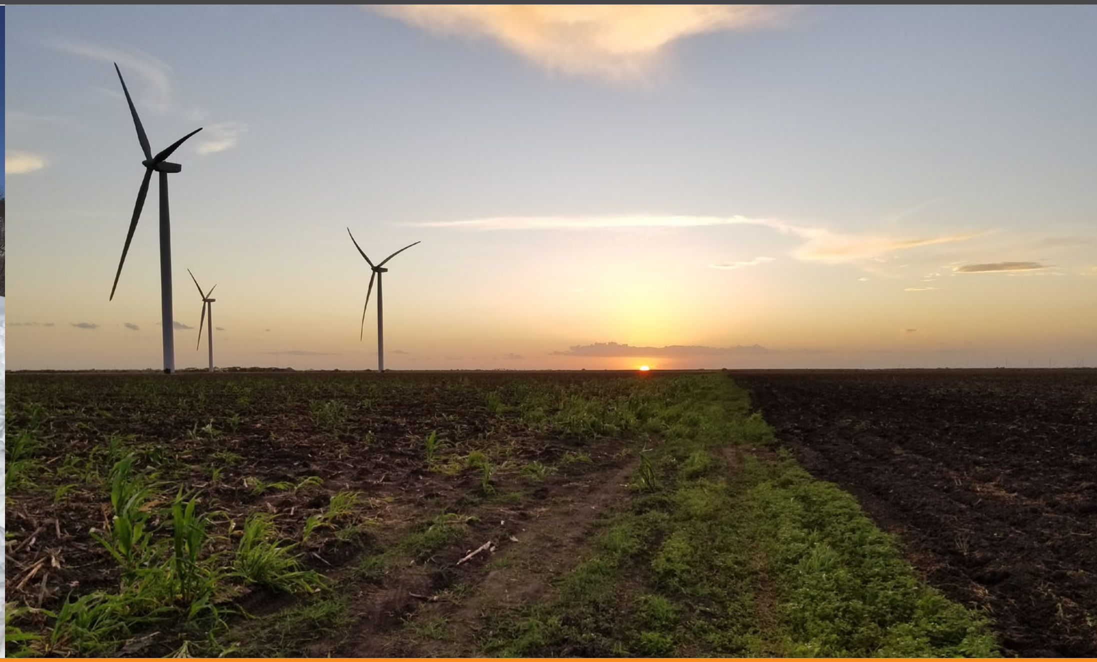
MERJENT

BOWMAN WIND SOUND MODELING

Report | July 20, 2021



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1.0 EXECUTIVE SUMMARY

The Bowman Wind Farm project (the "Project") is an up to 208.7 MW nameplate capacity wind power generation facility proposed in Bowman County, North Dakota.

The Project is subject to a Bowman County wind turbine noise standard of 45 dBA L_{eq} within 100 feet of any non-participating residence (absent a variance), and a North Dakota Public Service Commission (NDPSC) turbine noise standard of 45 dBA within 100 feet of an inhabited residence or a community building (absent a waiver). To assess the noise impacts of the Project, RSG has conducted sound propagation modeling of the planned turbine layout. The 45 dBA standard is also applied to sound generated by battery storage and substation components of the Project. We used the internationally accepted sound propagation modeling methodology, ISO 9613-2, with parameters developed specific to wind turbines.

The modeling results show that Project sound levels are at or below 44 dBA L_{eq} within 100 feet of non-participating residences and community buildings assuming concurrent and continuous operation of all Project components. One pending participating residence has a modeled sound level of 47 dBA L_{eq}. This residence is currently in the process of executing administrative documents for a participation agreement. Should this landowner not sign, Turbine 41 would not be constructed and sound levels within 100 feet of this residence would be 44 dBA L_{eq}.

Modeled Project generated operational sound levels do not exceed the applicable noise standards.

2.0 INTRODUCTION

The Bowman Wind Farm Project is an up to 208.7 MW nameplate capacity wind power generation facility proposed in Bowman County, North Dakota. RSG conducted sound propagation modeling for the proposed turbine array to assess compliance with the applicable sound level requirements.

Included in this report are:

1. A Project description,
2. An overview of ordinances and standards that apply to the Project,
3. A description of sound propagation modeling procedures,
4. Sound propagation modeling results, and
5. Conclusions.

A primer on acoustical terminology is provided in Appendix A.

Acoustical issues specific to wind turbine noise are described in Appendix B.

3.0 PROJECT DESCRIPTION

A Project area map is shown in Figure 1. The Project is located about 5 miles (8 km) west of the City of Bowman. Land within the Project area is rural and is primarily used for agriculture with some residences interspersed. The terrain is relatively flat.

The Project is modeled using General Electric (GE) 2.82 MW wind turbines with 127-meter rotor diameters, 89-meter hub heights, and fitted with low-noise trailing edges (LNTE). Other turbine models and hub heights are also being considered. Up to 74 wind turbines will be constructed. The preliminary locations for 86 turbine (74 primary and 12 alternative) sites are included in the modeling in this report. A single 222 MVA transformer at the collector substation connects the turbine array to the electric grid.

The Project also proposes a battery energy storage system (BESS) facility. This facility stores energy generated by the Project primarily during off-peak demand periods and releases that energy primarily during peak demand periods. The 400 MWh BESS includes batteries, cooling equipment, inverters, and transformers. It is proposed to be located on a fifteen-acre parcel just south of the Project substation.

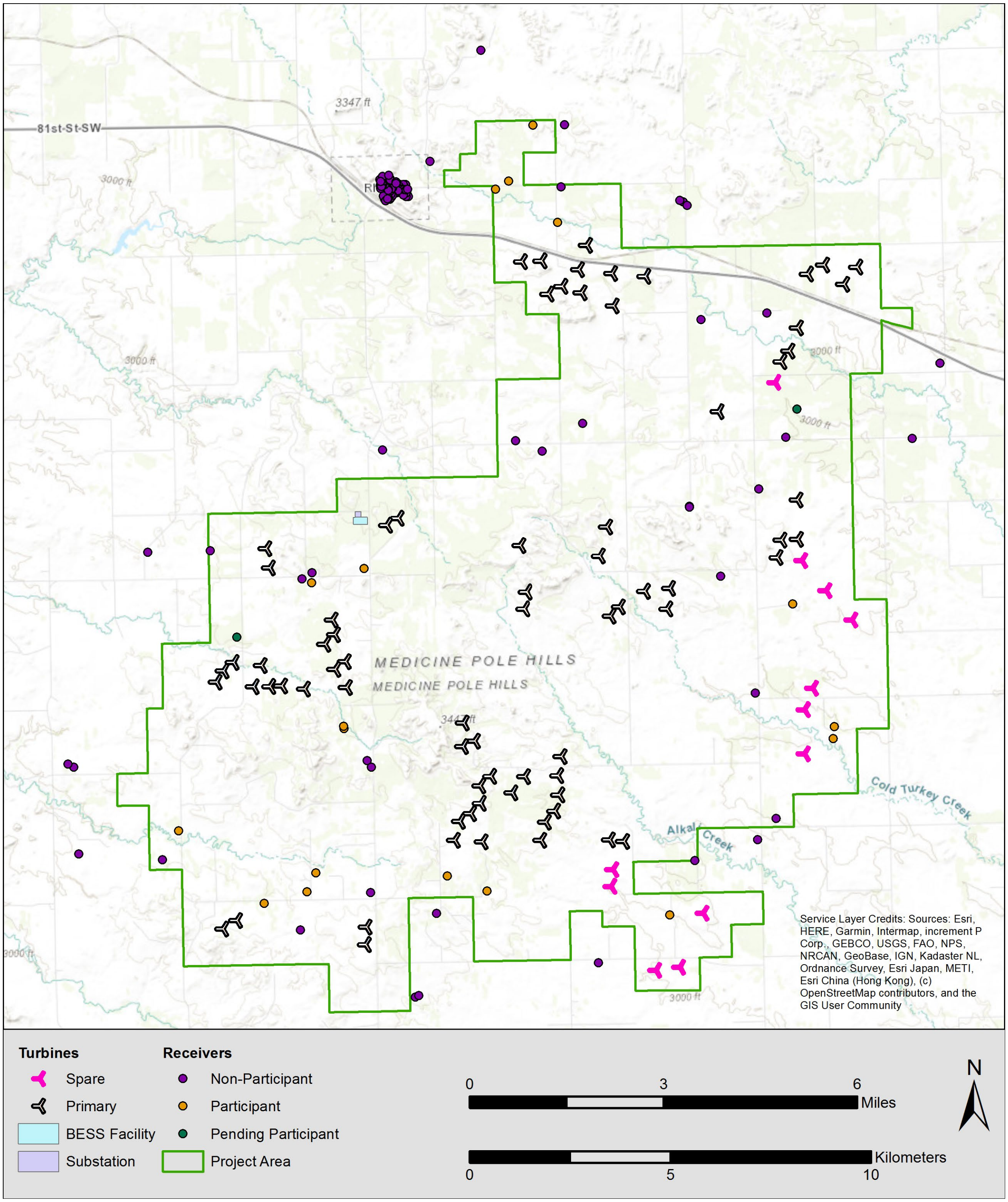

FIGURE 1: BOWMAN WIND FARM – PROJECT AREA MAP

4.0 NOISE STANDARDS & GUIDELINES

There are no Federal noise regulations applicable to the Project.

