APPENDIX A
Noise Analysis for the Proposed Odell Wind Farm

NOISE ANALYSIS FOR
THE PROPOSED ODELL WIND FARM
in
Cottonwood, Jackson, Martin, and Watonwan Counties, Minnesota

FOR
Odell Wind Farm, LLC

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September 25, 2013

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Table of Contents

List of Tables

List of Figures

I. Introduction & Purpose

Odell Wind Farm, LLC (OWF), a subsidiary of Geronimo Wind Energy, LLC (Geronimo), is proposing the construction of a Large Wind Energy Conversion System (LWECS), as defined in the Wind Siting Act, Minnesota Statutes, Chapter 216F.

The project will be located across parts of Cottonwood, Jackson, Martin, and Watonwan counties, near Mountain Lake, Minnesota. The planned output for the project is up to 200 MW of wind energy capacity using 100 to 133 turbines depending on type.

This report details the expected noise impact of the wind farm on residences (receptors) within and near the project area. The analysis includes assessing four turbine types with between 100 and 133 turbines.

II. General Noise Background

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more “weight.” The A-weighted scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies. The C-weighted scale (dBC) is used to reflect human sensitivity at louder levels. This scale puts more weight on the lower frequencies than does the A-weighted scale.

The term *ambient acoustic environment* refers to the all-encompassing sound in a given environment or community. The outdoor ambient acoustic environment is a composite of sound from varying sources, distances, and directions. Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally-oriented community has *equivalent continuous sound levels* ($L_{eq,}$ which is an energy-based time-averaged noise level) ranging from 30 dBA to 60 dBA.

In agricultural and/or rural communities, the higher sound levels typically exist near roadways and near areas that experience greater human activities such as farming. In addition, compared with similar environments with lower quality wind resources, those environments with higher wind resources generally experience higher sound levels. Different communities can experience a wide variety of sound levels within their given ambient acoustic environments, and this variation of sound creates their respective spectral content.

The background noise in the area is typically a result of wind, farming equipment/operations, and vehicles. **Table 1** provides a rough comparison of the noise levels of some common noise sources.

Table 1: Sound Pressure Levels of Common Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chain saw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Source: "A Guide to Noise Control in Minnesota" MPCA

Along with the volume of the noise source and other factors (i.e. topography of the area) that contribute to the loudness of noise, the distance of a receptor from a sound's source is also an important factor. Sound levels decrease as distance from a source increases. The following rule of thumb regarding sound decreases due to distance is commonly used: Beyond approximately 50 feet, each time the distance between a source and a receptor is doubled, sound levels decrease by three decibels over hard ground, such as pavement or water, and by 4.5 decibels over vegetated areas.

III. Noise from Wind Turbines

Mechanical noise

Mechanical noise from a wind turbine is sound that originates in the generator, gearbox, yaw motors (that intermittently turn the nacelle and blades to face the wind), tower ventilation system, and transformer. Generally, theses sounds are limited in new wind turbines so that they are a negligible fraction of the aerodynamic noise. Mechanical noise from the turbine or gearbox would only be heard above aerodynamic noise when they are not functioning properly.

Aerodynamic noise
Aerodynamic noise is caused by wind passing over the blade of the wind turbine. As wind passes over a moving blade, the blade interrupts the laminar flow of air, causing turbulence and noise. Unexpectedly high aerodynamic noise can be caused by improper blade angle or improper alignment of the rotor to the wind. This is correctable and is usually adjusted during the turbine break-in period. This is the primary source of noise produced by wind turbines. Wind turbines are generally quiet enough for people to hold a normal conversation while standing at the base of the tower.

Modulation of aerodynamic noise
Rhythmic modulation of noise, especially low frequency noise, is also perceptible by the human ear. To a receptor on the ground in front of the wind turbine, the detected blade noise is loudest as the blade is at the bottom of its rotation, and quietest when the blade is at the top of its rotation. For a modern 3-blade turbine, this distance-to-blade effect can cause a pulsing of the blade noise about once per second (1 Hz). The distance-to-blade effect diminishes as receptor distance increases because the relative difference in distance from the receptor to the top or bottom of the blade becomes smaller.

Another source of rhythmic modulation may occur if the wind through the rotor is not uniform. Horizontal layers with different wind speeds or directions can form in the atmosphere. This wind condition is called shear. If the winds at the top and bottom of the blade rotation are different, blade noise will vary between the top and bottom of blade rotation, causing modulation of aerodynamic noise.

Wind farm noise
The noise from multiple turbines similarly distant from a residence can be noticeably louder than a lone turbine through the addition of multiple noise sources. Under steady wind conditions, noise from a wind turbine farm may be greater than noise from the nearest turbine due to synchrony between noise from more than one turbine. If the dominant frequencies of different turbines vary by small amounts, an audible dissonance may be heard when wind conditions are stable.

IV. Assessment and Regulation

The Minnesota Pollution Control Agency is given power to adopt noise standards in Minnesota Statute 116.07 Subd. 2. The adopted standards are given in Minnesota Administrative Rules Chapter 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 AM – 10:00 PM) and nighttime (10:00 PM – 7:00 AM) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L_{10}) and 50 percent of any hour (L_{50}). Household units, including farm houses, are included in Land Use Classification 1. **Table 2** shows the MPCA State noise standards. All the land within the project area is considered Land Use Class 1.

Table 2: MPCA State Noise Standards – Hourly A-Weighted Decibels

Land Use	Code	Day (7:00am – 10:00pm) dBA		Night (10:00pm – 7:00am) dBA	
		L_{10}	L_{50}	L_{10}	L_{50}
Residential	NAC-1	65	60	55 (1)	50 (1)
Commercial	NAC-2	70	65	70	65
Industrial	NAC-3	80	75	80	75

Since wind farms generate a relatively constant noise volume, the anticipated noise from wind farms are typically reported in terms of an equivalent sound level (L_{eq}) that has the same energy and A-weighted level as the community noise over a given time interval rather than reporting both L_{10} and L_{50}. When describing relatively constant sound levels, the L_{10} and L_{50} values will be roughly equal. This equivalent sound level is most appropriately compared to the State L_{50} standards. The difference between L_{eq} and L_{50} is mathematically similar to the difference between the *mean* and the *median* for a data set. These values will be roughly equal for data sets without extreme values or statistical outliers (such as wind turbine noise).

V. Methods

Existing noise levels

Ambient noise monitoring was conducted in July 2013 at 4 (four) locations: three (3) locations (Sites 1 – 3) within the project area as well as 1 (one) at an off-site location (Site 4) as required by the Minnesota Department of Commerce, Energy Facility Permitting “Guidance for Large Wind Energy Conversion System Noise Study Protocol and Report”.

Site 1 – Located north of 410th St and west of 600th Ave.

Site 2 - Located between CR 13 and 430th St west of 550th Ave.

Site 3 – Located south of 920th St between 570th Ave and 580th Ave.

Site 4 - Located between 395th St and 400th St (CR 10) west of 630th Ave (CR 2).

The locations of the four monitoring sites are shown on **Figure 1** in **Appendix A**. These monitoring locations are believed to be representative of the project area. The instrumentation used for the monitoring included the following:

- Digital Larson Davis Model 831 sound level meters.
- Environmental microphones and preamplifiers, complete with a large wind screen and bird spikes.
- Weather sensor units for wind speed and direction, temperature, humidity, pressure, and rainfall.
- Digital audio recorders.
- Weatherproof cases used to store the sound level meter, preamplifiers and batteries.
- Heavy duty tripods to hold each microphone/preamplifier and each weather sensor.

The sound level meters meet all requirements of ANSI S1.4 Type 1 (precision). The sound level meter and analyzer were calibrated by an independent laboratory using standards traceable to the National Institute of Standards and Technology. The sound measurement equipment was also adjusted to a reference level traceable to the National Institute of Standards and Technology, using a battery operated precision microphone calibrator meeting ANSI S1.40 and IEC 60942, Class 1 Sound Calibrator standards. Sound measurement equipment was calibrated and adjusted in WSB's office prior to transportation to the project area. Calibration checks were performed in the field before the first measurement and after completion of measurements. Copies of the yearly calibration and site specific calibration are included in **Appendix B**.
Table 3 displays the typical sound levels observed during daytime and nighttime hours. Generally, the current L_{10} and L_{50} sound levels range from 28 to 59 dBA during both the daytime and nighttime. The monitoring revealed that the existing noise conditions at Site #2 during the nighttime hours already exceed the State Noise Standards for L_{10} and that the nighttime L_{50} ranges from 28.3 to 41.6 dBA.

Table 3: Existing Sound Levels

Time Period	Location	Noise Levels	
		L_{10}	L_{50}
Nighttime 6:00 – 7:00 AM	Site 1	47.0	31.0
	Site 2	59.3	41.6
	Site 3	29.6	28.3
	Site 4	41.8	36.9
Mn State Nighttime Standard		55	50
Daytime 5:00 – 6:00 PM	Site 1	35.3	29.6
	Site 2	55.8	43.9
	Site 3	50.1	36.6
	Site 4	45.8	35.5
Mn State Daytime Standard		65	60

Wind Turbines
Three wind turbine types and layout configuration were selected for analysis. **Table 4** outlines the characteristics of each turbine type.

Table 4: Wind Turbine Specifications

Equipment	Hub Height	Rotor Diameter	Total Sound Power Level (dBA)
GE 1.6-87	80m	87m	105.5
Vestas V110-2.0	80m	110m	107.5
Gamesa G97-2.0	78m	97m	105.8
Goldwind GW87	85m	84m	103.2

Figure 1 in **Appendix A** also shows the proposed wind turbine locations, for each type of turbine, in reference to the sensitive receptors and monitoring locations. **Table 5** summarizes the selected monitoring sites including the distance from each monitoring location to the nearest sensitive receptor and the distance from each monitoring site to the nearest turbine for each type of turbine. **Appendix C** includes the distance calculations between each monitoring site, receptor location and turbine.

Table 5 – Summary of Monitoring Site

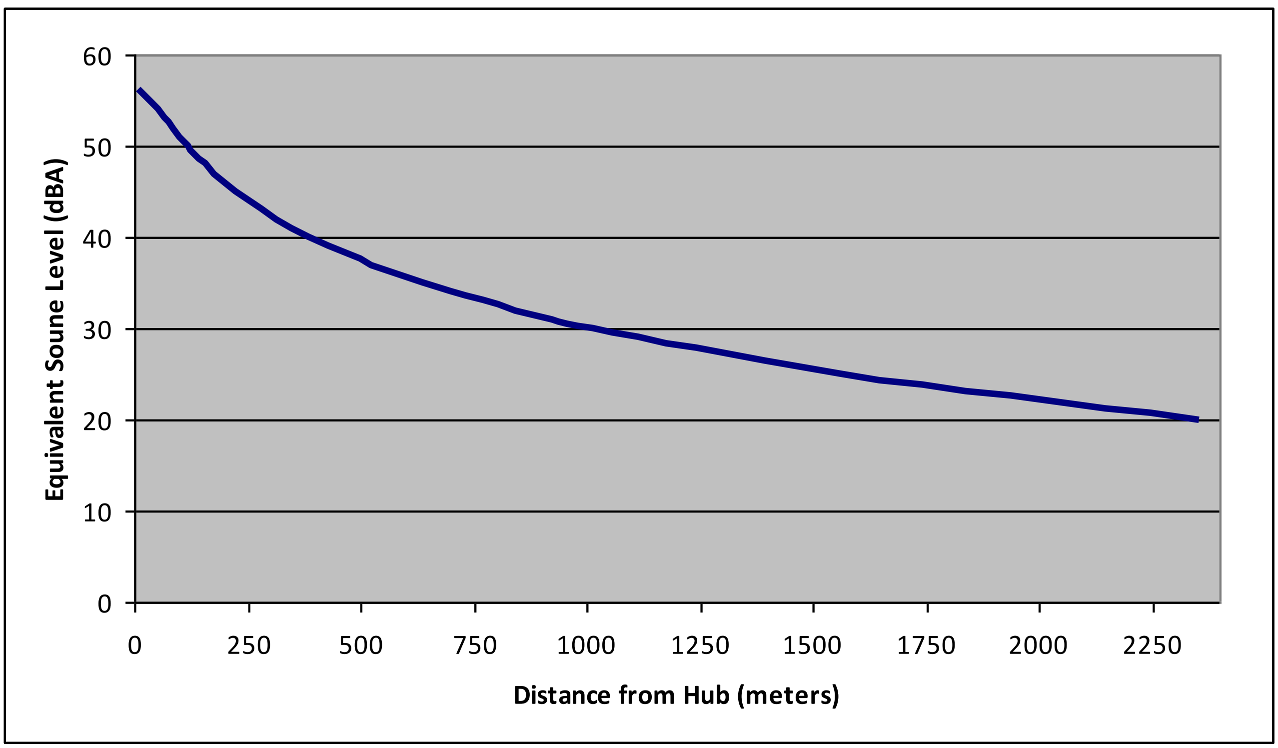
Location	Distance to Nearest Sensitive Receptor (ft)	Distance to Nearest Turbine (ft)			
		GE 1.6-87	Vestas V110–2.0	Gamesa G97–2.0	Goldwind GW87
Monitoring Site 1	1857 (Receptor 11)	2356 (Turbine 75)	1654 (Turbine 97)	1664 (Turbine 95)	2356 (Turbine 97)
Monitoring Site 2	411 (Receptor 39)	1910 (Turbine 60)	2318 (Turbine 39)	2281 (Turbine 70)	1910 (Turbine 82)
Monitoring Site 3	1090 (Receptor 113)	4846 (Turbine 84)	890 (Turbine16)	890 (Turbine 9)	1254 (Turbine 15)
Monitoring Site 4	5975 (Receptor 120)	18806 (Turbine 76)	17366 (Turbine 67)	18403 (Turbine 98)	18806 (Turbine 98)
Receptor 11	NA	1239 (Turbine 98)			
Receptor 63	NA	1475 (Turbine 59)			
Receptor 22	NA		1377 (Turbine 25)		
Receptor 13	NA		1442 (Turbine 67)		
Receptor 27	NA			1262 (Turbine 89)	
Receptor 25	NA			1282 (Turbine 85)	
Receptor 11	NA				1239 (Turbine 97)
Receptor 63	NA				1475 (Turbine 58)

