39 | 35 | 36 | 34 | 36 | 39 | 30 | 30 | 39 |
| 451W | 21 | 18 | 21 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 30 | 36 |
| 4537P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 32 | 34 | 38 |
| 4539P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 4540P | 25 | 24 | 24 | 49 | 35 | 38 | 38 | 38 | 49 | 34 | 35 | 39 |
| 4543B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 4544B | 19 | 16 | 19 | 39 | 35 | 37 | 36 | 37 | 40 | 33 | 34 | 38 |
| 4545P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 27 | 28 | 34 |
| 4546P | 25 | 24 | 24 | 49 | 35 | 33 | 32 | 33 | 49 | 26 | 27 | 33 |
| 4547P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 28 | 29 | 35 |
| 4555B | 19 | 16 | 19 | 39 | 35 | 30 | 30 | 30 | 39 | 26 | 27 | 31 |
| 4556B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 31 | 39 | 27 | 27 | 32 |
| 4557B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 28 | 28 | 33 |
| 4558B | 19 | 16 | 19 | 39 | 35 | 32 | 31 | 32 | 39 | 27 | 28 | 32 |
| 4559P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 4560P | 25 | 24 | 24 | 49 | 35 | 35 | 35 | 35 | 49 | 31 | 32 | 36 |
| 4561B | 19 | 16 | 19 | 39 | 35 | 38 | 37 | 38 | 40 | 35 | 35 | 41 |
| 458A | 27 | 23 | 32 | 48 | 42 | 30 | 28 | 34 | 48 | 23 | 23 | 31 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 487P | 25 | 24 | 24 | 49 | 35 | 31 | 29 | 31 | 49 | 24 | 24 | 32 |
| 514C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 23 | 32 |
| 522C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 23 | 32 |
| 525C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 24 | 33 |
| 526C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 23 | 32 |
| 531P | 25 | 24 | 24 | 49 | 35 | 39 | 38 | 39 | 49 | 34 | 35 | 41 |
| 535P | 25 | 24 | 24 | 49 | 35 | 30 | 28 | 29 | 49 | 24 | 24 | 33 |
| 537P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 35 | 35 | 42 |
| 545C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 24 | 33 |
| 560B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 27 | 39 | 26 | 27 | 36 |
| 561P | 25 | 24 | 24 | 49 | 35 | 27 | 26 | 26 | 49 | 20 | 21 | 31 |
| 568B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 28 | 39 | 26 | 28 | 37 |
| 571P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 26 | 49 | 22 | 23 | 33 |
| 575P | 25 | 24 | 24 | 49 | 35 | 28 | 26 | 26 | 49 | 21 | 22 | 32 |
| 578C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 24 | 33 |
| 581P | 25 | 24 | 24 | 49 | 35 | 28 | 26 | 26 | 49 | 22 | 23 | 33 |
| 582P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 27 | 49 | 22 | 23 | 33 |
| 584P | 25 | 24 | 24 | 49 | 35 | 28 | 26 | 26 | 49 | 21 | 22 | 32 |
| 587P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 26 | 49 | 22 | 23 | 33 |
| 588N | 25 | 24 | 24 | 40 | 38 | 29 | 27 | 29 | 40 | 22 | 22 | 30 |
| 592N | 25 | 24 | 24 | 40 | 38 | 31 | 29 | 31 | 40 | 25 | 24 | 33 |
| 598B | 19 | 16 | 19 | 39 | 35 | 29 | 28 | 27 | 39 | 26 | 28 | 36 |
| 599N | 25 | 24 | 24 | 40 | 38 | 30 | 28 | 29 | 40 | 23 | 23 | 31 |
| 601C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 25 | 24 | 33 |
| 604N | 25 | 24 | 24 | 40 | 38 | 31 | 29 | 31 | 40 | 24 | 24 | 33 |
| 610C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 25 | 24 | 33 |
| 611C | 29 | 27 | 28 | 49 | 36 | 32 | 30 | 32 | 49 | 24 | 24 | 33 |
| 621P | 25 | 24 | 24 | 49 | 35 | 28 | 27 | 27 | 49 | 23 | 24 | 34 |
| 626P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 37 | 37 | 44 |
| 627B | 19 | 16 | 19 | 39 | 35 | 30 | 28 | 28 | 39 | 27 | 28 | 37 |
| 630C | 29 | 27 | 28 | 49 | 36 | 33 | 31 | 33 | 49 | 26 | 26 | 33 |
| 637B | 19 | 16 | 19 | 39 | 35 | 30 | 28 | 28 | 39 | 27 | 28 | 37 |
| 639B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 26 | 35 |
| 642C | 29 | 27 | 28 | 49 | 36 | 33 | 31 | 33 | 49 | 26 | 26 | 33 |
| 647B | 19 | 16 | 19 | 39 | 35 | 28 | 27 | 27 | 39 | 25 | 27 | 35 |