The State of North Dakota has adopted regulations through the North Dakota Public Service Commission (PSC) for the noise emitted from wind energy facilities under NDAC Section 69-06-08-01(4). The regulation states that noise produced by wind turbines shall not exceed 45 dBA within 100 feet of an inhabited residence or community building. The regulation allows for the criteria to be waived in writing by the owner of the occupied residence or the community building.

Bowman County has a wind energy facility ordinance in Section 6.11 of its Zoning Ordinance. The code states that "sound levels of wind turbines within one-hundred (100) feet of any non-participating residence will not exceed 45 dBA L_{eq}. Construction noise or reasonable and necessary maintenance activities are allowed to exceed the sound limit except between the hours of 10 PM to 6 AM local time. This sound standard does not apply to participating dwellings."

5.0 SOUND PROPAGATION MODELING

5.1 PROCEDURES

Modeling for the Project was performed 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® Version 2020 from Datakustik GmbH. CadnaA® 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 receiver. Consequently, all wind directions, including the prevailing wind directions, are taken into account. The Project area was modeled with a ground factor of G=0.5. Otherwise, no reflections (such as due to buildings) were considered. Shielding by structures and foliage attenuation were likewise not considered. Atmospheric absorption was based on 10˚C and 70% relative humidity and source contributions were considered up to 10,000 meters (6.2 miles) from each receiver. Turbines were modeled with the manufacturer specified apparent sound power. All turbine data used is the most recent available from the manufacturer. The model was laid over the USGS Digital Terrain Model to give accurate elevations throughout.

Sound levels were modeled within 100 feet in all directions from each of 140 residences and seven community buildings located in the area. All receivers were modeled at a 4-meter (13 foot) height. Locations of these receivers are shown in Appendix D.

To account for sound power and propagation uncertainty, +2 dB was added to the modeling results.

Results calculated with these parameters represent the highest one-hour equivalent sound level ($L_{eq(1h)}$) that will be emitted by the Project. As such, the results are likely to overestimate typical sound levels from the Project.

5.2 SOUND SOURCES

Wind Turbines

The 86 wind turbine locations, including 74 primary and 12 alternative locations, shown in Figure 1 were included in the sound propagation model. The wind turbine assumed was the GE 2.82-127 LNTE, although other models are currently being considered. If a different wind turbine is selected, revised sound modeling will be produced for that model. Details of the wind turbine modeled are found in Appendix C.

Project Transformer

The proposed 34.5 kV to 230 kV 222 MVA 1050 kV BIL collector substation transformer will be located in the western portion of the Project area (see Figure 1).

The sound emissions data used for modeling is from the NEMA TR 1 standard (“Transformers, Step Voltage Regulators, and Reactors, NEMA TR 1-2013”), with spectral information taken from a transformer test performed by RSG for a similarly sized transformer.

The transformer will have cooling fans. Cooling fan operation is usually a function of electric load and ambient air temperature. As a conservative assumption, we model the transformer with fans on. The fans-off cooling mode is specified by NEMA TR 1 as having sound pressure levels that are 3 dB lower.

Battery Energy Storage System

The proposed battery energy storage system (BESS) facility would be located in the western portion of the site, immediately south of the substation (see Figure 1).

The 400 MWh BESS facility would include 90 Powin battery containers, 90 inverters, and 90 4.2-MVA transformers. Each container would utilize two heating ventilation air conditioners (HVAC) for a total of 180 HVAC units.

The HVAC unit assumed was the Marvair 6-ton Vertical Mount Air Conditioner, with a specified sound pressure level of 60 dBA at 50 feet, equivalent to a sound power level of 94.7 dBA. Spectral information was taken from a HVAC unit test performed by RSG for a similarly sized Marvair unit.

Sound emissions data for similarly sized inverters and transformers was used. The BESS inverters were each assumed to generate a sound power level of 92 dBA and the transformers were each assumed to generate a sound power level of 84 dBA.

5.3 RESULTS

Maximum Hourly L_{eq}

Modeling results are shown in Table 1 and Figure 2. This analysis assumes a credible worst-case scenario with all primary and spare turbines and all substation and BESS equipment operating simultaneously under their loudest mode and without taking into account shielding or foliage attenuation.

As shown in Table 1 and Figure 2, all non-participating land uses are modeled to be below the 45 dBA L_{eq} criteria. One residence, R-148, has a modeled sound level of 47 dBA L_{eq}. This residence is a pending participant and currently in the process of executing administrative documents for a participation agreement. Should this landowner not sign, Turbine 41 would not be constructed and sound levels within 100 feet of this residence would be 44 dBA L_{eq}. Detailed information for each receiver is provided in Appendix D.

TABLE 1: MODEL RESULTS SUMMARY ($L_{eq\text{-}1h}$)

Land Use	Average	Maximum	Minimum	≥ 45 dBA
All (147)	30 dBA	47dBA	19 dBA	1%
Participating Residence (20)[1]	40 dBA	47 dBA	32 dBA	5%
Non-Participating Residence (120)	28 dBA	44 dBA	19 dBA	0%
Community Buildings (7)	27 dBA	41 dBA	24 dBA	0%

[1] Two residences considered 'Participating' are in the process of executing administrative documents for a participation agreement. This includes R-38, which has a modeled sound level of 42 dBA and would be below the 45 dBA L_{eq} criteria for non-participating residences and R-148, which has a modeled sound level of 47 dBA and would be above the criteria for non-participating residences. Should the landowner at R-148 not sign, Turbine 41 would not be constructed and the modeled sound level at R-148 would be 44 dBA L_{eq}.