Noise Modeling

A noise assessment was completed for each of the four wind turbine options using industry-accepted sound-modeling software. The program used to model the project was the Computer Aided Design for Noise Abatement (CadnaA), Version 4.1.137, published by DataKustik, Ltd., Munich, Germany. The CadnaA program is a scaled, three-dimensional program that takes into account air absorption, terrain, ground absorption, and ground reflection for each piece of noise-emitting equipment and predicts downwind sound-pressure levels.

The wind turbines to be used within the project site are warranted to generate a maximum apparent sound power level of 103.2 dBA to 107.5 dBA +/- 2 dBA immediately adjacent to the turbine hub. All turbine models being proposed for this project have multiple hub heights, for the purposes of this report the most impactful hub heights (i.e. the lowest hub height under consideration) for each model was evaluated. The decibels decrease as the receptor moves further away from the turbine. Assuming a featureless plain and constant attenuation, a single turbine is expected to generate less than 50 decibels at approximately 100 meters (328 feet). **Figure 2** shows the relationship between the sound volumes created by a single turbine and the receptor distance from the base of the turbine.

Figure 2 – Sound Level and Distance



VI. Results

Based on the ambient monitoring the monitoring data has been graphed by time of day for the daytime and night time conditions. **Figure 3a – 3d** in **Appendix A** shows the noise levels over time at each monitoring site.

The monitored hourly L_{10} and L_{50} data was also compared to measured wind speeds. **Figure 4a – 4b** in **Appendix A** shows hourly sound distributions in comparison to average wind speeds measured at microphone height at each monitoring site. In addition **Figure 5a – 5b** in **Appendix A** presents the A-weighted and C-weighted hourly Leq in comparison to wind speeds at hub height for each monitoring site.

Figures 6 - 9 in **Appendix A** depict the sound contours anticipated by the construction of the Odell Wind Farm project for each of the optional turbine types. These figures depict only turbine-generated sound, and do not represent cumulative noise volumes including background or existing noise. It is also useful to consider the magnitude of the increase in sound levels by the Odell Wind Farm project.

Table 6 displays the sound levels from the turbines for the highest 5 (five) modeled receptor locations as well as the resulting cumulative sound levels. In Minnesota, the MPCA State Noise Standards restrict noise levels to 60 dBA during the daytime. Since actual background noise levels are not known for each receptor, the sound impacts are summarized for three assumed L_{50} background noise levels: 40 dBA, 50 dBA and 60 dBA.

The analysis indicates that operation of the Odell Wind project does not have noise levels of 60 dBA or greater, during the daytime conditions or 50 dBA or greater during the nighttime conditions, on any modeled receptor, nor will the cumulative impact on any residence exceed 60 dBA or 50 dBA when assuming a 40 dBA background sound level. The highest monitored background noise levels ranged from 31.0 dBA to 41.6 dBA for the nighttime conditions and 29.6 to 43.9 for the daytime conditions. When assuming background sound levels of 40 dBA, the cumulative sound levels range from 40.0 dBA to 46.2 dBA, indicating that the change in sound levels caused by the wind farm would range from 0.0 dBA to 6.2 dBA. This additional sound from the wind turbines would not be noticeable. During the daytime or nighttime conditions, only with a background sound level already approaching or exceeding the 60 dBA or 50 dBA thresholds would the cumulative sound level (background and wind turbine sound) exceed the MPCA requirements and then only by an imperceptible incremental increase over the current background sound levels.

Table 6: Sound Levels at Potential Receptors

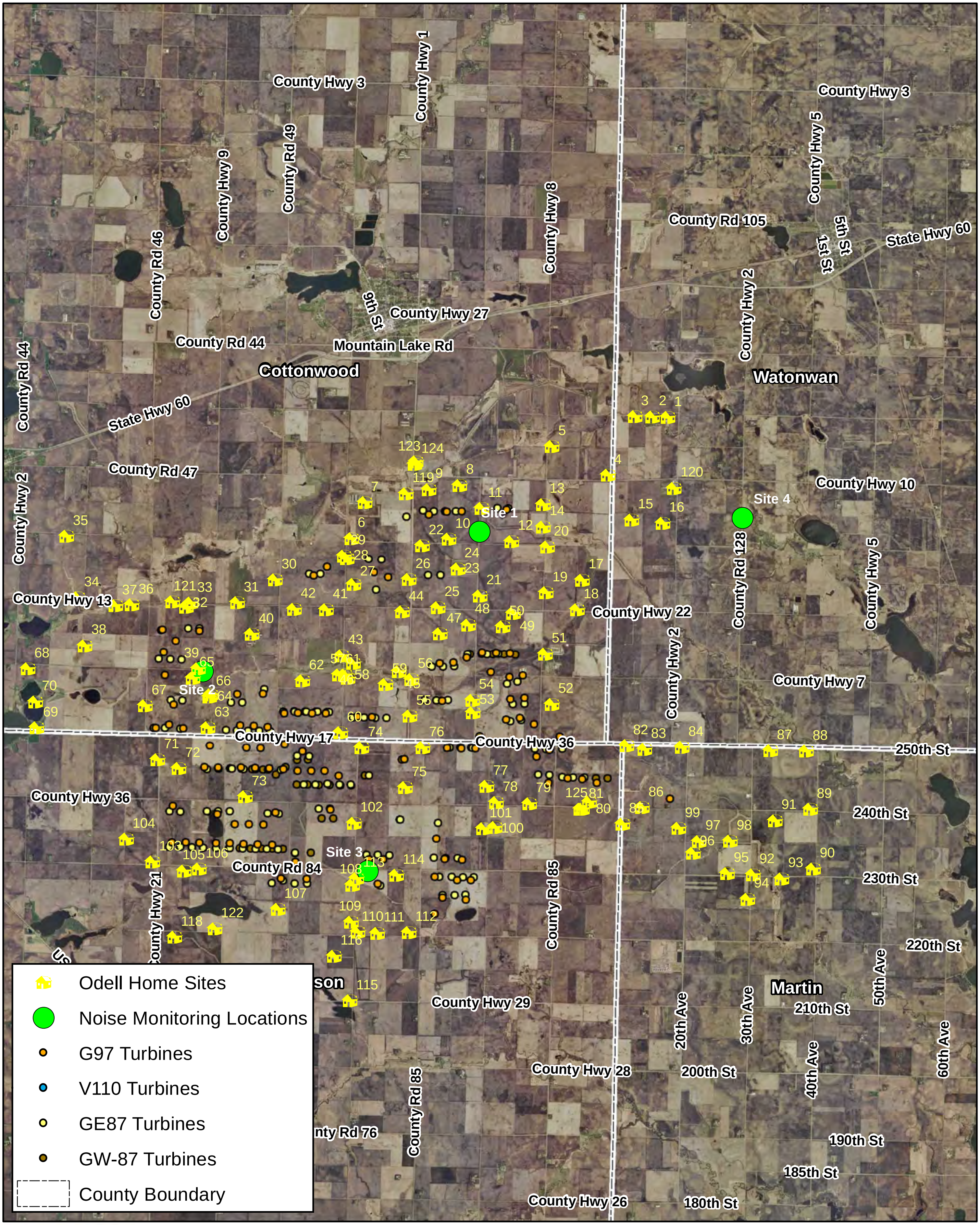
Receptor	Turbine Sound Impact (dBA)	Background + Turbine Impact		
		40 dBA	**50** dBA	**60** dBA
GE 1.6-87 Turbine				
73	43.7	45.2	50.9	60.1
63	42.8	44.6	50.8	60.1
60	42.7	44.6	50.7	60.1
114	42.1	44.2	50.7	60.1
106	42.0	44.1	50.6	60.1
Vestas V110-2.0 Turbine				
73	45.0	46.2	51.2	60.1
63	44.3	45.7	51.0	60.1
60	43.3	45.0	50.8	60.1
114	43.1	44.8	50.8	60.1
54	42.8	44.6	50.8	60.1
Gamesa G97-2.0 Turbine				
73	43.3	45.0	50.8	60.1
63	42.6	44.5	50.7	60.1
60	41.6	43.9	50.6	60.1
114	41.4	43.8	50.6	60.1
54	41.1	43.6	50.5	60.1
Goldwind G87 Turbine				
73	41.7	43.9	50.6	60.1
63	40.5	43.3	50.5	60.0
60	40.3	43.2	50.4	60.0
106	39.8	42.9	50.4	60.0
114	39.7	42.9	50.4	60.0

Guide to Reading Table 6: At receptor 73 for the GE 1.6-87 Turbine type, we can predict that the maximum sound generated by the proposed turbine will be 43.7 dBA. However, the existing sound levels at this specific location can only be estimated based on the sound monitoring results presented earlier. If the existing sound level is 50 dBA, the resulting sound level (background noise + turbine noise) at receptor 73 will be 50.9 dBA, an imperceptible increase.