| Receptor | Daytime Ambient Noise Level (L90 dBA) | Summer Nighttime Ambient Noise Level (L90 dBA) | Winter Nighttime Ambient Noise Level (L90 dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 652P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 663C | 29 | 27 | 28 | 49 | 36 | 33 | 31 | 33 | 49 | 26 | 26 | 33 |
| 667B | 19 | 16 | 19 | 39 | 35 | 31 | 29 | 29 | 39 | 28 | 29 | 38 |
| 671C | 29 | 27 | 28 | 49 | 36 | 33 | 32 | 33 | 49 | 26 | 26 | 33 |
| 675P | 25 | 24 | 24 | 49 | 35 | 43 | 42 | 43 | 49 | 38 | 39 | 44 |
| 680B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 29 | 39 | 27 | 29 | 37 |
| 691B | 19 | 16 | 19 | 39 | 35 | 30 | 29 | 29 | 39 | 27 | 28 | 37 |
| 692N | 25 | 24 | 24 | 40 | 38 | 33 | 31 | 33 | 40 | 27 | 27 | 35 |
| 698B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 28 | 29 | 38 |
| 703P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 39 | 45 |
| 706N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 34 |
| 713B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 28 | 29 | 38 |
| 715B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 28 | 30 | 38 |
| 716B | 19 | 16 | 19 | 39 | 35 | 31 | 30 | 30 | 39 | 28 | 30 | 38 |
| 720P | 25 | 24 | 24 | 49 | 35 | 43 | 43 | 43 | 49 | 39 | 40 | 45 |
| 725N | 25 | 24 | 24 | 40 | 38 | 35 | 34 | 35 | 40 | 30 | 30 | 37 |
| 726N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 27 | 28 | 34 |
| 748N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 33 | 40 | 28 | 28 | 35 |
| 751N | 25 | 24 | 24 | 40 | 38 | 33 | 32 | 32 | 40 | 27 | 28 | 34 |
| 775N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 34 |
| 791P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 41 | 49 | 37 | 37 | 43 |
| 799N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 33 |
| 802P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 824P | 25 | 24 | 24 | 49 | 35 | 34 | 33 | 34 | 49 | 29 | 29 | 35 |
| 825P | 25 | 24 | 24 | 49 | 35 | 42 | 42 | 42 | 49 | 38 | 39 | 44 |
| 843P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 42 | 49 | 37 | 38 | 43 |
| 851N | 25 | 24 | 24 | 40 | 38 | 30 | 29 | 30 | 40 | 25 | 25 | 31 |
| 859P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 43 |
| 864P | 25 | 24 | 24 | 49 | 35 | 42 | 41 | 42 | 49 | 38 | 38 | 43 |
| 870N | 25 | 24 | 24 | 40 | 38 | 30 | 30 | 30 | 40 | 25 | 25 | 32 |
| 874N | 25 | 24 | 24 | 40 | 38 | 39 | 38 | 39 | 40 | 34 | 34 | 40 |
| 878P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 34 | 34 | 39 |
| 881P | 25 | 24 | 24 | 49 | 35 | 37 | 37 | 37 | 49 | 33 | 34 | 39 |
| 884N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 33 |
| 900P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |