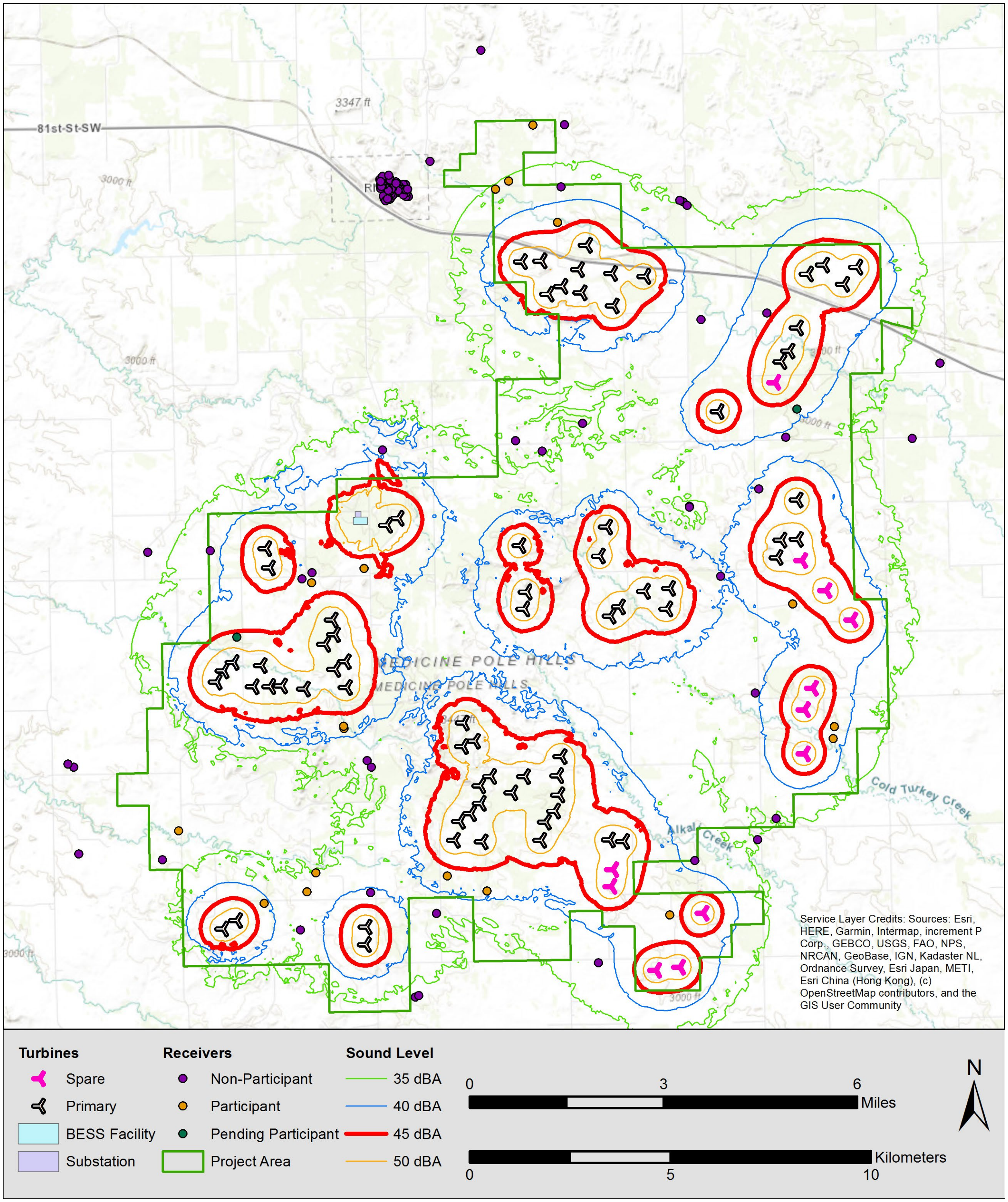

FIGURE 2: SOUND PROPAGATION MODELING RESULTS

Long-Term Project Sound Levels

The modeling results shown in Table 1, Figure 2, and Appendix D are calculated a worst-case short term (1-hour) equivalent average sound level with all Project components (primary and alternative) operating continuously and simultaneously under a single worst-case meteorological condition. However, in real-life a variety of meteorological conditions will occur, and each turbine will only operate at maximum sound power for a portion of the time. The actual sound level at a receiver will depend on variations in atmospheric stability, wind speed, wind direction, and other parameters that change hourly, as well as the operational utilization of each turbine. Differences between $L_{eq(1h)}$ and annual average sound levels due to changes in meteorology are on the order of 5 to 15 dBA, depending on the configuration of the receiver relative to the turbines.[2] Therefore, a receiver that is modeled to have a highest hour 44 dBA $L_{eq(1h)}$ exposure will have an annual average sound level of 29 to 39 dBA.

Tonality

Figure 3 shows the tonal prominence of the GE 2.82-127 LNTE turbine compared with the ANSI S12.9 Part 4 tonality criteria. This indicates that sound power spectrum of the wind turbine does not have a tonal prominence.

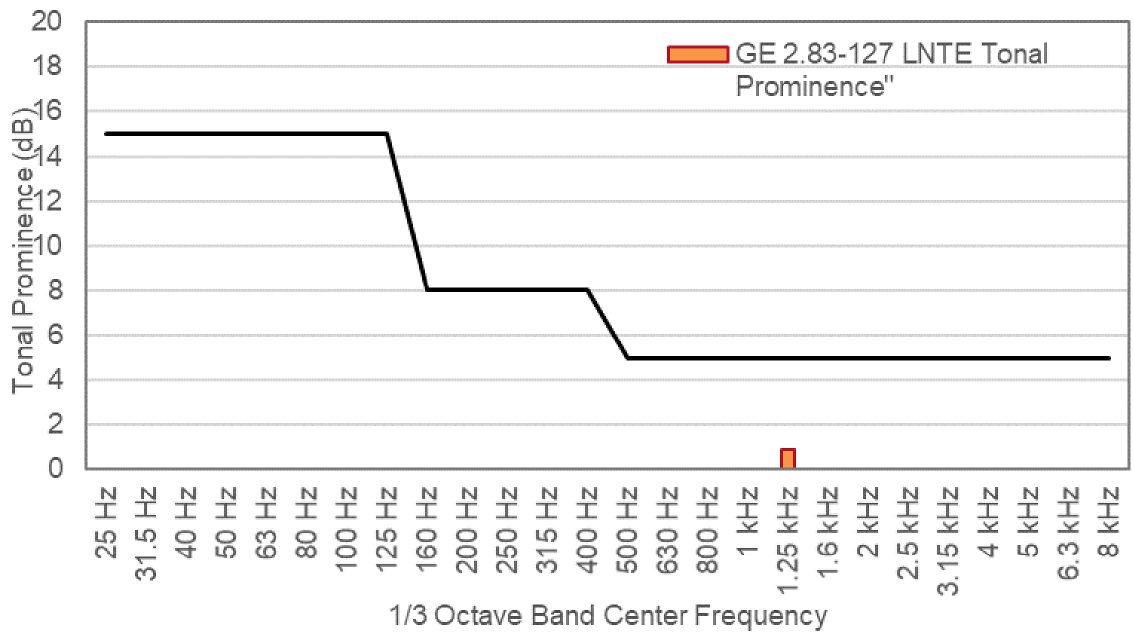

FIGURE 3: REPORTED 1/3 OCTAVE BAND TONAL PROMINENCE COMPARED TO ANSI S12.9 PART 4 TONALITY CRITERIA

Tones are generated by transformers but are often masked when cooling fans are operating. In addition, as one moves away from the substation, the sound is further masked by background sound (including the wind turbines). Under ANSI S12.9 Part 4, if tonal sounds are present, 5 dB

[2] Kaliski, et al, 2010, "Calculating annualized sound levels for a wind farm," Proceedings of Acoustical Society of America/NOISE-CON 2010, 159th Meeting, Baltimore, Maryland, April 2010.

is added to the tonal sound as a penalty. The maximum sound level from the Project substation and BESS facility transformers is 31 dBA L_{eq}. Assuming it is tonal sound and not masked, adding 5 dB would bring the transformer sound to 36 dBA L_{eq}. Thus, even with a tonal penalty, the substation and BESS facility sound would meet the Project noise criteria.

6.0 CONCLUSIONS

RSG performed sound propagation modeling of the proposed Project. The Project will be capable of generating up to 208.7 MW. The modeled array consists of 86 (74 primary and 12 alternate) GE 2.82-127 LNTE wind turbines on an 89-meter tower, though other hub heights and turbine models are being considered. The Project also proposes a 222 MVA transformer at the collector substation to connect the turbine array to the electric grid and a BESS facility.

Sound propagation modeling was performed ISO 9613-2, implemented in the Cadna/A modeling package. The Project model used parameters have been shown to represent conservatively accurate $L_{eq(1h)}$ sound levels.

The results of the modeling show that Project generated sound levels would be 44 dBA $L_{eq(1h)}$ or less within 100 feet of all non-participating residences and all community buildings. Modeled Project generated operational sound levels do not exceed 45 dBA L_{eq} within 100 feet of any non-participating residence or community building. One pending participant has a modeled sound level of 47 dBA L_{eq}. This residence is currently in the process of executing administrative documents for a participation agreement. Should this landowner not sign, Turbine 41 would not be constructed and sound levels within 100 feet of this residence would be 44 dBA L_{eq}.

APPENDIX A. PRIMER ON SOUND

Expressing Sound in Decibel Levels

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”).[3] 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” (such as “L_{eq}”).

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) at 1 kHz. 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 sound sources, and their sound pressure levels, are listed on the scale in Figure 4. Typical ambient nighttime sound levels around wind turbine locations, in the absence of wind turbines, is shown in Figure 5.

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.

[3] 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.