APPENDIX

Appendix A

Figures



Noise Monitoring & Turbine Locations

Figure 1

1 inch = 10,000 feet

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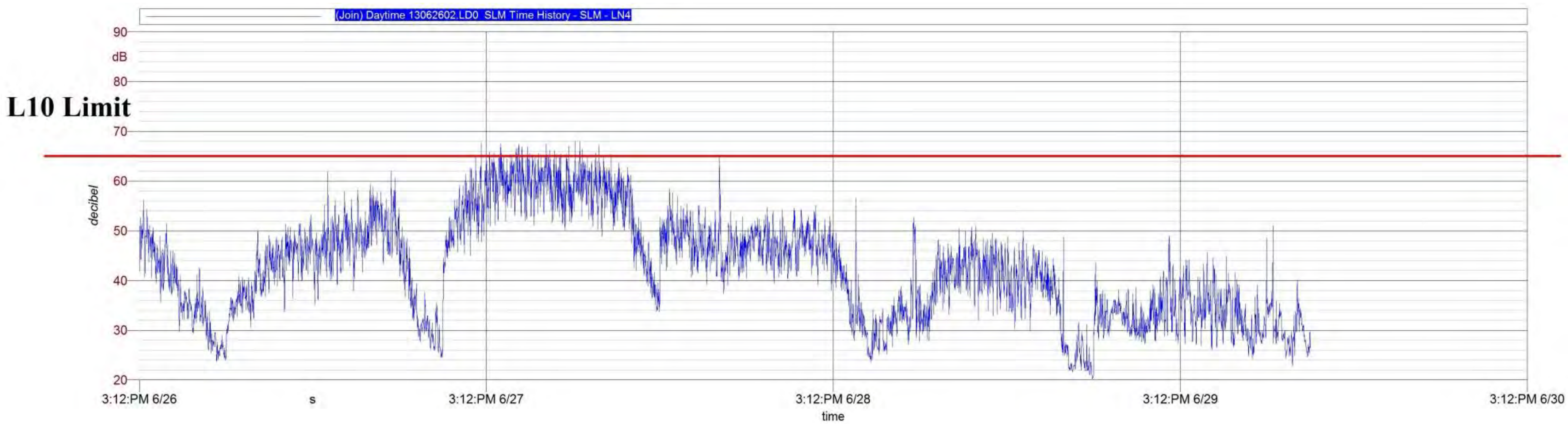
Figure 3a: Monitored Noise vs Wind Speed

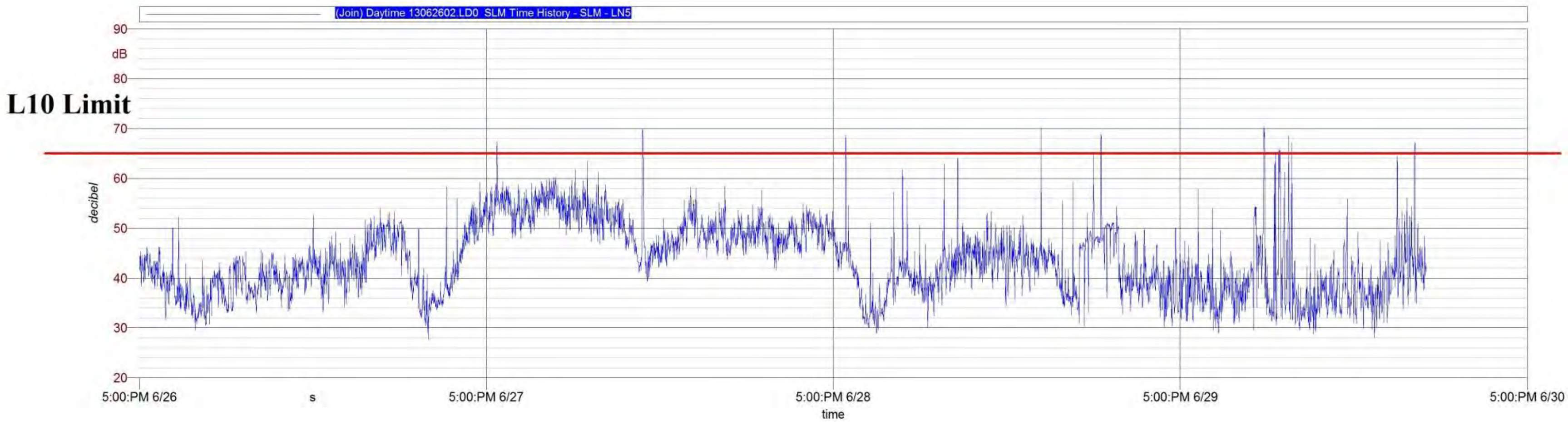
Monitoring Site 1 – Daytime



Monitoring Site 1 – Nighttime

Figure 3b: Monitored Noise vs Wind Speed

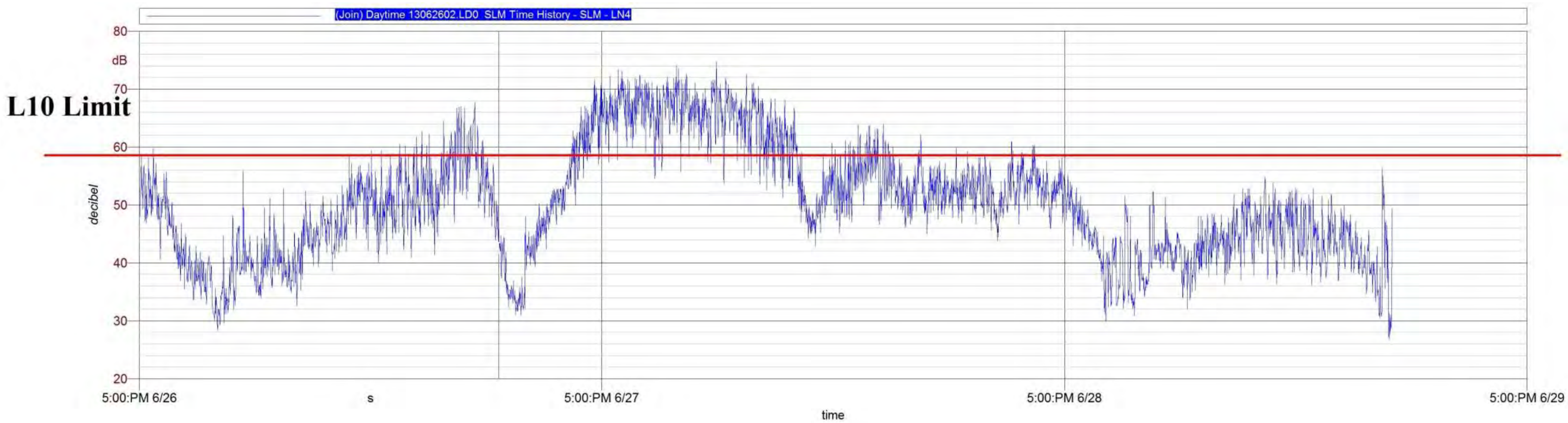
Monitoring Site 2 – Daytime



Monitoring Site 2 – Nighttime

Figure 3c: Monitored Noise vs Wind Speed

Monitoring Site 3 – Daytime



Monitoring Site 3 – Nighttime

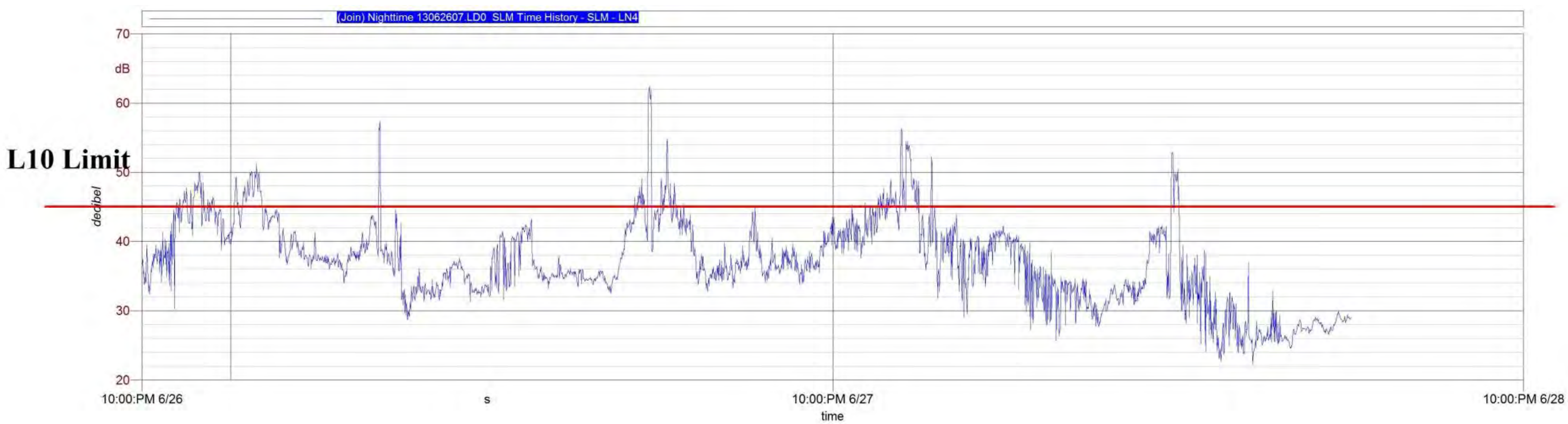
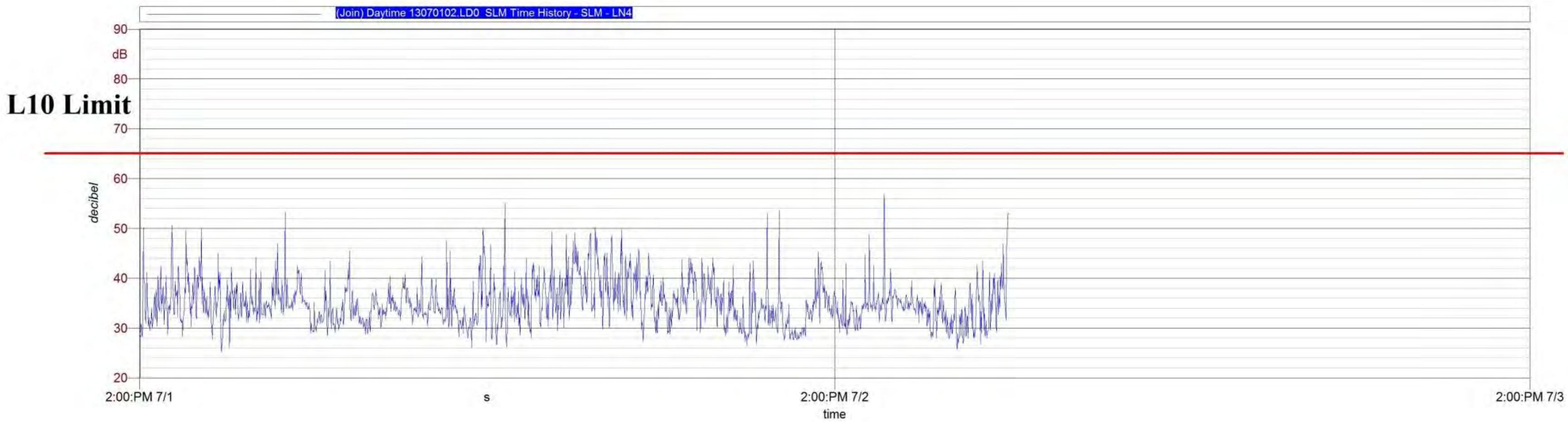