| Receptor | Daytime Ambient Noise Level ($L_{90}$ dBA) | Summer Nighttime Ambient Noise Level ($L_{90}$ dBA) | Winter Nighttime Ambient Noise Level ($L_{90}$ dBA) | Daytime Ambient Average Noise Level (Leq dBA) | Nighttime Ambient Average Noise Level (Leq dBA) | Worst Case Daytime Future Noise Level (dBA) | Worst Case Summer Nighttime Future Noise Level (dBA) | Worst Case Winter Nighttime Future Noise Level (dBA) | Typical Facility Noise Levels (dBA) | Modeled Overall Leq (dBA) | Modeled Overall $L_{night}$ (dBA) | Modeled Maximum $L_{(8)}$ (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 34 |
| 902N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 23 | 32 |
| 911N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 34 |
| 913P | 25 | 24 | 24 | 49 | 35 | 41 | 41 | 41 | 49 | 37 | 38 | 43 |
| 928N | 25 | 24 | 24 | 40 | 38 | 32 | 31 | 32 | 40 | 27 | 27 | 34 |
| 940P | 25 | 24 | 24 | 49 | 35 | 40 | 39 | 40 | 49 | 36 | 36 | 41 |
| 943P | 25 | 24 | 24 | 49 | 35 | 38 | 37 | 38 | 49 | 34 | 34 | 39 |
| 969N | 25 | 24 | 24 | 40 | 38 | 41 | 40 | 41 | 41 | 37 | 37 | 42 |
| 972N | 25 | 24 | 24 | 40 | 38 | 29 | 28 | 29 | 40 | 23 | 24 | 30 |
| 986N | 25 | 24 | 24 | 40 | 38 | 31 | 29 | 31 | 40 | 25 | 25 | 33 |
| 995P | 25 | 24 | 24 | 49 | 35 | 40 | 40 | 40 | 49 | 36 | 37 | 41 |
| 998N | 25 | 24 | 24 | 40 | 38 | 28 | 27 | 27 | 40 | 21 | 21 | 27 |
| 999N | 25 | 24 | 24 | 40 | 38 | 31 | 29 | 31 | 40 | 25 | 25 | 33 |
| Boutwell Parking B | 19 | 16 | 19 | 39 | 35 | 33 | 33 | 33 | 39 | 30 | 30 | 36 |
| Worst Case TrailB | 19 | 16 | 19 | 39 | 35 | 45 | 45 | 45 | 42 | 41 | 42 | 46 |

**TABLE 32: SOUND LEVEL LIMITS AND GUIDELIENS APPLICABLE TO CASSADAGA WIND**

| **Municipality/Organization** | **Standard or Guideline** | **Overall Level** | **Metric** | **Tonal Penalty** | **Does Project Comply with Standard/Guideline** |
|---|---|---|---|---|---|
| Town of Arkwright | Standard | 50 dBA or Ambient Sound Level plus 5 dB if the Ambient Sound Level is Above 48 dBA | $L_{10}$ | 5 dB | Yes |
| Town of Charlotte | Standard | 50 dBA or Ambient Sound Level plus 5 dB if the Ambient Sound Level is Above 50 dBA | $L_{10}$ | 5 dB | Yes |
| Town of Cherry Creek | Standard | 50 dBA or Ambient Sound Level plus 5 dB if the Ambient Sound Level is Above 50 dBA | $L_{10}$ | 5 dB | Yes |
| NYSDEC | Guideline | 55 dBA $L_{dn}$/ Ambient Sound Level plus 6 dB | $L_{dn}$ | - | Yes/Yes[75] |
| NYSDPS Chapter 10 | Guideline | - | - | - | - |
| Word Health Organization (Night) | Guideline | 45 dBA | $L_{(8)}$ - $L_{EQ}$ Averaged Over the Night | - | Yes |
| World Health Organization (Day) | Guideline | 55 dBA | $L_{(16)}$ - $L_{EQ}$ Averaged Over the Day | - | Yes |
| Environmental Protection Agency | Guideline | 55 dBA | $L_{dn}$ | - | Yes |

[75] Comparing modeled annual $L_{EQ}$ to monitored overall $L_{EQ}$

| Municipality/Organization | Standard or Guideline | Overall Level | Metric | Tonal Penalty | Does Project Comply with Standard/Guideline |
|---|---|---|---|---|---|
| Federal Interagency Task Force | Guideline | 55 to 65 dBA | $L_{dn}$ | - | Yes |

# APPENDIX E: GLOSSARY OF TERMS

This section includes terms used in this report that might not be explained elsewhere.

Accuracy — A measure of how close an estimate is to the true value.