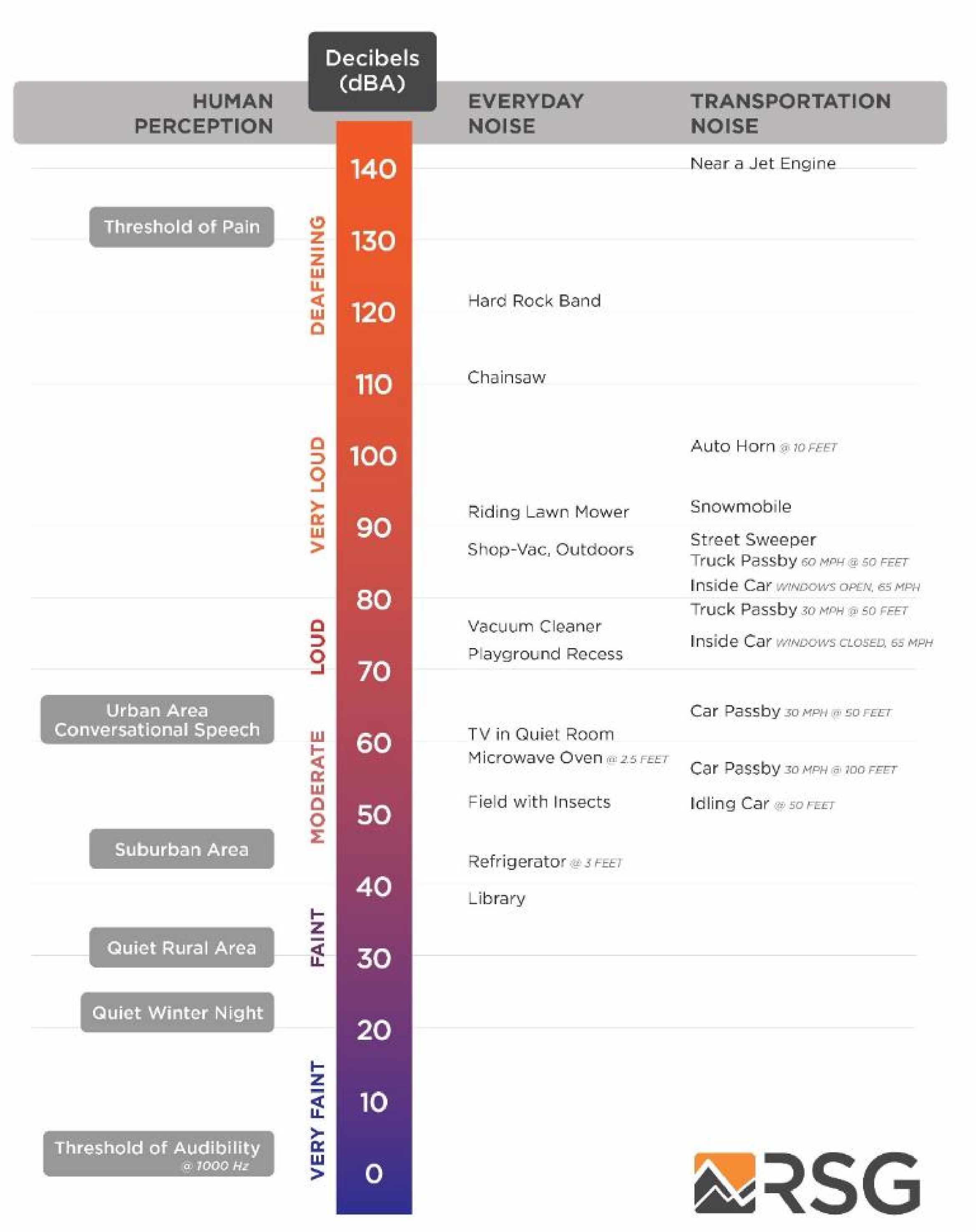

FIGURE 4: A SCALE OF SOUND PRESSURE LEVELS FOR TYPICAL SOUND SOURCES

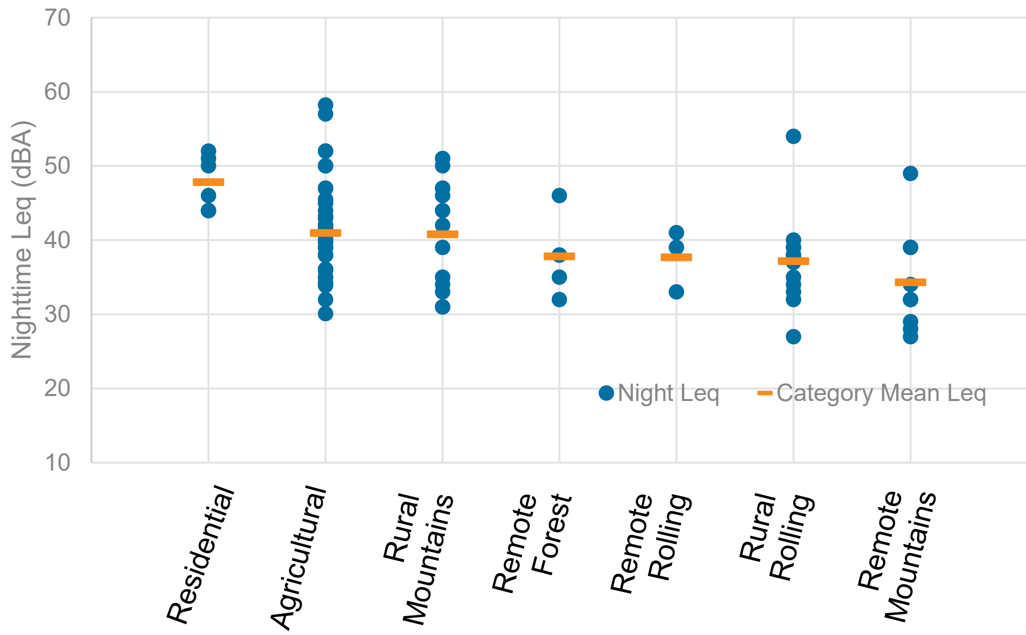

FIGURE 5: BACKGROUND NIGHTTIME L_{eq} AT 102 LOCATIONS AT POTENTIAL WIND TURBINE SITES ACROSS THE U.S. BY LAND USE CATEGORY[4]

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 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.

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

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[4] From Kaliski, K., Bastasch, M., and O’Neal, R., “Regulating and Predicting Wind Turbine Sound in the U.S.,” Proceedings of InterNoise2018, Institute of Noise Control Engineering, 2018

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, pitch perception is greatly reduced and sound may be “felt” as much as “heard”. Frequencies below 20 Hz are 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. G-weighting is a standardized weighting used to evaluate infrasound.

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” or “dB(A)”. 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.

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 sounds.

APPENDIX B. WIND TURBINE ACOUSTICS

Sources of Sound Generation by Wind Turbines

Wind turbines generate two principal 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 broad band. 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 6):

- 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.

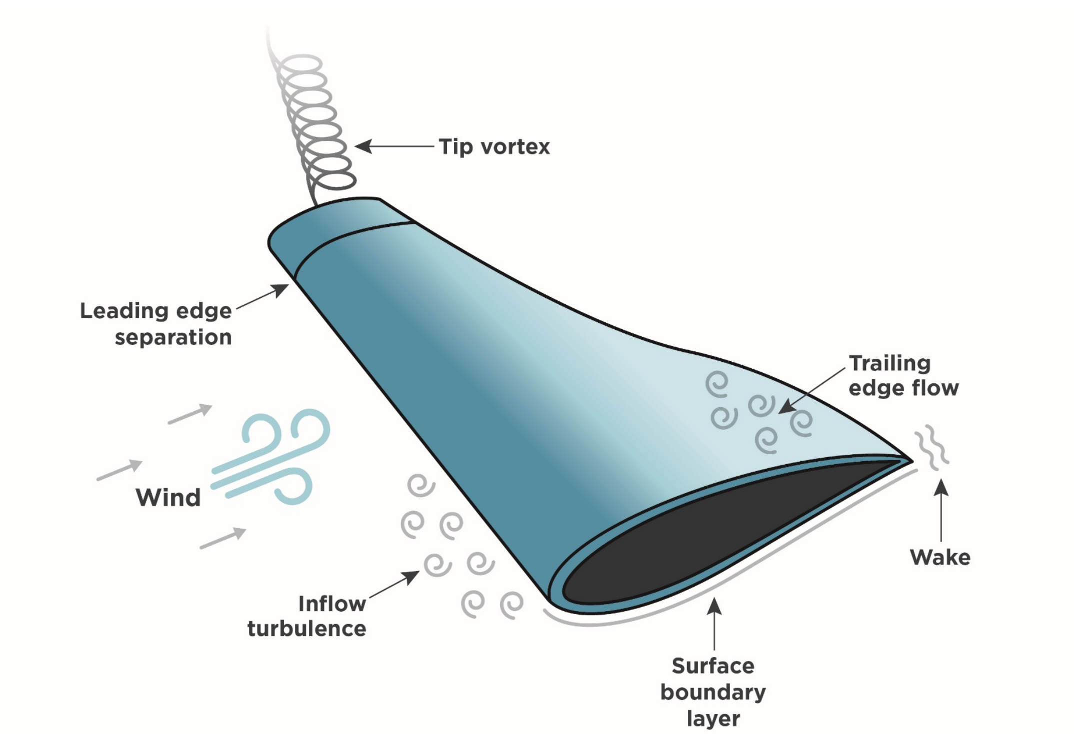

FIGURE 6: AIRFLOW AROUND A ROTOR BLADE

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.

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 7).

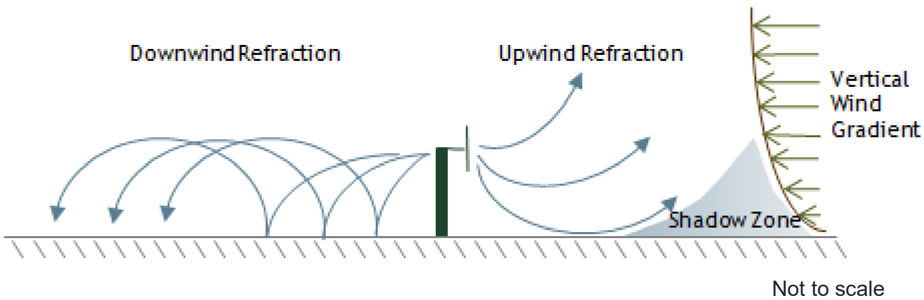

FIGURE 7: SCHEMATIC OF THE REFRACTION OF SOUND DUE TO VERTICAL WIND GRADIENT (WIND SHEAR)

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 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.

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 receivers because the frequency spectrum from wind is similar to the frequency spectrum from a wind turbine. Figure 8 compares the shape of the sound spectrum measured during a 5 m/s wind event to that of the GE 3.0-140 LNTE wind turbine. As shown, the shapes of the spectra are 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.