Figure 3d: Monitored Noise vs Wind Speed

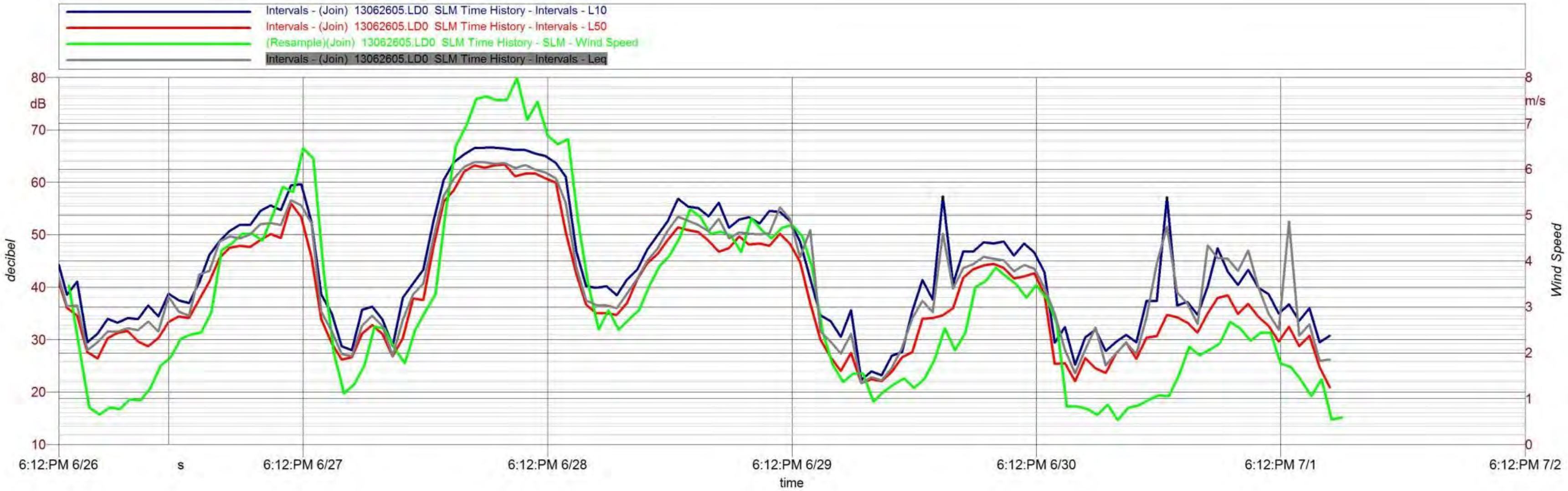
Monitoring Site 4 – Daytime



Monitoring Site 4 – Nighttime

Figure 4a: Monitored L_{10} and L_{50} vs Wind Speed

Monitoring Site 1



Monitoring Site 2

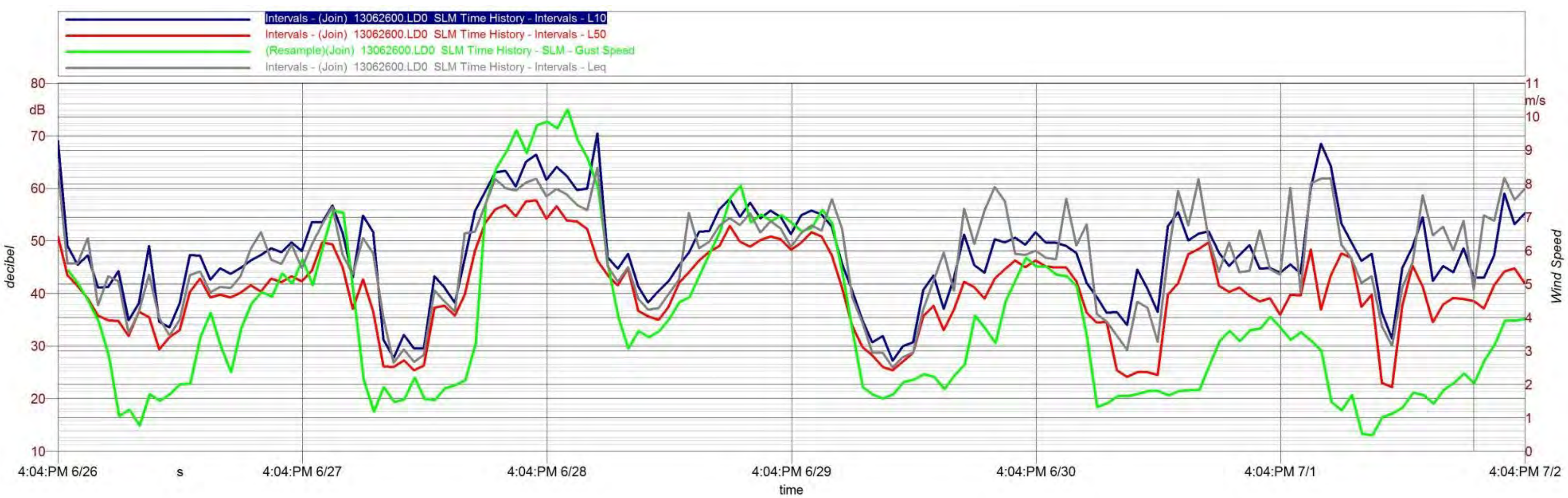
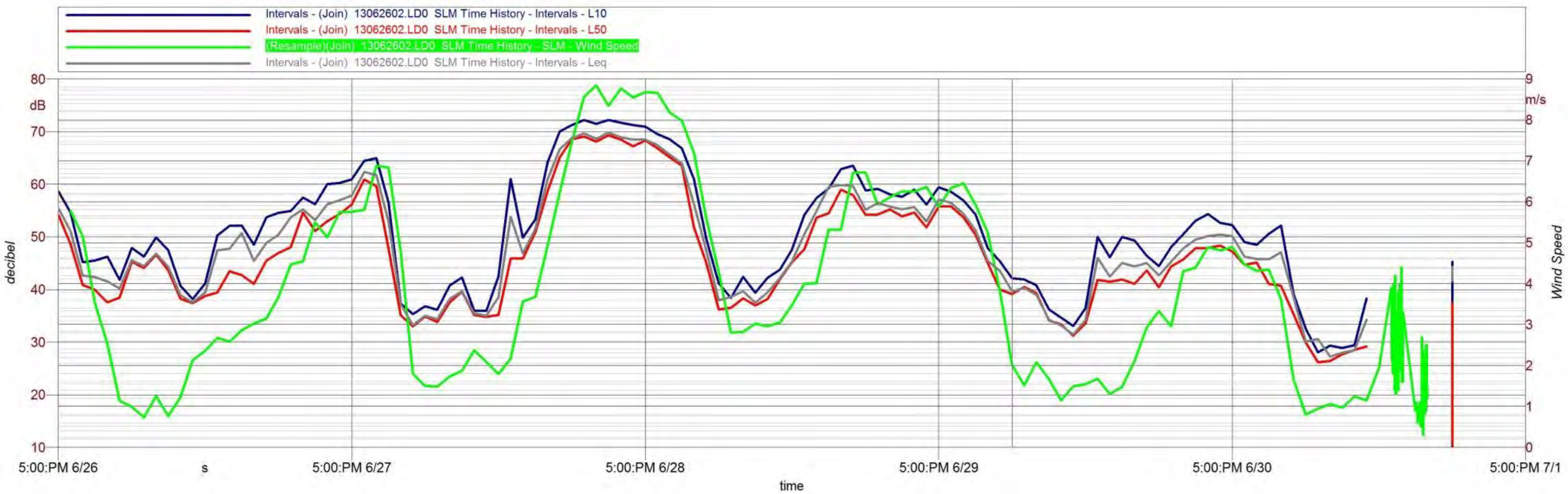


Figure 4b: Monitored L_{10} and L_{50} vs Wind Speed

Monitoring Site 3



Monitoring Site 4

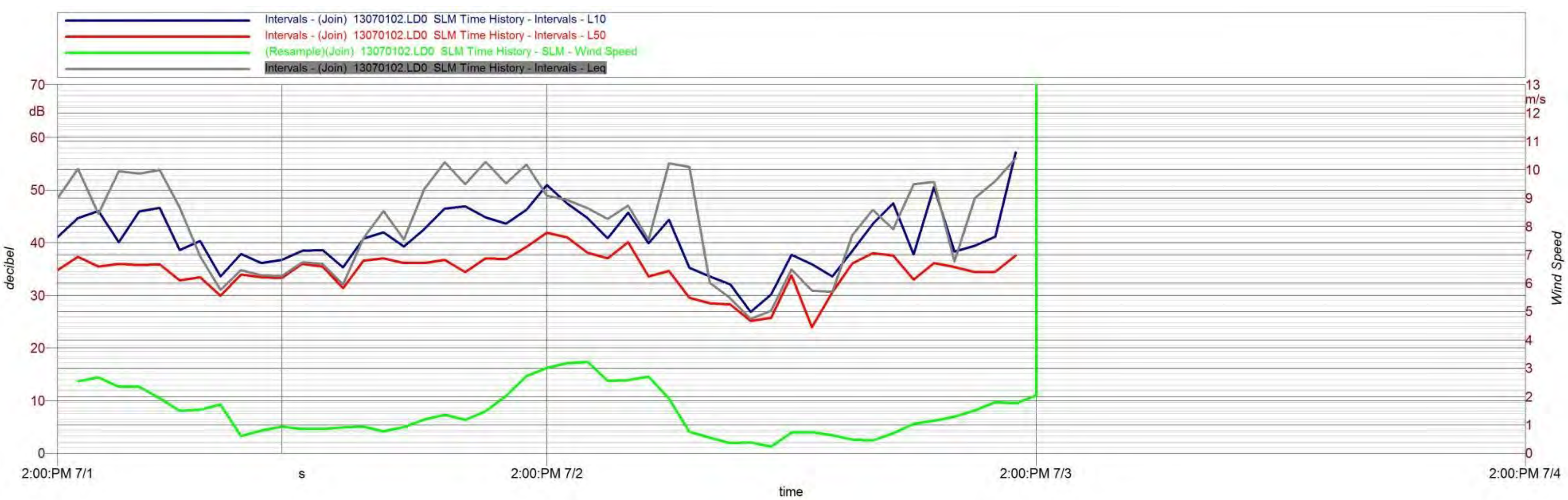
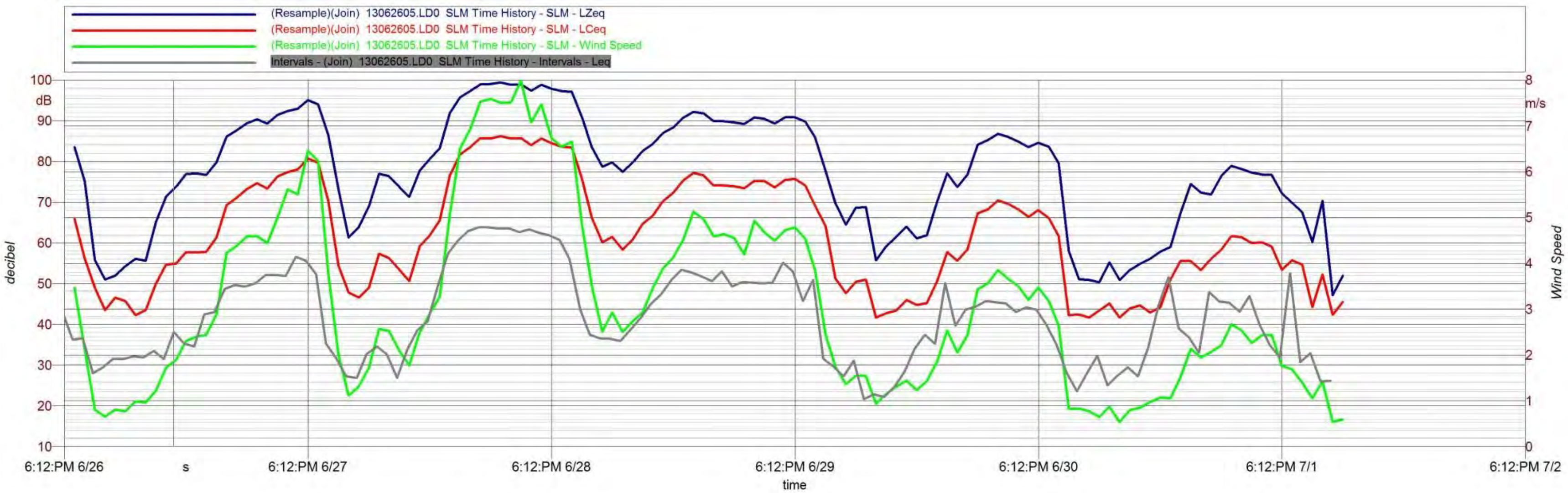