Ambient — The ANSI S1.1 definition is the "all-encompassing sound at a given place, usually a composite of sounds from many sources near and far." "Ambient" is sometimes used as meaning the background sound level, as in the Arkwright, Cherry Creek, and Charlotte noise regulations.

Amplitude Modulation – with respect to wind turbine sound, a regular pattern of increasing and decreasing sound with a period roughly equal to the blade passage frequency (generally less than one-second). Qualitatively, this is sometimes described as "swishing", "thumping", or "churning."

Atmospheric Stability – A condition related to the tendency of air in the atmosphere to move vertically. Unstable atmospheres, such as where the ground is heated, have greater vertical movement of air, and are potentially more turbulent. Stable air, such as under a nighttime temperature inversion, resists the vertical movement of air. Neutral stability, such as on a cloudy day or night, is typically characterized by a normal change in temperature with height (where the actual temperature lapse rate is the same as the dry adiabatic lapse rate of 1°C per 100 meters of lift).

Audible — For the purposes of this report, able to be heard by ontologically normal healthy young adults (18 to 25 years), according to ISO 389-7 (see Figure 123). The frequency range of nominally audible sound is 20 Hz to 20,000 Hz. For infrasound (below 20 Hz), audibility/perceptibility is defined in this report according to the 90-dBG curve of ISO 7196 (Figure 93).

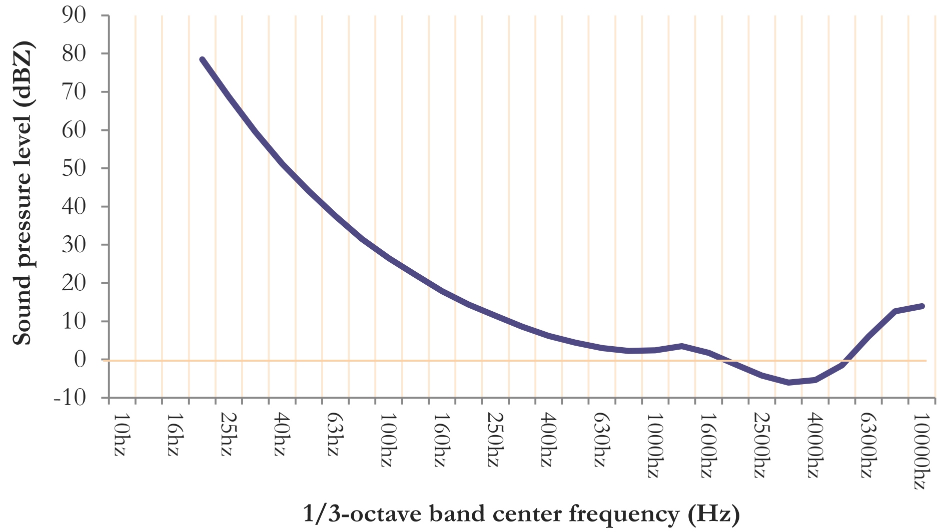


**FIGURE 123: ISO 387-7 AUDIBILITY CURVE IN A FREE FIELD**

Background Sound Level – the sound level in absence of the source of interest. In this case, it is the level measured either before a wind turbine becomes operational or when an installed turbine is not operating.

Broadband Sound – Sound with a broad spectral distribution, with no tones, such as white noise, static, and airflow sound.

Confidence Interval – a reliability measure provided for an estimated value or parameter.

Energetic Adding – The addition of two decibel levels. Since a decibel is 10 times the logarithm of a value, the energetic addition would be:

$$Lp = 10log_{10}\left(10^{Lp1}/_{10} + 10^{Lp2}/_{10}\right)$$

Where Lp is the total level, and Lp1 and Lp2 are the levels to be added.

Frequency — In acoustics, the number of times in a second one cycle of a waveform passes a fixed space. The perceived pitch of a sound is proportional to its frequency. The relationship between wavelength and frequency is dependent on the speed of sound.

$$f = \frac{c}{\lambda}$$

where λ is wavelength, c is the speed of sound, and f is frequency. The typical hearing range for young healthy individuals is roughly between frequencies of 20 Hz (1 Hertz is one cycle per second) and 20,000 Hz (also designated as 20 kHz, where 1 kHz is one thousand cycles per second).