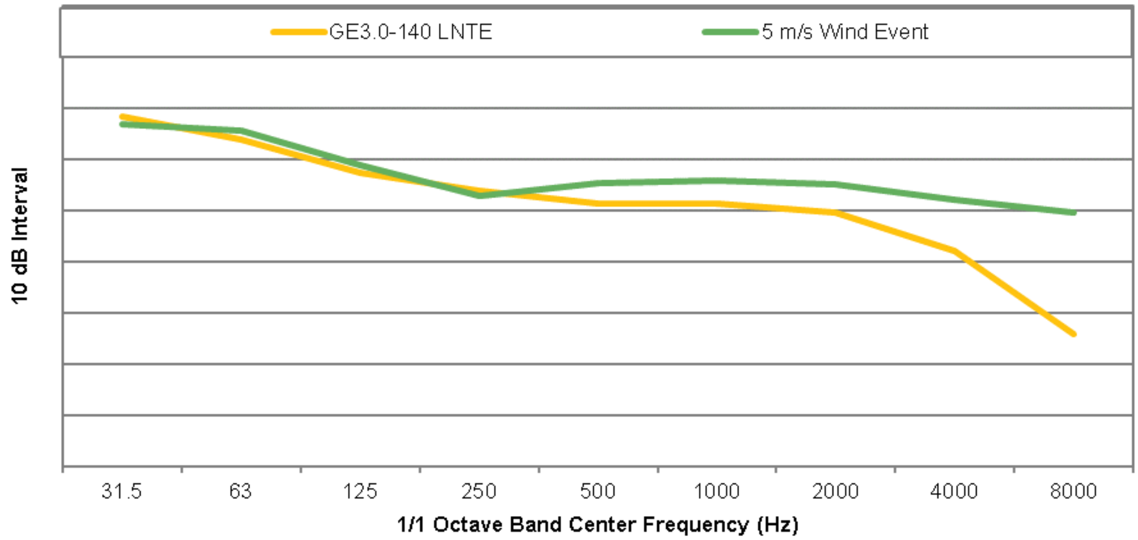

FIGURE 8: COMPARISON OF NORMALIZED FREQUENCY SPECTRA MEASURED FROM A 5 M/S WIND EVENT AND THE SOUND POWER SPECTRA FROM THE GE 3.0-140 LNTE[5]

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.

[5] 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.

APPENDIX C. SOURCE INFORMATION

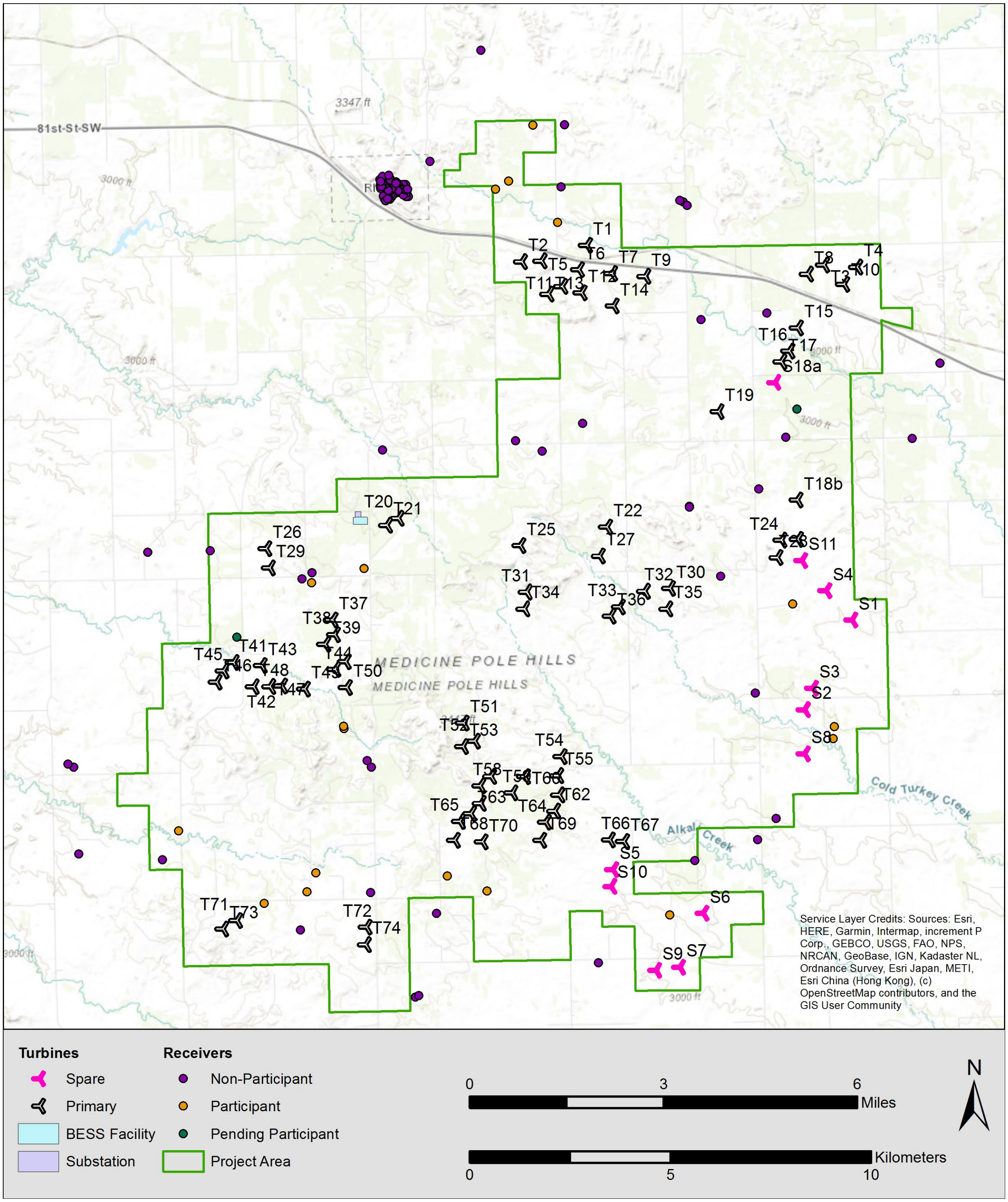

FIGURE 9: WIND TURBINE LOCATION MAP

TABLE 2: NOISE SOURCE INFORMATION TABLE

ID	Type	Sound Power Level (dBA)	Hub Height (m)	Coordinates (UTM NAD83 Z13N)		
				X (m)	Y (m)	Z (m)
T1	GE 2.82 - 127 LNTE-Enhanced	111	89	607880	5118354	1059
T2	GE 2.82 - 127 LNTE-Enhanced	111	89	613689	5112222	1031
T3	GE 2.82 - 127 LNTE-Enhanced	111	89	610844	5110516	1032
T4	GE 2.82 - 127 LNTE-Enhanced	111	89	600532	5108578	1040
T5	GE 2.82 - 127 LNTE-Enhanced	111	89	606984	5105936	1047
T6	GE 2.82 - 127 LNTE-Enhanced	111	89	606238	5104714	1047
T7	GE 2.82 - 127 LNTE-Enhanced	111	89	614268	5106908	999
T8	GE 2.82 - 127 LNTE-Enhanced	111	89	609496	5104030	1019
T9	GE 2.82 - 127 LNTE-Enhanced	111	89	614202	5111718	1032
T10	GE 2.82 - 127 LNTE-Enhanced	111	89	609507	5118052	1037
T11	GE 2.82 - 127 LNTE-Enhanced	111	89	614094	5117507	1009
T12	GE 2.82 - 127 LNTE-Enhanced	111	89	613884	5116934	1007
T13	GE 2.82 - 127 LNTE-Enhanced	111	89	613688	5116670	1019
T14	GE 2.82 - 127 LNTE-Enhanced	111	89	612115	5115426	1026
T15	GE 2.82 - 127 LNTE-Enhanced	111	89	614088	5113222	1011
T16	GE 2.82 - 127 LNTE-Enhanced	111	89	604150	5112776	1072
T17	GE 2.82 - 127 LNTE-Enhanced	111	89	603861	5112601	1071
T18b	GE 2.82 - 127 LNTE-Enhanced	111	89	609338	5112554	1069
T19	GE 2.82 - 127 LNTE-Enhanced	111	89	614099	5112243	1023
T20	GE 2.82 - 127 LNTE-Enhanced	111	89	607180	5112089	1117
T21	GE 2.82 - 127 LNTE-Enhanced	111	89	600850	5112020	1046
T22	GE 2.82 - 127 LNTE-Enhanced	111	89	609163	5111833	1050
T23	GE 2.82 - 127 LNTE-Enhanced	111	89	613587	5111791	1040
T24	GE 2.82 - 127 LNTE-Enhanced	111	89	600938	5111538	1062
T25	GE 2.82 - 127 LNTE-Enhanced	111	89	610910	5111022	1047
T26	GE 2.82 - 127 LNTE-Enhanced	111	89	610283	5110961	1049
T27	GE 2.82 - 127 LNTE-Enhanced	111	89	607343	5110935	1077
T28	GE 2.82 - 127 LNTE-Enhanced	111	89	609659	5110563	1043
T29	GE 2.82 - 127 LNTE-Enhanced	111	89	607283	5110522	1062
T30	GE 2.82 - 127 LNTE-Enhanced	111	89	609429	5110338	1029
T31	GE 2.82 - 127 LNTE-Enhanced	111	89	602506	5110240	1055
T32	GE 2.82 - 127 LNTE-Enhanced	111	89	602562	5109873	1062
T33	GE 2.82 - 127 LNTE-Enhanced	111	89	602325	5109633	1056
T34	GE 2.82 - 127 LNTE-Enhanced	111	89	602827	5109198	1066
T35	GE 2.82 - 127 LNTE-Enhanced	111	89	602573	5109005	1063
T36	GE 2.82 - 127 LNTE-Enhanced	111	89	599788	5108975	1037