Figure 5a: Monitored A Weighted and C Weighted L_{eq} vs Wind Speed

Monitoring Site 1



Monitoring Site 2

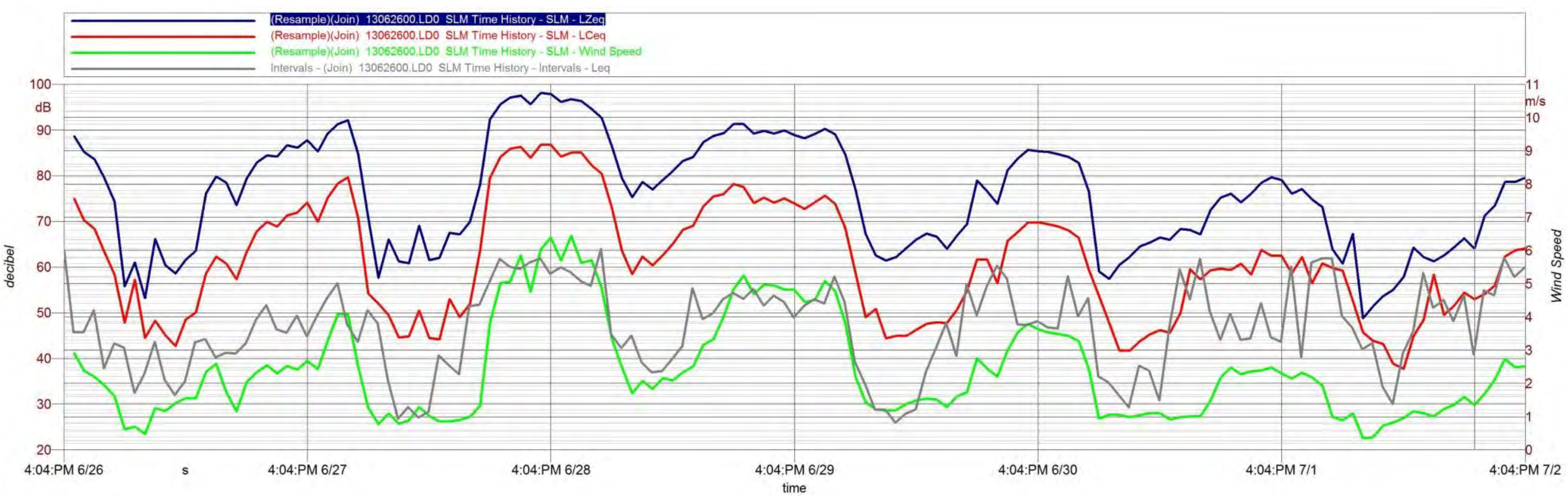
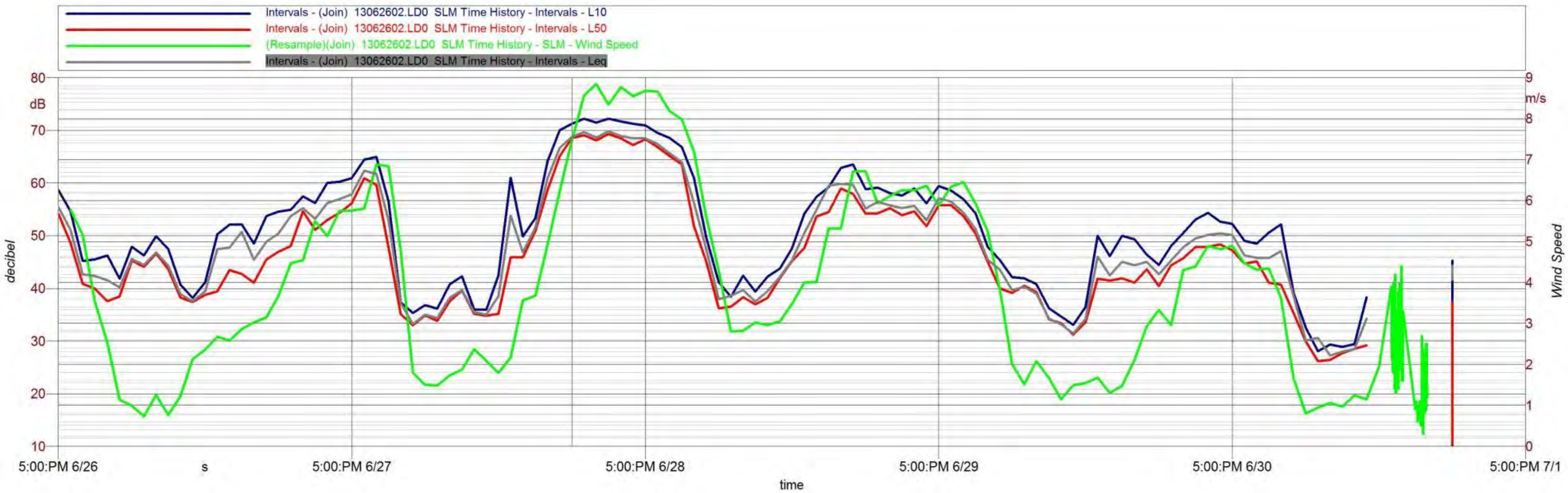
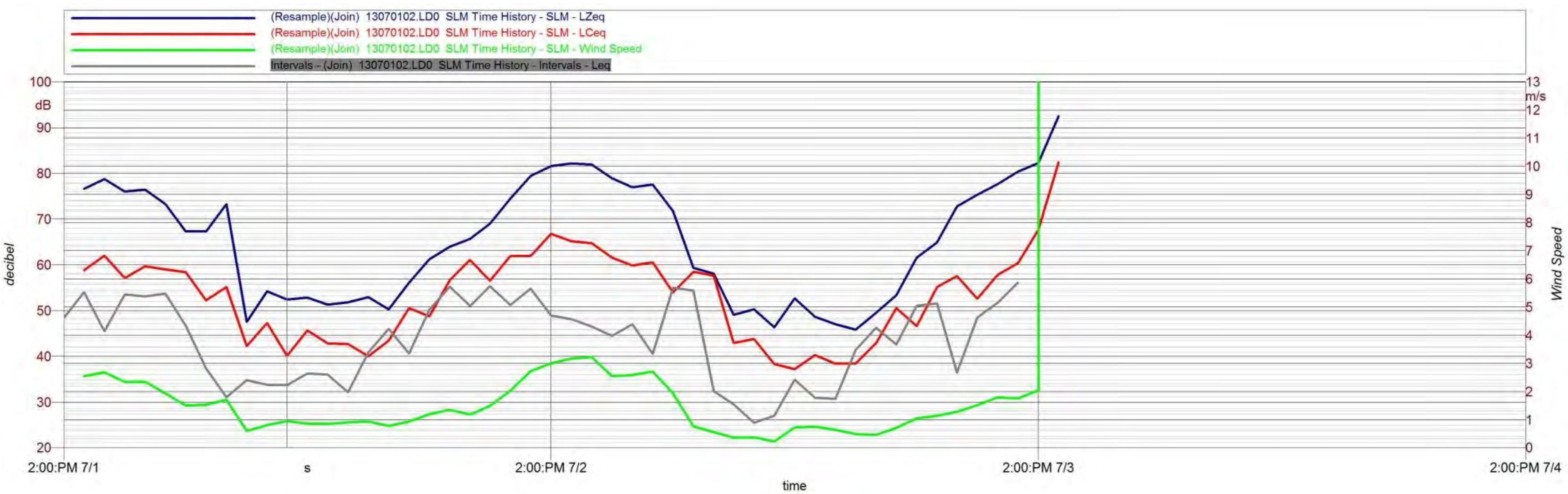


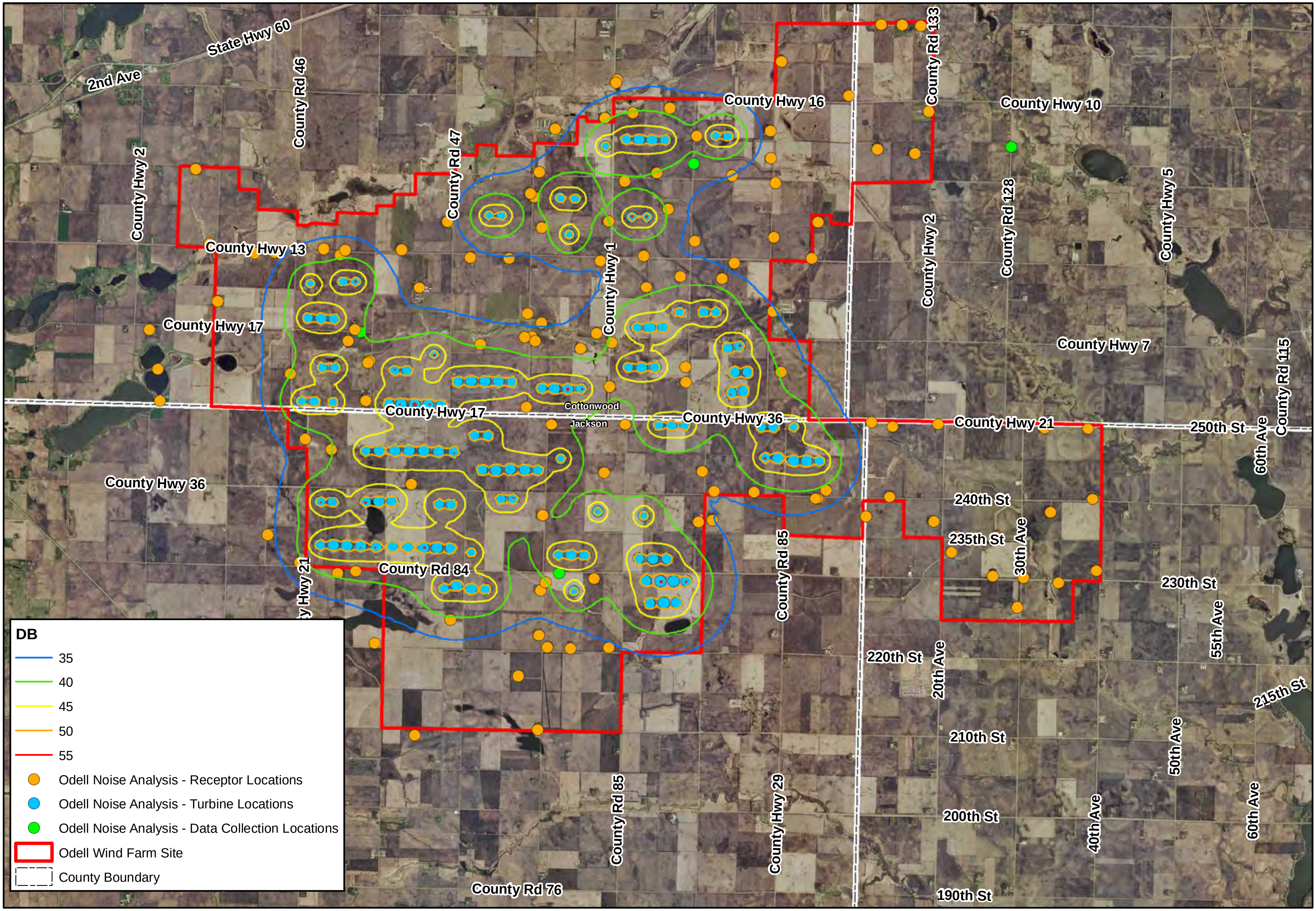
Figure 5b: Monitored A Weighted and C Weighted L_{eq} vs Wind Speed

Monitoring Site 3



Monitoring Site 4





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Noise Modeling - GE87
Odell Wind Farm

Figure 6

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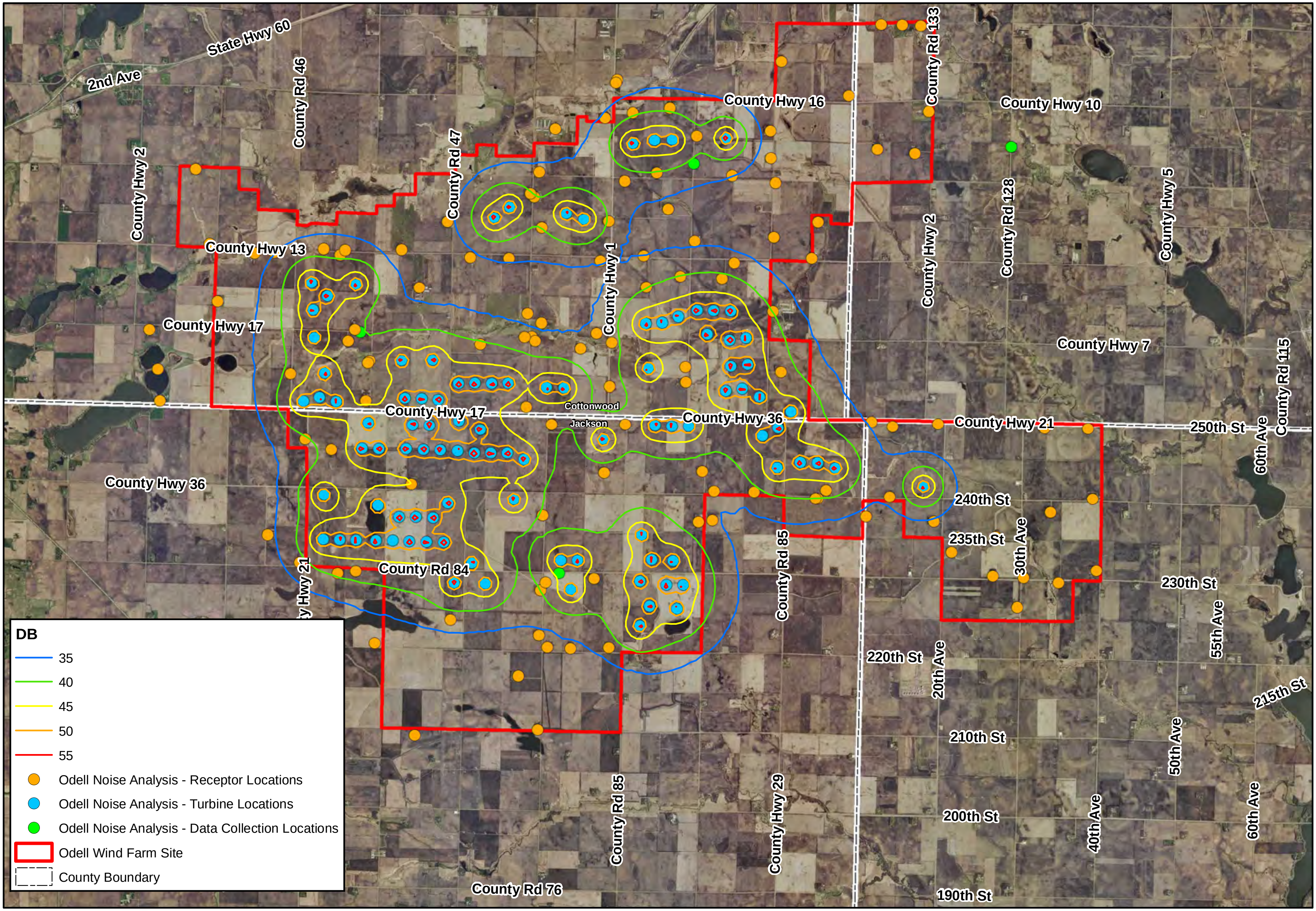
0 1.5 Miles