G The proportion of ground that is considered porous, as defined under ISO 9613-2. For example, G = 1 represents all porous ground, G = 0 represents all hard ground, and G = 0.5 represents half-porous and half-hard ground.

IEC 61400-11 The International Electrotechnical Commission standard, "Wind turbines – Part 11: Acoustic noise measurement techniques." This is the industry standard for measuring the sound power, uncertainty, and tonality from wind turbines. The measurement procedures defined in this standard are different in some respects from those that would be adopted for noise assessment in community noise studies.

Infrasound Sound that is of such low frequency that it is not readily audible by humans at nominal levels – generally considered to be below 20 Hz (Figure 124)

ISO 9613 The International Standards Organization Standard ISO 9613, "Acoustics – Attenuation of sound during propagation outdoors". The standard is used to predict how sound propagates outdoors. It is currently the standard used by most noise control engineers in the U.S. to predict wind turbine sound levels in communities. Part 1 of the standard estimates atmospheric attenuation, and Part 2 uses the results from Part 1 with sound emissions from the source and propagation path factors to estimate sound levels at some distance from the source.

$L_A$ or A-weighted level - A weighting of the sound spectrum used to mimic the human response to loudness at lower sound levels. An A-weighted sound level – both sound pressure and sound power level – is reported in decibels as dBA or dB(A). The various weighting schemes are shown in Figure 124.

$L_{Ai}$ The "insect" A- weighted response. $L_{Ai}$ is used to filter out biogenic sounds, by eliminating all sounds at and above the 1,600 Hz 1/3-octave band. (Schomer & Hessler, 2010) (see Figure 124). In this report the $L_{Ai}$ is used in charts of summer sound level measurements. The "Smart" Ai" applies the Ai weighting only when tonal high frequency sound is detected. The Smart Ai weight is used in tables of statistical sound levels in this report.

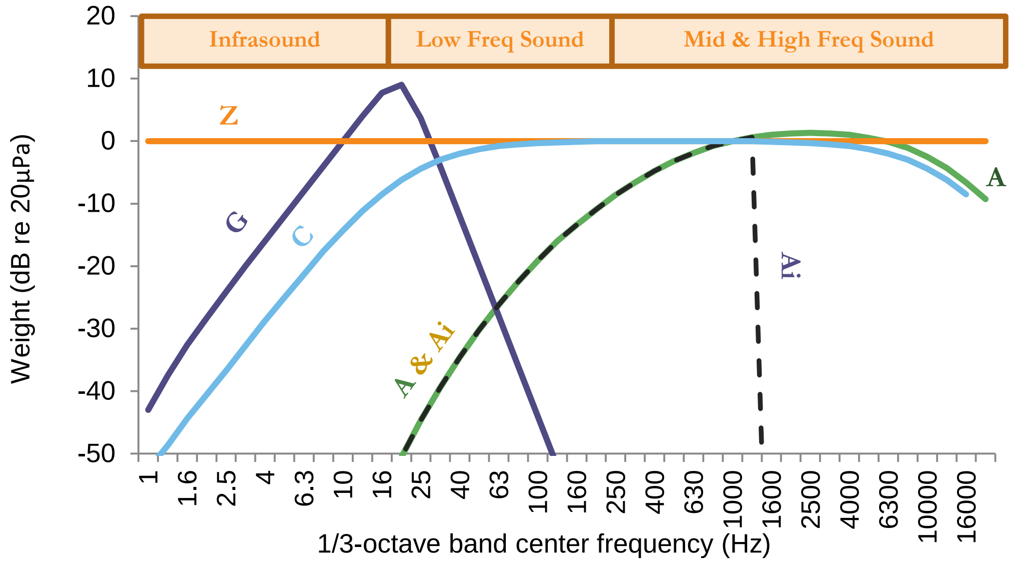


**FIGURE 124: SOUND WEIGHTING SCHEMES**

$L_F$ Fast-response sound level, where the exponential response time is set to 125 ms. A sound level meter set to Fast-response is relatively faster to respond to rapidly changing sound levels, such as amplitude modulation close to a typical wind turbine.. It can be expressed as an instantaneous level, in a percentile, or in a statistic such as a one-second $L_{Fmax}$, for example. (See "sound level meter response")

$L_{Fmax\ (1\text{-sec})}$ The A-weighted, fast-response maximum sound level, as measured over a one-second period, in decibels.