ID	Type	Sound Power Level (dBA)	Hub Height (m)	Coordinates (UTM NAD83 Z13N)		
				X (m)	Y (m)	Z (m)
T37	GE 2.82 - 127 LNTE-Enhanced	111	89	601244	5108593	1056
T38	GE 2.82 - 127 LNTE-Enhanced	111	89	599617	5108695	1044
T39	GE 2.82 - 127 LNTE-Enhanced	111	89	600946	5108585	1046
T40	GE 2.82 - 127 LNTE-Enhanced	111	89	601812	5108523	1048
T41	GE 2.82 - 127 LNTE-Enhanced	111	89	602860	5108557	1055
T42	GE 2.82 - 127 LNTE-Enhanced	111	89	605772	5107673	1069
T43	GE 2.82 - 127 LNTE-Enhanced	111	89	606053	5107219	1067
T44	GE 2.82 - 127 LNTE-Enhanced	111	89	605751	5107087	1091
T45	GE 2.82 - 127 LNTE-Enhanced	111	89	608210	5106838	1039
T46	GE 2.82 - 127 LNTE-Enhanced	111	89	608119	5106370	1037
T47	GE 2.82 - 127 LNTE-Enhanced	111	89	606453	5106347	1063
T48	GE 2.82 - 127 LNTE-Enhanced	111	89	607300	5106342	1043
T49	GE 2.82 - 127 LNTE-Enhanced	111	89	606179	5106110	1084
T50	GE 2.82 - 127 LNTE-Enhanced	111	89	608148	5105887	1037
T51	GE 2.82 - 127 LNTE-Enhanced	111	89	606191	5105679	1074
T52	GE 2.82 - 127 LNTE-Enhanced	111	89	608046	5105484	1040
T53	GE 2.82 - 127 LNTE-Enhanced	111	89	605949	5105422	1057
T54	GE 2.82 - 127 LNTE-Enhanced	111	89	605669	5105224	1051
T55	GE 2.82 - 127 LNTE-Enhanced	111	89	607819	5105203	1038
T56	GE 2.82 - 127 LNTE-Enhanced	111	89	609408	5104768	1017
T57	GE 2.82 - 127 LNTE-Enhanced	111	89	605545	5104754	1048
T58	GE 2.82 - 127 LNTE-Enhanced	111	89	607697	5104754	1043
T59	GE 2.82 - 127 LNTE-Enhanced	111	89	609766	5104726	1017
T60	GE 2.82 - 127 LNTE-Enhanced	111	89	600122	5102755	1052
T61	GE 2.82 - 127 LNTE-Enhanced	111	89	603350	5102590	1076
T62	GE 2.82 - 127 LNTE-Enhanced	111	89	599775	5102549	1067
T63	GE 2.82 - 127 LNTE-Enhanced	111	89	603331	5102160	1076
T64	GE 2.82 - 127 LNTE-Enhanced	111	89	600036	5109180	1037
T65	GE 2.82 - 127 LNTE-Enhanced	111	89	600738	5109102	1040
T66	GE 2.82 - 127 LNTE-Enhanced	111	89	614803	5110965	1013
T67	GE 2.82 - 127 LNTE-Enhanced	111	89	615448	5110235	1003
T68	GE 2.82 - 127 LNTE-Enhanced	111	89	614475	5108543	1014
T69	GE 2.82 - 127 LNTE-Enhanced	111	89	614268	5108014	998
T70	GE 2.82 - 127 LNTE-Enhanced	111	89	609445	5103616	1008
T71	GE 2.82 - 127 LNTE-Enhanced	111	89	611745	5102937	1016
T72	GE 2.82 - 127 LNTE-Enhanced	111	89	611156	5101598	998
T73	GE 2.82 - 127 LNTE-Enhanced	111	89	610565	5101517	1004
T74	GE 2.82 - 127 LNTE-Enhanced	111	89	613543	5116151	1019
S1	GE 2.82 - 127 LNTE-Enhanced	111	89	608840	5119564	1031

ID	Type	Sound Power Level (dBA)	Hub Height (m)	Coordinates (UTM NAD83 Z13N)		
				X (m)	Y (m)	Z (m)
S2	GE 2.82 - 127 LNTE-Enhanced	111	89	615575	5119024	1021
S3	GE 2.82 - 127 LNTE-Enhanced	111	89	608643	5118955	1043
S4	GE 2.82 - 127 LNTE-Enhanced	111	89	609469	5118868	1039
S5	GE 2.82 - 127 LNTE-Enhanced	111	89	614344	5118851	1020
S6	GE 2.82 - 127 LNTE-Enhanced	111	89	610290	5118792	1039
S7	GE 2.82 - 127 LNTE-Enhanced	111	89	615253	5118591	1026
S8	GE 2.82 - 127 LNTE-Enhanced	111	89	608227	5118542	1053
S9	GE 2.82 - 127 LNTE-Enhanced	111	89	608710	5118383	1052
S10	GE 2.82 - 127 LNTE-Enhanced	111	89	607711	5119179	1056
S11	GE 2.82 - 127 LNTE-Enhanced	111	89	607222	5119163	1061
S18a	GE 2.82 - 127 LNTE-Enhanced	111	89	614751	5119077	1023
Substation Trans	222 MVA Transformer ONAF2	112	2.5	603163	5112872	974
BESS Trans1	4.2 MVA Transformer ONAF2	84	2.5	603298	5112631	976
BESS Trans2	4.2 MVA Transformer ONAF3	84	2.5	603298	5112649	976
BESS Trans3	4.2 MVA Transformer ONAF4	84	2.5	603298	5112667	976
BESS Trans4	4.2 MVA Transformer ONAF5	84	2.5	603298	5112685	976
BESS Trans5	4.2 MVA Transformer ONAF6	84	2.5	603298	5112703	975
BESS Trans6	4.2 MVA Transformer ONAF7	84	2.5	603298	5112721	975
BESS Trans7	4.2 MVA Transformer ONAF8	84	2.5	603298	5112739	974
BESS Trans8	4.2 MVA Transformer ONAF9	84	2.5	603298	5112757	974
BESS Trans9	4.2 MVA Transformer ONAF10	84	2.5	603298	5112775	974
BESS Trans10	4.2 MVA Transformer ONAF11	84	2.5	603308	5112631	976
BESS Trans11	4.2 MVA Transformer ONAF12	84	2.5	603308	5112649	976
BESS Trans12	4.2 MVA Transformer ONAF13	84	2.5	603308	5112667	976
BESS Trans13	4.2 MVA Transformer ONAF14	84	2.5	603308	5112685	975
BESS Trans14	4.2 MVA Transformer ONAF15	84	2.5	603308	5112703	975
BESS Trans15	4.2 MVA Transformer ONAF16	84	2.5	603308	5112721	975
BESS Trans16	4.2 MVA Transformer ONAF17	84	2.5	603308	5112739	974
BESS Trans17	4.2 MVA Transformer ONAF18	84	2.5	603308	5112757	973
BESS Trans18	4.2 MVA Transformer ONAF19	84	2.5	603308	5112775	973
BESS Trans19	4.2 MVA Transformer ONAF20	84	2.5	603318	5112631	976
BESS Trans20	4.2 MVA Transformer ONAF21	84	2.5	603318	5112649	976
BESS Trans21	4.2 MVA Transformer ONAF22	84	2.5	603318	5112667	976
BESS Trans22	4.2 MVA Transformer ONAF23	84	2.5	603318	5112685	975
BESS Trans23	4.2 MVA Transformer ONAF24	84	2.5	603318	5112703	975
BESS Trans24	4.2 MVA Transformer ONAF25	84	2.5	603318	5112721	974
BESS Trans25	4.2 MVA Transformer ONAF26	84	2.5	603318	5112739	974
BESS Trans26	4.2 MVA Transformer ONAF27	84	2.5	603318	5112757	973
BESS Trans27	4.2 MVA Transformer ONAF28	84	2.5	603318	5112775	973