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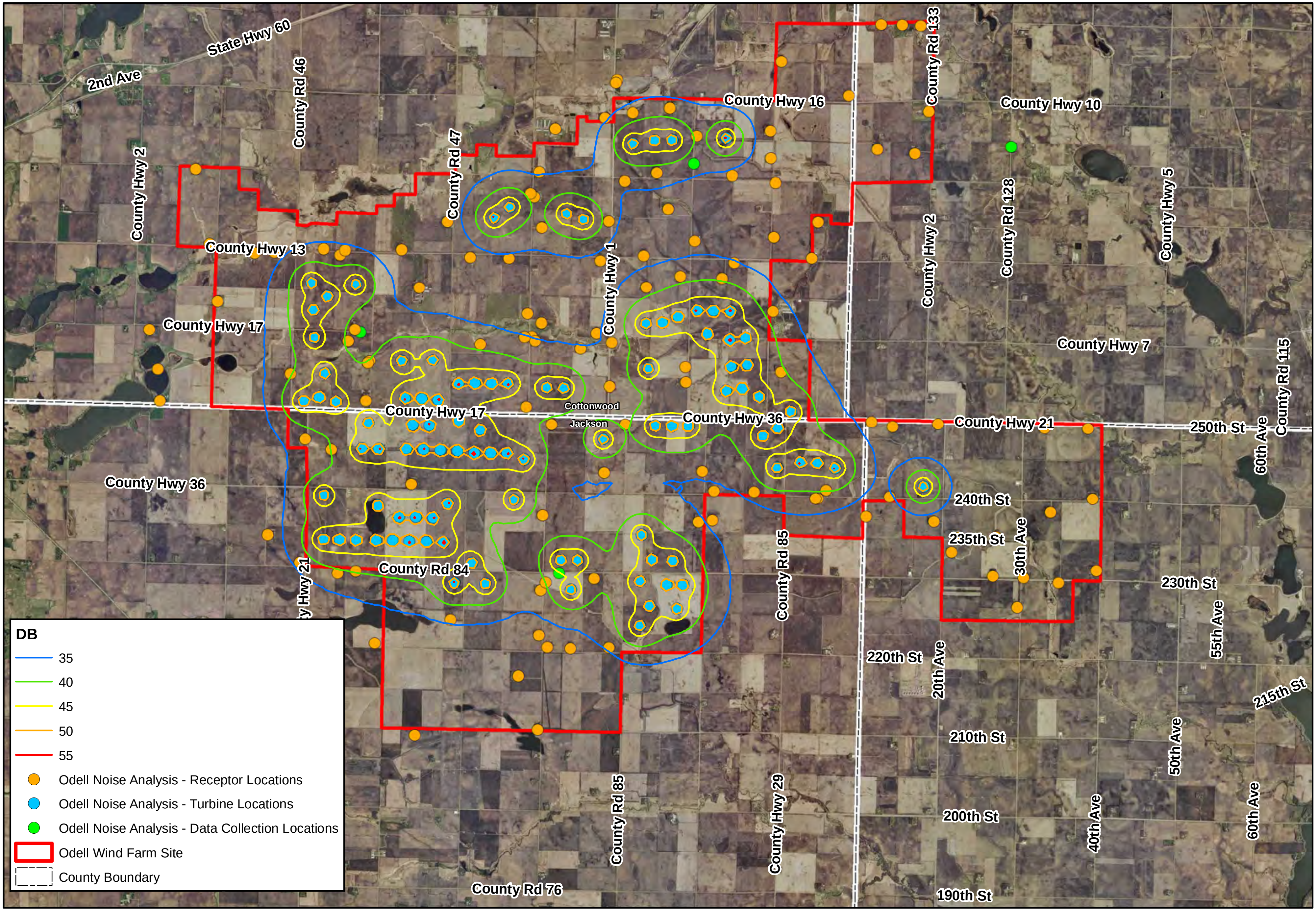
ODELL WIND FARM
Cottonwood County, MN

Noise Modeling - V110
Odell Wind Farm

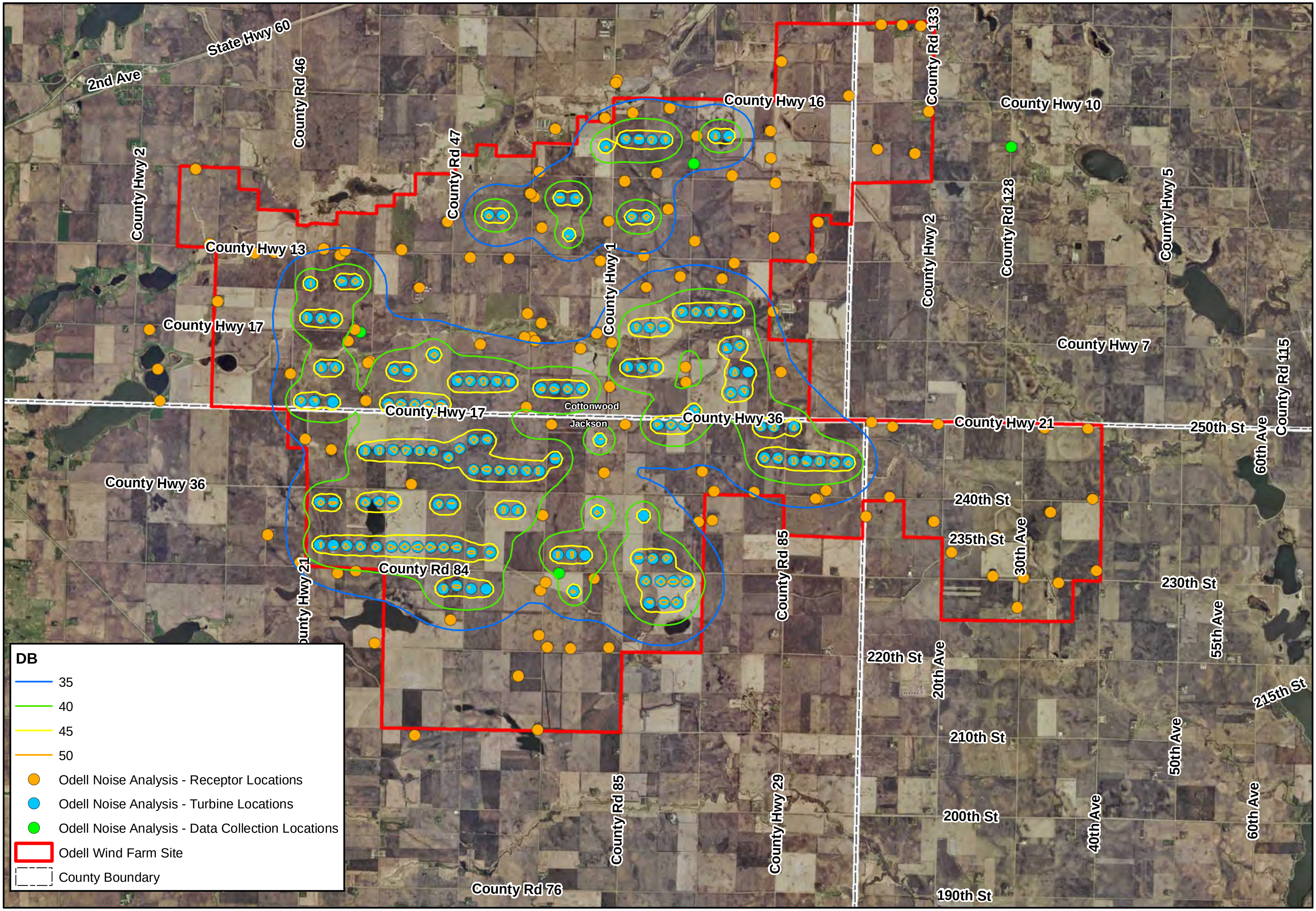
Figure 7

WSB & Associates, Inc.



Noise Modeling - G97
Odell Wind Farm

Figure 8



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ODELL WIND FARM Cottonwood County, MN

Noise Modeling - GW-87
Odell Wind Farm

Figure 9

N

0 1.5 Miles

WSB & Associates, Inc.

Appendix B

Calibration Results

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-170505

Instrument Model 831, Serial Number 0003160, was calibrated on 22FEB2013. The instrument meets factory specifications per Procedure D0001.8310, ANSI S1.4-1983 (R 2006) Type 1; S1.4A-1985 ; S1.43-1997 Type 1; S1.11-2004 Octave Band Class 1; S1.25-1991; IEC 61672-2002 Class 1; 60651-2001 Type 1; 60804-2000 Type 1; 61260-2001 Class 1; 61252-2002.

New Instrument
Date Calibrated: 22FEB2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Stanford Research Systems	DS360	61889	12 Months	30JAN2014	61889-013013

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 26 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

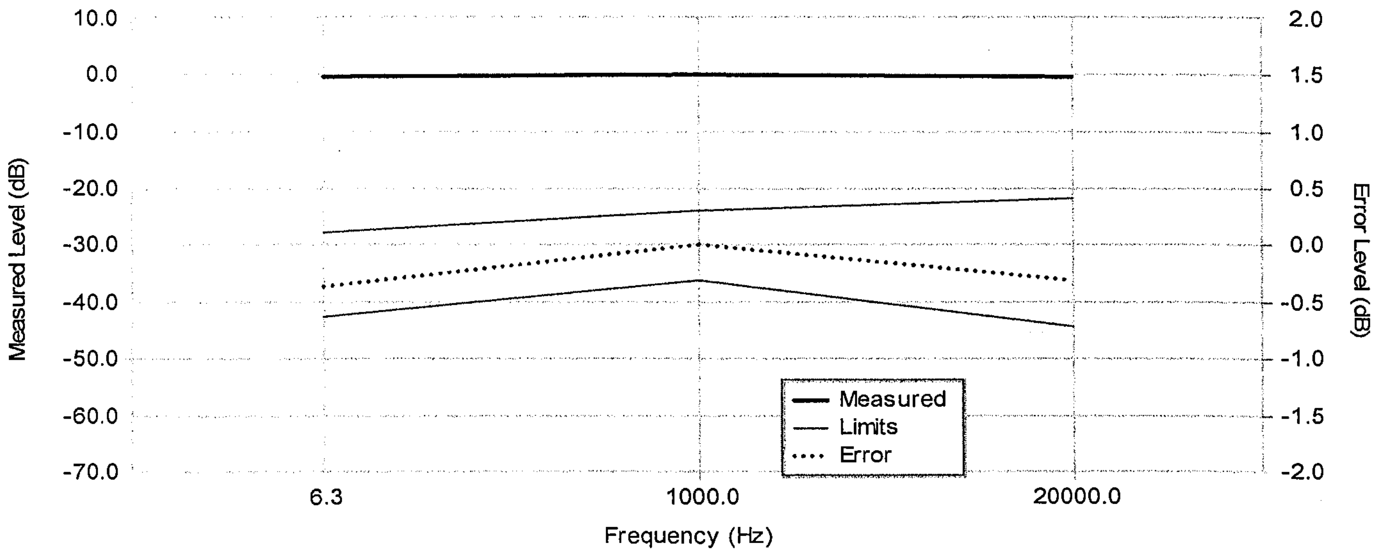
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Tested with PRM831-023886

Signed: Ron Harris
Technician: Ron Harris

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 137.0dBμV. The instrument's Z-weighted response was then electrically tested using a sinewave at exact frequencies as specified in IEC 61672-1:2002 Table 2 note b. Instrument has 0dB gain.