$L_C$ The C-weighted sound level. This weighting was developed to represent the human response to high-energy sounds. It is relatively flat in the audible range (see Figure 124).

$L_{EQ}$ Equivalent average sound level. The average of the mean square sound *pressure* over an entire monitoring period and expressed as a decibel:

$$Leq_T = 10 * log_{10}\left(\frac{1}{T}\int_{\theta}^{T} p_A^2(t)dt \Big/ p_{ref}^2\right)$$

where $p_A^2$ is the squared instantaneous weighted sound pressure signal, as a function of elapsed time t, $p_{ref}$ is the reference pressure of 20 µPa, and T is the stated time interval. The reference pressure of 20 µPa is used for all measurements in this document.

The monitoring period, T, can be for any defined length of time. It could be one second ($L_{EQ\ 1\text{-sec}}$), one hour ($L_{EQ(1)}$), or 24 hours ($L_{EQ(24)}$). Because $L_{EQ}$ is a logarithmic function of the average pressure, loud and infrequent sounds have a greater effect on the resulting $L_{EQ}$ than quieter and more frequent sounds.

The $L_{EQ}$ is the most commonly used metric in environmental sound regulations for wind turbines, including IEC 61400-11 test procedures for wind turbines.

| | |
|---|---|
| $L_G$ | The G-weighted sound level. This is a weighting relative to the perception and annoyance of infrasound (see Figure 124). |
| $L_n$ | See "n$^{th}$ percentile" |
| Lp | See "Sound Pressure Level" |
| $L_S$ | Slow response sound level, where the exponential response time is set to 1.0 second. This is a relatively slower response time to Fast and results in a longer rise and fall time in the displayed sound level. $L_S$ is often used in local sound regulations as it tends to filter short-term contamination by responding more slowly to rapidly changing sound levels, and is easier to read on a sound level meter display. (See "sound level meter response") |
| Lw | See "Sound Power Level" |
| $L_Z$ | The Z-weighted sound level has zero weighting; un-weighted. The units are dBZ or dB(Z). This is sometimes seen elsewhere as dB, dB(L) (linear), or dB(F) (flat). |
| Location | A specific monitoring location within a Site. |

Logarithmic Addition – see "Energetic adding".

Low Frequency Sound – Sound with frequency content between 20 Hz and 200 Hz.

| | |
|---|---|
| Measured | An observed quantity. In this report, we differentiate between measured values, for example, those that are logged by a sound level meter, and modeled values, such as those that are predicted by a sound propagation model. |
| m/s | Meters per second, a standard unit measuring wind speed. |
| ms | Milliseconds; one thousandth of a second |
| n$^{th}$ Percentile | In statistics, the value which represents the highest n$^{th}$ percent of a series of values. For example, in 100 measurements sorted from high to low, the 10$^{th}$ percentile would be the 90$^{th}$ measurement down from the top. That is, 10 percent of the observations fall below that value. In acoustics, the n$^{th}$ percentile level is the level exceeded n percent of the time, which is the opposite of the statistical definition. Thus the acoustic $L_{90}$ represents the statistical 10$^{th}$ percentile level. In this document, if we use "*n*$^{th}$ percentile" it will refer to the statistical definition, and if we use "L*n*", it refers to the acoustical definition. $L_{50}$ is the median sound level. |

Octave bands — An octave is a band of frequencies whose lower frequency limit is one half of its upper frequency limit. An octave-band is identified by its center frequency. As an example, the 500 Hz octave band is the range which includes frequencies between 360 Hz and 720 Hz. An octave higher would be twice this. That is, it would be centered at 1,000 Hz with a range between 720 and 1,440 Hz. The range of human hearing is divided into 10 standardized octave-bands: 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz. For analyses that require even further frequency detail, each octave-band divided into equal parts, such as 1/3-octave-bands.

Precision — The repeatability of measuring the same value if conditions stay the same.

R-squared, $R^2$ — A statistical measure which represents the proportion of the variance in a variable explained by other independent variables. R-squared varies from 0 (no relation between the variables) to 1 (perfect correlation between the variables).