ID	Type	Sound Power Level (dBA)	Hub Height (m)	Coordinates (UTM NAD83 Z13N)		
				X (m)	Y (m)	Z (m)
BESS Trans28	4.2 MVA Transformer ONAF29	84	2.5	603328	5112631	976
BESS Trans29	4.2 MVA Transformer ONAF30	84	2.5	603328	5112649	976
BESS Trans30	4.2 MVA Transformer ONAF31	84	2.5	603328	5112667	975
BESS Trans31	4.2 MVA Transformer ONAF32	84	2.5	603328	5112685	975
BESS Trans32	4.2 MVA Transformer ONAF33	84	2.5	603328	5112703	975
BESS Trans33	4.2 MVA Transformer ONAF34	84	2.5	603328	5112721	974
BESS Trans34	4.2 MVA Transformer ONAF35	84	2.5	603328	5112739	974
BESS Trans35	4.2 MVA Transformer ONAF36	84	2.5	603328	5112757	973
BESS Trans36	4.2 MVA Transformer ONAF37	84	2.5	603328	5112775	973
BESS Trans37	4.2 MVA Transformer ONAF38	84	2.5	603338	5112631	975
BESS Trans38	4.2 MVA Transformer ONAF39	84	2.5	603338	5112649	975
BESS Trans39	4.2 MVA Transformer ONAF40	84	2.5	603338	5112667	975
BESS Trans40	4.2 MVA Transformer ONAF41	84	2.5	603338	5112685	975
BESS Trans41	4.2 MVA Transformer ONAF42	84	2.5	603338	5112703	974
BESS Inverter42	SMA Inverter	92	2.5	603338	5112721	974
BESS Inverter43	SMA Inverter	92	2.5	603338	5112739	973
BESS Inverter44	SMA Inverter	92	2.5	603338	5112757	973
BESS Inverter45	SMA Inverter	92	2.5	603338	5112775	973
BESS Inverter46	SMA Inverter	92	2.5	603348	5112631	975
BESS Inverter47	SMA Inverter	92	2.5	603348	5112649	975
BESS Inverter48	SMA Inverter	92	2.5	603348	5112667	975
BESS Inverter49	SMA Inverter	92	2.5	603348	5112685	975
BESS Inverter50	SMA Inverter	92	2.5	603348	5112703	974
BESS Inverter51	SMA Inverter	92	2.5	603348	5112721	974
BESS Inverter52	SMA Inverter	92	2.5	603348	5112739	973
BESS Inverter53	SMA Inverter	92	2.5	603348	5112757	973
BESS Inverter54	SMA Inverter	92	2.5	603348	5112775	973
BESS Inverter55	SMA Inverter	92	2.5	603358	5112631	975
BESS Inverter56	SMA Inverter	92	2.5	603358	5112649	975
BESS Inverter57	SMA Inverter	92	2.5	603358	5112667	975
BESS Inverter58	SMA Inverter	92	2.5	603358	5112685	974
BESS Inverter59	SMA Inverter	92	2.5	603358	5112703	974
BESS Inverter60	SMA Inverter	92	2.5	603358	5112721	973
BESS Inverter61	SMA Inverter	92	2.5	603358	5112739	973
BESS Inverter62	SMA Inverter	92	2.5	603358	5112757	972
BESS Inverter63	SMA Inverter	92	2.5	603358	5112775	972
BESS Inverter64	SMA Inverter	92	2.5	603368	5112631	974
BESS Inverter65	SMA Inverter	92	2.5	603368	5112649	974
BESS Inverter66	SMA Inverter	92	2.5	603368	5112667	974

ID	Type	Sound Power Level (dBA)	Hub Height (m)	Coordinates (UTM NAD83 Z13N)		
				X (m)	Y (m)	Z (m)
BESS Inverter67	SMA Inverter	92	2.5	603368	5112685	974
BESS Inverter68	SMA Inverter	92	2.5	603368	5112703	974
BESS Inverter69	SMA Inverter	92	2.5	603368	5112721	973
BESS Inverter70	SMA Inverter	92	2.5	603368	5112739	973
BESS Inverter71	SMA Inverter	92	2.5	603368	5112757	972
BESS Inverter72	SMA Inverter	92	2.5	603368	5112775	972
BESS Inverter73	SMA Inverter	92	2.5	603378	5112631	974
BESS Inverter74	SMA Inverter	92	2.5	603378	5112649	974
BESS Inverter75	SMA Inverter	92	2.5	603378	5112667	974
BESS Inverter76	SMA Inverter	92	2.5	603378	5112685	974
BESS Inverter77	SMA Inverter	92	2.5	603378	5112703	973
BESS Inverter78	SMA Inverter	92	2.5	603378	5112721	973
BESS Inverter79	SMA Inverter	92	2.5	603378	5112739	973
BESS Inverter80	SMA Inverter	92	2.5	603378	5112757	972
BESS Inverter81	SMA Inverter	92	2.5	603378	5112775	972
BESS Inverter82	SMA Inverter	92	2.5	603388	5112631	974
BESS Inverter83	SMA Inverter	92	2.5	603388	5112649	974
BESS Inverter84	SMA Inverter	92	2.5	603388	5112667	973
BESS Inverter85	SMA Inverter	92	2.5	603388	5112685	973
BESS Inverter86	SMA Inverter	92	2.5	603388	5112703	973
BESS Inverter87	SMA Inverter	92	2.5	603388	5112721	973
BESS Inverter88	SMA Inverter	92	2.5	603388	5112739	972
BESS Inverter89	SMA Inverter	92	2.5	603388	5112757	972
BESS Inverter90	SMA Inverter	92	2.5	603388	5112775	972