Freq. (Hz)	Meas. (dB)	Theor. (dB)	Error (dB)	Uncert. (dB)	Limits (dB)
6.30	-0.36	0.00	-0.36	0.13	0.12,-0.63
1000.00	0.00	0.00	0.00	0.10	0.30,-0.30
20000.00	-0.31	0.00	-0.31	0.21	0.41,-0.71

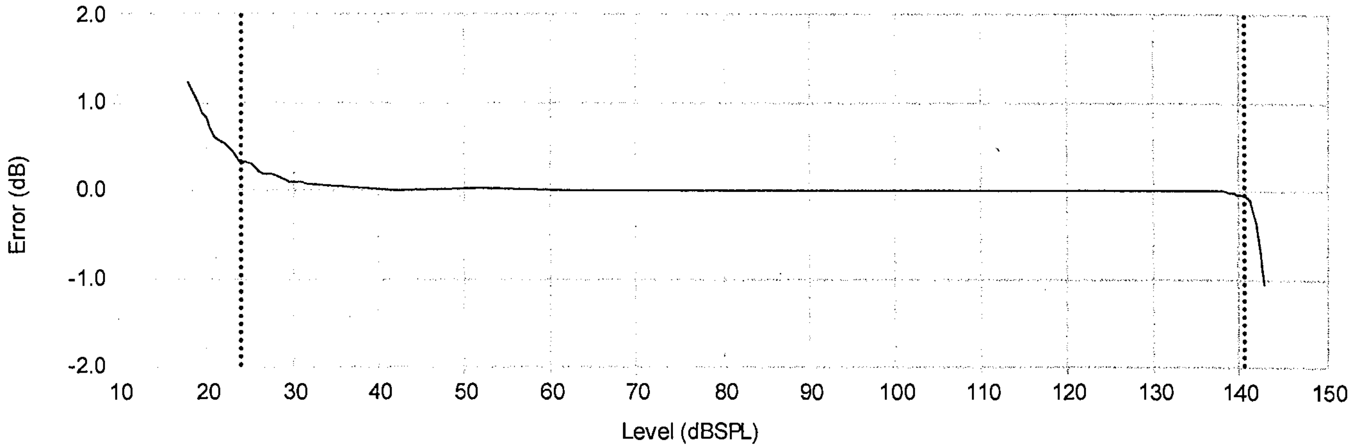
Environmental conditions: 23.5°C, 24.9% RH (0.3°C, 3% RH uncertainty)
Uncertainties are given as expanded uncertainty at ~95% confidence level (k=2).
Test Procedure: 831 Std (ADP090).xml

This Z-Weight frequency response is in compliance with IEC 61672-1:2002 5.4 Class 1, IEC 60651-2001 6.1 and 9.2.2, ANSI S1.4-1983 (R2006) 5.1 and 8.2.1, and IEC 60804-2000 5.1 for Type 1 sound level meters when used with a PCB precision microphone.

Technician: Ron Harris   Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1000.0Hz sine wave at a level of 112.0dBSPL. The instrument's A-Weighted, slow, Log Linearity response was then electrically tested using a 1000.0Hz sine wave with an equivalent voltage from 18.0dBSPL to 143.0dBSPL. Instrument has 0dB gain.



Theor. (dBSPL)	Meas. (dBSPL)	Uncert. (dB)	Error (dB)	Theor. (dBSPL)	Meas. (dBSPL)	Uncert. (dB)	Error (dB)	Theor. (dBSPL)	Meas. (dBSPL)	Uncert. (dB)	Error (dB)	Theor. (dBSPL)	Meas. (dBSPL)	Uncert. (dB)	Error (dB)
18.0	19.2	0.27	1.2	24.5	24.8	0.26	0.3	31.0	31.1	0.15	0.1	138.0	138.0	0.11	0.0
18.5	19.6	0.27	1.1	25.0	25.3	0.26	0.3	31.5	31.6	0.15	0.1	138.5	138.5	0.11	0.0
19.0	20.0	0.27	1.0	25.5	25.8	0.16	0.3	32.0	32.1	0.15	0.1	139.0	139.0	0.11	-0.0
19.5	20.4	0.26	0.9	26.0	26.2	0.16	0.2	42.0	42.0	0.11	0.0	139.5	139.5	0.11	-0.0
20.0	20.8	0.26	0.8	26.5	26.7	0.16	0.2	52.0	52.0	0.11	0.0	140.0	140.0	0.11	-0.0
20.5	21.2	0.26	0.7	27.0	27.2	0.16	0.2	62.0	62.0	0.11	0.0	140.5	140.5	0.11	-0.0
21.0	21.6	0.26	0.6	27.5	27.7	0.16	0.2	72.0	72.0	0.11	0.0	141.0	140.9	0.11	-0.1
21.5	22.1	0.26	0.6	28.0	28.2	0.16	0.2	82.0	82.0	0.12	0.0	141.5	141.4	0.11	-0.1
22.0	22.5	0.26	0.5	28.5	28.7	0.16	0.2	92.0	92.0	0.11	0.0	142.0	141.6	0.11	-0.4
22.5	23.0	0.26	0.5	29.0	29.1	0.16	0.1	102.0	102.0	0.11	0.0	142.5	141.8	0.11	-0.7
23.0	23.4	0.26	0.4	29.5	29.6	0.15	0.1	112.0	112.0	0.11	0.0	143.0	142.0	0.11	-1.0
23.5	23.9	0.26	0.4	30.0	30.1	0.15	0.1	122.0	122.0	0.11	0.0				
24.0	24.3	0.26	0.3	30.5	30.6	0.15	0.1	132.0	132.0	0.11	0.0				

Overload occurs at 140.8dBSPL (Limit: 140.2dBSPL).
Primary indicator range: 116.8dB (Limit: 115.0dB), 24.0dBSPL to 140.8dBSPL.
Dynamic range: 127.9dB (Limit: 126.0dB), 12.9dBSPL to 140.8dBSPL.

Noise Floors: A-Wt 12.9dBSPL (Limit: 15.0dBSPL), C-Wt 14.4dBSPL (Limit: 17.3dBSPL), Z-Wt 22.0dBSPL (Limit: 24.5dBSPL)

Environmental conditions: 23.3°C, 25.2% RH (0.3°C, 3% RH uncertainty)
Uncertainties are given as expanded uncertainty at ~95% confidence level (k=2).
Data reported in dBSPL assuming a microphone sensitivity of 50mV/Pa.
Test Procedure: 831 Std (ADP090).xml

This log linearity is in compliance with IEC 61672-1:2002 5.5.5 and 5.6 Class 1, IEC 60651-2001 7.9 and 7.10, ANSI S1.4-1983 (R2006) 3.2 and IEC 60804-2000 9.2.1 for Class 1 sound level meters when used with a Larson Davis Class 1 microphone.

Technician: Ron Harris Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave using a voltage equivalent to 114.0dBSPL. The instrument's Flat-weighted response to specific crest factors was then electrically tested. Instrument has 0dB gain.

******* 200μs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below upper limit of 140.8dBSPL *******

Crest Factor	Test Level (dBSPL)	Pulse OFF Time (ms)	Pos. Pulse Error (dB)	Neg. Pulse Error (dB)	Limits (dB)	Uncert. (dB)
3	138.8	1.6	OVLD	OVLD	±0.7	0.2
5	138.8	4.8	OVLD	OVLD	±1.2	0.2
10	138.8	19.8	OVLD	OVLD	±1.7	0.2
3	128.8	1.6	0.17	0.15	±0.7	0.2
5	128.8	4.8	-0.14	-0.09	±1.2	0.2
10	128.8	19.8	OVLD	OVLD	±1.7	0.2
3	118.8	1.6	0.17	0.15	±0.7	0.2
5	118.8	4.8	-0.06	-0.09	±1.2	0.2
10	118.8	19.8	-0.29	-0.28	±1.7	0.2
3	108.8	1.6	0.16	0.14	±0.7	0.2
5	108.8	4.8	-0.05	-0.08	±1.2	0.2
10	108.8	19.8	-0.28	-0.28	±1.7	0.2

Environmental conditions: 23.3°C, 25.5% RH (0.3°C, 3% RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95% confidence level (k=2).
Data reported in dBSPL assuming a microphone sensitivity of 50mV/Pa.
Test Procedure: 831 Std (ADP090).xml

This crest factor response is in compliance with IEC 60651-2001 9.4.2 and ANSI S1.4-1983 (R2006) 8.4.2.

Technician: Ron Harris Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

A 1kHz sine wave was fed into the Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter). For the normal range, the reading is compared to the input level of 94.0dBµV. At the low range the input signal is dropped 30dB and compared to the normal range reading. For the 20dB gain the unit is the normal range and the input signal is dropped 20dB and compared to the 0dB reading. Error shown is the difference between the output level read and the expected level.

Range	Error (dB)	Limits (dB)	Uncert. (dB)
Normal	-0.305	±0.80	0.2
Low	-0.001	±0.10	0.1

Environmental conditions: 23.3°C, 25.1% RH (0.3°C, 3% RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95% confidence level (k=2).
Test Procedure: 831 Std (ADP090).xml

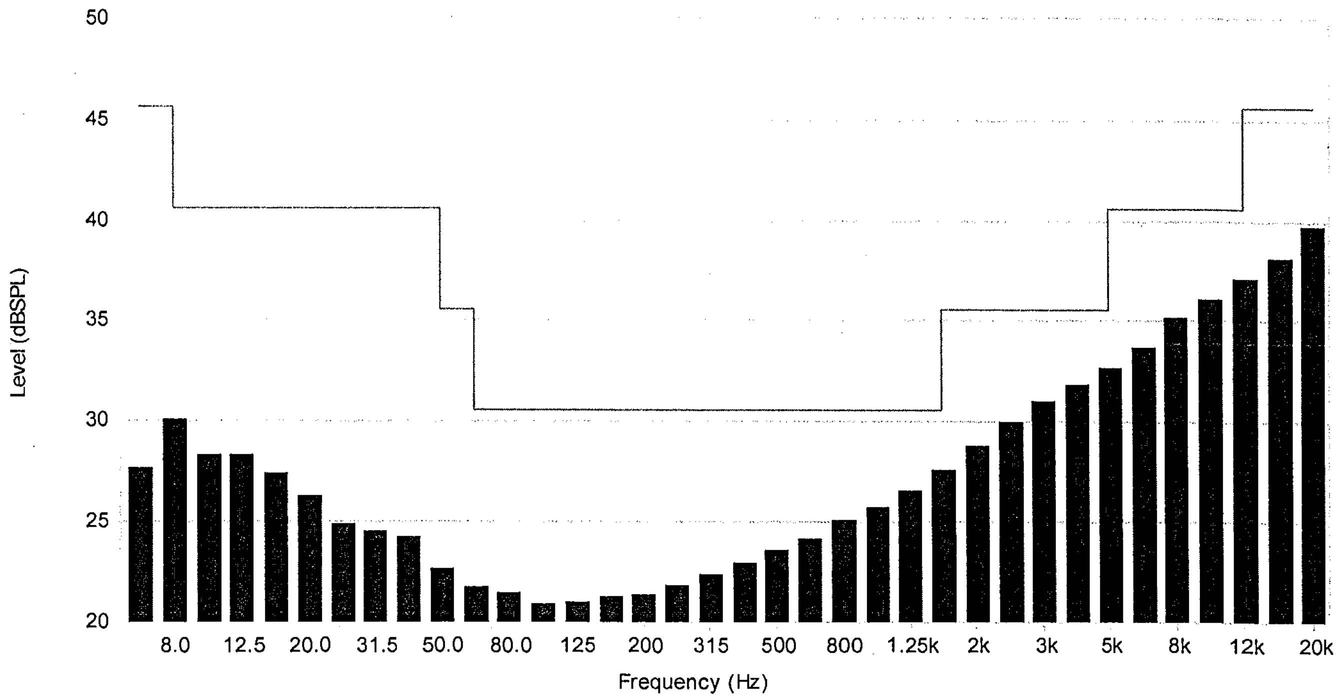
This gain result is in compliance with Larson Davis standards.