Sound [Pressure] Level – the sound pressure level as measured in decibels:

$$\text{Lp (in dB)} = 10log_{10}\left(\frac{p}{p_{ref}}\right)^2$$

where p is the sound pressure in Pascals and $p_{ref}$ is the reference sound pressure of 20 μPa. All sound pressure levels shown in this document use this $p_{ref}$.

Sound level meter response – The rate at which a sound level meter display can change related to a change in actual sound level. Sound levels vary over time. In fact, the variation is so fast, that one would not be reliably able to read the level on a sound level meter. For that reason, the displayed sound level is damped in time, to make it readable.

There are three standard time responses available on most sound level meters: Slow, Fast, and Impulse. Fast response has a time constant of 125 ms. This response is similar to the response of the human ear. The Slow response has a time constant of 1 second. This is often used in environmental noise measurement because its slow rise and fall time eliminates very short spikes in noise that are not related to the measurement. The Impulse response has a very fast rise time of 35 ms and a slow decay time of 1.5 seconds. It is rarely used in environmental noise measurements, but can be used with other metrics to evaluate the impulsivity of a sound event.

Fast, slow, and impulse sound levels cannot be averaged over time, since they are not representative of the actual sound level over time. They are simply applied to the actual sound level to slow the meter reading. A true energy average can be calculated using the $L_{EQ}$ metric, which is independent of the sound level meter response setting (see "$L_{EQ}$").

Sound Power Level – The level of sound power (sound generation) of a source, independent of environmental factors, measured in decibels:

$$\text{Lw (in dB)} = 10log_{10}\left(\frac{w}{w_{ref}}\right)^2$$

where w is the sound power measured in Watts and $w_{ref}$ is the reference sound power of $10^{-12}$ Watts. A simple way of thinking about the difference between sound pressure and sound power is by the analogy of a light bulb: the sound pressure is similar to the lumens of light measured in a certain place under specific conditions, while the sound power would be equivalent to the wattage rating of the bulb, which does not change.

Spectrum The components of a sound broken down in to individual frequencies.

Standard Deviation – A measure of the variability or dispersion of a given value in a population. Standard deviation can be estimated from a subset (sample) of a given population.

Standard Error –The standard deviation of the estimated statistic's sampling distribution. If the statistic is a mean, it is a measure of the precision of the estimate of the mean. For example, if one calculated many means from a population, the standard error would be the standard deviation of the means. Thus, it is a measure of how close the actual mean is to your estimate. Standard error is estimated by dividing the sample standard deviation by the square root of the sample size.

Statistical Bias – The tendency to under- or over-estimate the true value, i.e., a directional error. A bias may be intentional or unintentional. An example of an intentional bias is adding to sound modeling results to increase the likelihood that the true level of sound does not exceed the modeled level.

Temperature Lapse Rate – The rate at which temperature decreases with increasing height above ground.

Tonal Sound - Sound where narrow frequency band(s) are pronounced, such as in alarms, sirens, squeals, and horns.

Turbine-on Sound Level (modeled or measured) – the sound level that includes both background sound and turbine-generated sound.

Turbine Only Sound Level – the estimated sound level due to a wind turbine alone. It can be either modeled from the sound power profile of the particular wind turbine and propagation characteristics, or estimated by subtracting background sound from measured Turbine-on sound level. The Turbine [only] sound level does not include any background sound.

Turbulence Intensity – The standard deviation of the wind speed divided by the mean wind speed, over a defined period. The IEC 61400-1 turbulence model uses a period of 10-minutes over which to calculate the mean and standard deviation. However, other lengths of time can be used for different purposes.

Wind Shear The change in wind speed with height. Higher shear represents higher wind speeds aloft compared with closer to the ground.

Wind Shear Exponent – A quantification of the vertical wind shear between two levels of the atmospheric boundary layer. Derived from the wind shear power law, the function of the vertical wind speed profile is expressed as,

$$\alpha = \frac{ln\frac{v}{v_0}}{ln\frac{z-dh}{zh_0-d}}$$

where:

α is the wind shear power law exponent;

v and $v_0$ are the wind speeds at heights z and $z_0$, above ground level respectively;

*d* represents the displacement height above ground level to account for the decoupling of the winds throughout the tree canopy. For simplicity throughout this analysis, the displacement height is assumed to be zero for all sites.