APPENDIX D. RECEIVER LEVEL RESULTS

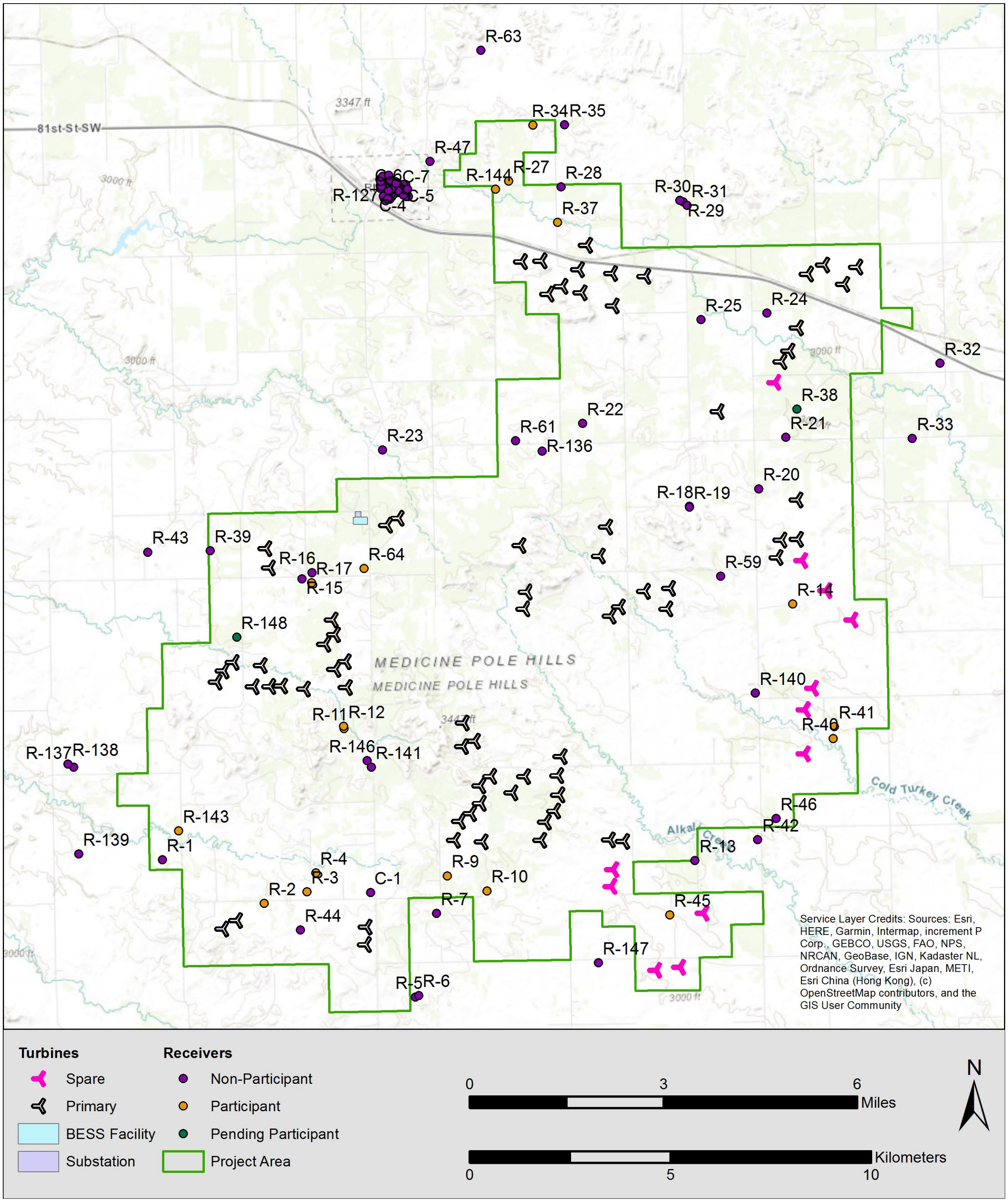

FIGURE 10: RECEIVER MAP

TABLE 3: RECEPTOR SOUND LEVEL RESULTS AND COORDINATES

Receptor	**Land Use**	Overall Sound Level (dBA)	**Coordinates (UTM Zone 13N, NAD 83)**		
			X (m)	Y (m)	Z (m)
R-1	Residential Non-Participant	32	598290	5104261	941
R-2	Residential Participant	41	600826	5103183	956
R-3	Residential Participant	37	601891	5103470	959
R-4	Residential Participant	36	602113	5103942	953
R-5	Residential Non-Participant	34	604593	5100844	960
R-6	Residential Non-Participant	35	604671	5100890	959
R-7	Residential Non-Participant	39	605115	5102927	974
R-9	Residential Participant	43	605382	5103866	969
R-10	Residential Participant	41	606371	5103492	952
R-11	Residential Participant	42	602810	5107530	977
R-12	Residential Participant	42	602807	5107585	976
R-13	Residential Non-Participant	39	611554	5104249	921
R-14	Residential Participant	44	613992	5110632	929
R-15	Residential Non-Participant	44	601761	5111255	975
R-16	Residential Non-Participant	43	602011	5111415	974
R-17	Residential Participant	43	602001	5111159	969
R-18	Residential Non-Participant	35	611420	5113066	960
R-19	Residential Non-Participant	35	611415	5113039	961
R-20	Residential Non-Participant	42	613145	5113499	949
R-21	Residential Non-Participant	40	613815	5114783	920
R-22	Residential Non-Participant	36	608753	5115123	962
R-23	Residential Non-Participant	38	603772	5114469	962
R-24	Residential Non-Participant	44	613349	5117872	930
R-25	Residential Non-Participant	39	611703	5117712	935
R-27	Residential Participant	36	606912	5121157	964
R-28	Residential Non-Participant	38	608220	5121018	955
R-29	Residential Non-Participant	35	611264	5120638	944
R-30	Residential Non-Participant	35	611177	5120682	945
R-31	Residential Non-Participant	36	611358	5120554	944
R-32	Residential Non-Participant	33	617660	5116624	914
R-33	Residential Non-Participant	33	616971	5114750	909
R-34	Residential Participant	32	607517	5122547	981
R-35	Residential Non-Participant	32	608309	5122556	981
R-37	Residential Participant	44	608128	5120127	952
R-38	Pending Participant[6]	42	614096	5115483	928
R-39	Residential Non-Participant	39	599477	5111956	947
R-40	Residential Participant	43	614996	5107279	914
R-41	Residential Participant	43	615024	5107579	916

[6] This residence is a pending participant and currently in the process of executing administrative documents for a participation agreement.

Receptor	Land Use	Overall Sound Level (dBA)	Coordinates (UTM Zone 13N, NAD 83)		
			X (m)	Y (m)	Z (m)
R-42	Residential Non-Participant	35	613120	5104763	915
R-43	Residential Non-Participant	34	597921	5111924	945
R-44	Residential Non-Participant	37	601725	5102516	964
R-45	Residential Participant	43	610922	5102894	914
R-46	Residential Non-Participant	36	613577	5105297	920
R-47	Residential Non-Participant	30	604953	5121651	987
R-48	Residential Non-Participant	25	604367	5120914	984
R-49	Residential Non-Participant	25	604349	5121071	983
R-50	Residential Non-Participant	24	604213	5121073	983
R-51	Residential Non-Participant	25	604364	5120814	987
R-52	Residential Non-Participant	25	604381	5120816	987
R-53	Residential Non-Participant	25	604397	5120815	987
R-54	Residential Non-Participant	25	604420	5120774	990
R-55	Residential Non-Participant	25	604361	5120776	988
R-56	Residential Non-Participant	25	604001	5120773	980
R-57	Residential Non-Participant	25	603960	5120722	979
R-58	Residential Non-Participant	24	604134	5120870	981
R-59	Residential Non-Participant	41	612193	5111321	944
R-61	Residential Non-Participant	35	607087	5114694	977
R-63	Residential Non-Participant	19	606220	5124417	948
R-64	Residential Participant	44	603312	5111520	998
R-65	Residential Non-Participant	24	604294	5121067	982
R-66	Residential Non-Participant	24	604181	5121033	982
R-67	Residential Non-Participant	24	604130	5121044	983
R-68	Residential Non-Participant	25	604063	5121124	986
R-69	Residential Non-Participant	24	604085	5121076	984
R-71	Residential Non-Participant	25	604363	5120859	987
R-72	Residential Non-Participant	25	604296	5120816	986
R-73	Residential Non-Participant	25	604356	5120934	984
R-74	Residential Non-Participant	25	604400	5120958	983
R-75	Residential Non-Participant	25	604023	5121081	985
R-76	Residential Non-Participant	25	604000	5121062	984
R-77	Residential Non-Participant	25	603977	5121074	985
R-78	Residential Non-Participant	25	603985	5121117	986
R-79	Residential Non-Participant	30	603852	5121246	997
R-80	Residential Non-Participant	25	603893	5121202	992
R-81	Residential Non-Participant	25	603857	5121057	984
R-82	Residential Non-Participant	25	603891	5121094	986
R-83	Residential Non-Participant	25	603938	5121037	983
R-84	Residential Non-Participant	25	603999	5121036	983
R-85	Residential Non-Participant	25	603923	5121129	988

Receptor	Land Use	Overall Sound Level (dBA)	Coordinates (UTM Zone 13N, NAD 83)		
			X (m)	Y (m)	Z (m)
R-86	Residential Non-Participant	24	603926	5121162	989
R-87	Residential Non-Participant	25	603828	5121192	990
R-88	Residential Non-Participant	25	603880	5120787	973
R-89	Residential Non-Participant	25	603960	5120800	977
R-90	Residential Non-Participant	25	603923	5120769	974
R-91	Residential Non-Participant	25	603954	5120712	978
R-92	Residential Non-Participant	25	603980	5120748	980
R-93	Residential Non-Participant	24	604023	5120801	981
R-94	Residential Non-Participant	25	603982	5120828	978
R-95	Residential Non-Participant	25	603901	5120811	974
R-96	Residential Non-Participant	25	603834	5120824	974
R-97	Residential Non-Participant	25	603824	5120713	973
R-98	Residential Non-Participant	25	603807	5120783	974
R-99	Residential Non-Participant	25	603853	5120738	973
R-100	Residential Non-Participant	25	603834	5120759	973
R-101	Residential Non-Participant	25	603863	5120860	976
R-102	Residential Non-Participant	25	603876	5120870	977
R-103	Residential Non-Participant	25	603865	5120963	980
R-104	Residential Non-Participant	25	603886	5120919	979
R-105	Residential Non-Participant	25	603970	5120920	979
R-106	Residential Non-Participant	25	604022	5120990	981
R-107	Residential Non-Participant	25	603996	5120964	980
R-108	Residential Non-Participant	25	603880	5120970	980
R-109	Residential Non-Participant	25	603915	5120745	974
R-110	Residential Non-Participant	25	603882	5120705	973
R-111	Residential Non-Participant	25	603872	5120733	973
R-112	Residential Non-Participant	25	603787	5120787	975
R-113	Residential Non-Participant	25	603916	5120958	980
R-114	Residential Non-Participant	25	603916	5120924	979
R-115	Residential Non-Participant	25	603718	5121051	985
R-116	Residential Non-Participant	25	603729	5121065	985
R-117	Residential Non-Participant	25	603764	5121112	987
R-118	Residential Non-Participant	25	603810	5121098	987
R-119	Residential Non-Participant	25	603826	5121076	985
R-120	Residential Non-Participant	25	603776	5121056	985
R-121	Residential Non-Participant	25	603747	5121085	986
R-122	Residential Non-Participant	25	603729	5120979	983
R-123	Residential Non-Participant	25	603743	5121020	983
R-124	Residential Non-Participant	28	603707	5121202	995
R-125	Residential Non-Participant	24	603811	5121164	988
R-126	Residential Non-Participant	29	603770	5121271	1000

Receptor	Land Use	Overall Sound Level (dBA)	Coordinates (UTM Zone 13N, NAD 83)		
			X (m)	Y (m)	Z (m)
R-127	Residential Non-Participant	25	603722	5121151	989
R-128	Residential Non-Participant	25	603963	5121214	992
R-129	Residential Non-Participant	24	603947	5121164	989
R-130	Residential Non-Participant	24	603966	5121186	990
R-131	Residential Non-Participant	29	603926	5121303	1004
R-132	Residential Non-Participant	24	604108	5121142	986
R-133	Residential Non-Participant	24	604110	5121100	985
R-134	Residential Non-Participant	25	603853	5120666	973
R-135	Residential Non-Participant	25	603894	5120716	974
R-136	Residential Non-Participant	35	607753	5114434	972
R-137	Residential Non-Participant	29	596075	5106566	937
R-138	Residential Non-Participant	29	595936	5106648	944
R-139	Residential Non-Participant	29	596205	5104411	925
R-140	Residential Non-Participant	40	613058	5108413	918
R-141	Residential Non-Participant	36	603495	5106574	989
R-143	Residential Participant	32	598695	5104987	932
R-144	Residential Participant	36	606584	5120958	962
R-146	Residential Non-Participant	38	603386	5106732	999
R-147	Residential Non-Participant	38	609152	5101701	928
R-148	Pending Participant[7]	47	600142	5109806	952
C-1	Church	41	603470	5103451	974
C-2	School	25	604273	5120933	983
C-3	School	25	604275	5120888	984
C-4	School	25	604206	5120889	982
C-5	School	25	604269	5120952	983
C-6	School	25	604306	5120948	984
C-7	School	24	604161	5120915	981

[7] This residence is a pending participant and currently in the process of executing administrative documents for a participation agreement. Should this landowner not sign, Turbine 41 would not be constructed and the resulting sound level would be 44 dBA L_{eq}.

the science of insight

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