Technician: Ron Harris Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

Sound Level Meter Model: 831 Serial Number: 0003160 Firmware: 2.112
1/3 Octave Noise Floor Test Report

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0dBµV. The instrument's 1/3 Octave Leq response was then electrically tested with the instrument set to normal range. Instrument has 0dB gain.



Freq. (Hz)	Measured (dBSPL)	Uncert. (dB)	Limits (dBSPL)	Freq. (Hz)	Measured (dBSPL)	Uncert. (dB)	Limits (dBSPL)	Freq. (Hz)	Measured (dBSPL)	Uncert. (dB)	Limits (dBSPL)
6.3	27.7	0.6	45.6	100.0	20.9	0.6	30.6	1600.0	27.7	0.6	35.6
8.0	30.1	0.6	40.6	125.0	21.1	0.6	30.6	2000.0	28.8	0.6	35.6
10.0	28.3	0.6	40.6	160.0	21.3	0.6	30.6	2500.0	30.0	0.6	35.6
12.5	28.4	0.6	40.6	200.0	21.3	0.6	30.6	3150.0	31.1	0.6	35.6
16.0	27.4	0.6	40.6	250.0	21.9	0.6	30.6	4000.0	31.8	0.6	35.6
20.0	26.3	0.6	40.6	315.0	22.4	0.6	30.6	5000.0	32.7	0.6	40.6
25.0	24.9	0.6	40.6	400.0	22.9	0.6	30.6	6300.0	33.7	0.6	40.6
31.5	24.5	0.6	40.6	500.0	23.6	0.6	30.6	8000.0	35.3	0.6	40.6
40.0	24.3	0.6	40.6	630.0	24.2	0.6	30.6	10000.0	36.1	0.6	40.6
50.0	22.7	0.6	35.6	800.0	25.1	0.6	30.6	12500.0	37.2	0.6	45.6
63.0	21.8	0.6	30.6	1000.0	25.8	0.6	30.6	16000.0	38.2	0.6	45.6
80.0	21.5	0.6	30.6	1250.0	26.6	0.6	30.6	20000.0	39.8	0.6	45.6

Environmental conditions: 23.5°C, 24.9% RH (0.3°C, 3% RH uncertainty)
Uncertainties are given as expanded uncertainty at ~95% confidence level (k=2).
Data reported in dBSPL assuming a microphone sensitivity of 50mV/Pa.
Test Procedure: 831 Std (ADP090).xml

This noise floor is in compliance with Larson Davis standards.

Technician: Ron Harris

Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

A sine wave was fed into the Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter). Instrument is in normal OBA range. Instrument has 0dB gain.

Amplitude (dBSPL)	Frequency (Hz)	THD (%)	THD Limit (%)	THD+N (%)	THD+N Limit (%)
137.0	10.0	0.006	0.150	0.013	0.180

Environmental conditions: 23.3°C, 25.1% RH (0.3°C, 3% RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95% confidence level (k=2).
Data reported in dBSPL assuming a microphone sensitivity of 50mV/Pa.
Test Procedure: 831 Std (ADP090).xml

This distortion is in compliance with Larson Davis standards.

Technician: Ron Harris Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave using a voltage equivalent to 114.0dBSPL. The instrument's Flat-weighted response to pulse widths was then electrically tested to a 10ms pulse. Instrument has 0dB gain.

Test Level (dBSPL)	Pulse Width (µs)	Pos. Pulse Error (dB)	Neg. Pulse Error (dB)	Limits (dB)	Uncert. (dB)
137.0	40.0	-0.53	-0.63	-2.2	0.2
137.0	30.0	-1.45	-1.46	-2.2	0.2

Environmental conditions: 23.4°C, 25.1% RH (0.3°C, 3% RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95% confidence level (k=2).
Data reported in dBSPL assuming a microphone sensitivity of 50mV/Pa.
Test Procedure: 831 Std (ADP090).xml

This peak detector is in compliance with IEC 60651 (2001-10) 9.4.4 and ANSI S1.4-1983 (R2006) 8.4.4.

Technician: Ron Harris Test Date: 22 Feb 2013 08:46:27

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

~ *Certificate of Calibration and Compliance* ~

Microphone Model: 377B20 Serial Number: LW134296 Manufacturer: PCB

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
Hewlett Packard	34401A	MY41045214	LD-001	3/8/12	3/8/13
Bruel & Kjaer	4192	2657834	CA1270	11/16/12	11/15/13
Newport	BTH-W/N	8410668	CA1187	not required	not required
Larson Davis	PRM915	124	CA-1024	12/6/12	12/6/13
Larson Davis	PRM902	4709	CA-1453	10/16/12	10/16/13
Larson Davis	2559LF	3216	CA-883	not required	not required
Larson Davis	ADP005	1	LD-017	not required	not required
Larson Davis	PRM916	127	CA-924	4/4/12	4/4/13
Larson Davis	CAL250	5025	CA1277	3/7/12	3/7/13
Larson Davis	2201	140	CA-891	4/20/12	4/19/13
Larson Davis	2900	1079	CA-521A	6/10/11	6/10/13
Larson Davis	PRA951-4	234	CA1154	9/19/12	9/19/13
0	0	0	0	not required	not required
0	0	0	0	not required	not required

Frequency sweep performed with B&K UA0033 electrostatic actuator.

Condition of Unit

As Found: N/A

As Left: New unit in tolerance

Notes

1. Calibration of reference microphone is traceable through PTB.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Open circuit sensitivity is measured using the insertion voltage method following procedure AT603-5.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/-0.20 dB.
7. Unit calibrated per ACS-20.

Technician: Milton Munger MJM Date: January 16, 2013

ilac-MRA ACCREDITED CALIBRATION CERT #1862.01

PCB PIEZOTRONICS VIBRATION DIVISION
3425 Walden Avenue, Depew, New York, 14043
TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

ID:CAL60-3441240321.103

~ Calibration Report ~

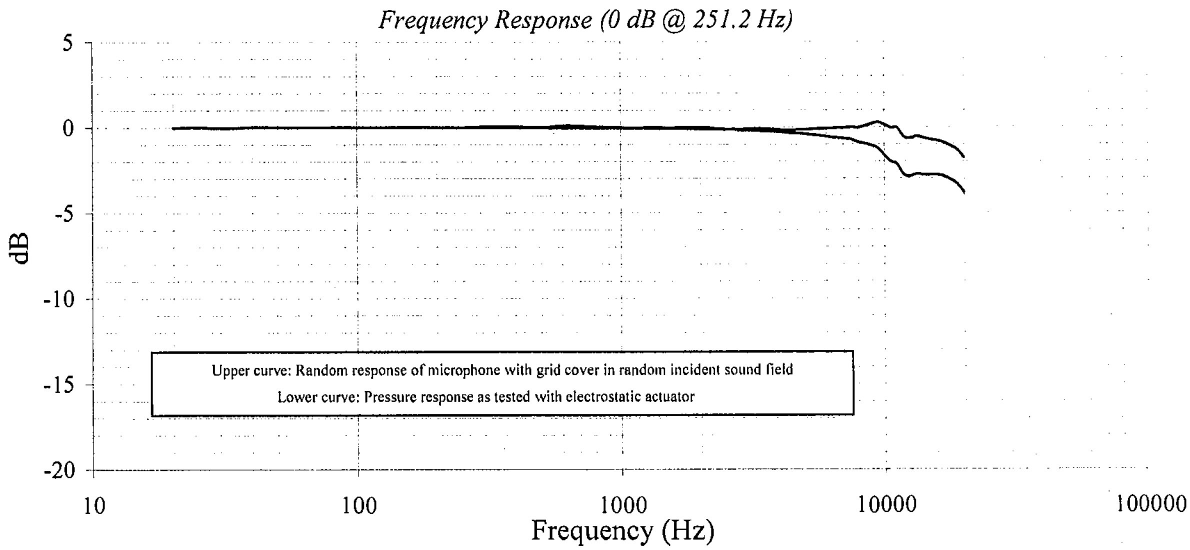
Microphone Model: 377B20 Serial Number: LW134296 Description: 1/2" Random-Incidence Microphone

Calibration Data

Open Circuit Sensitivity @ 251.2 Hz: 48.33 mV/Pa
-26.32 dB re 1V/Pa

Polarization Voltage, External: 0 V
Capacitance: 12.3 pF

Temperature: 71 °F (22°C) Ambient Pressure: 984 mbar Relative Humidity: 27 %



Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)
20.0	-0.01	-0.01	1584.9	-0.06	-0.02	6683.4	-0.63	-0.04	-	-	-
25.1	0.01	0.01	1678.8	-0.06	-0.01	7079.5	-0.67	-0.03	-	-	-
31.6	-0.03	-0.03	1778.3	-0.07	-0.01	7498.9	-0.71	0.00	-	-	-
39.8	0.03	0.03	1883.7	-0.08	0.00	7943.3	-0.86	-0.03	-	-	-
50.1	0.02	0.02	1995.3	-0.09	0.00	8414.0	-0.96	0.05	-	-	-
63.1	0.02	0.02	2113.5	-0.09	-0.01	8912.5	-1.07	0.17	-	-	-
79.4	0.02	0.02	2238.7	-0.10	-0.05	9440.6	-1.24	0.27	-	-	-
100.0	0.01	0.01	2371.4	-0.11	-0.09	10000.0	-1.63	0.14	-	-	-
125.9	0.01	0.01	2511.9	-0.12	-0.12	10592.5	-2.01	-0.03	-	-	-
158.5	0.01	0.01	2660.7	-0.12	-0.11	11220.2	-2.18	-0.05	-	-	-
199.5	0.00	0.00	2818.4	-0.16	-0.13	11885.0	-2.78	-0.57	-	-	-
251.2	0.00	0.00	2985.4	-0.17	-0.10	12589.3	-2.87	-0.64	-	-	-
316.2	0.00	0.06	3162.3	-0.19	-0.09	13335.2	-2.76	-0.55	-	-	-
398.1	-0.01	0.05	3349.7	-0.21	-0.08	14125.4	-2.80	-0.65	-	-	-
501.2	-0.01	0.01	3548.1	-0.23	-0.10	14962.4	-2.79	-0.72	-	-	-
631.0	-0.02	0.12	3758.4	-0.25	-0.12	15848.9	-2.80	-0.80	-	-	-
794.3	-0.03	0.04	3981.1	-0.28	-0.15	16788.0	-2.88	-0.91	-	-	-
1000.0	-0.03	-0.01	4217.0	-0.30	-0.16	17782.8	-3.07	-1.10	-	-	-
1059.3	-0.04	-0.04	4466.8	-0.33	-0.16	18836.5	-3.33	-1.33	-	-	-
1122.0	-0.04	-0.03	4731.5	-0.36	-0.15	19952.6	-3.83	-1.78	-	-	-
1188.5	-0.04	-0.02	5011.9	-0.40	-0.14	-	-	-	-	-	-
1258.9	-0.05	-0.01	5308.8	-0.44	-0.12	-	-	-	-	-	-
1333.5	-0.05	0.00	5623.4	-0.48	-0.09	-	-	-	-	-	-
1412.5	-0.06	-0.01	5956.6	-0.54	-0.07	-	-	-	-	-	-
1496.2	-0.06	-0.02	6309.6	-0.59	-0.06	-	-	-	-	-	-

Technician: Milton Munger *MTM* Date: January 16, 2013

ilac-MRA ACCREDITED
CALIBRATION CERT #1862.01

PCB PIEZOTRONICS™
VIBRATION DIVISION
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TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

ID:CAL60-3441240321.103

Appendix C

Location Calculations

Distance Results

Turbine ID	Receptor ID	Distance (m)	Distance (ft)
GE87_Turbine_001	112	1654	5427
GE87_Turbine_002	112	1437	4715
GE87_Turbine_003	101	1220	4003
GE87_Turbine_004	101	1298	4257
GE87_Turbine_005	114	1353	4438
GE87_Turbine_006	114	1046	3433
GE87_Turbine_007	114	480	1574
GE87_Turbine_008	107	948	3109
GE87_Turbine_009	107	746	2448
GE87_Turbine_010	107	698	2291
GE87_Turbine_011	101	1179	3867
GE87_Turbine_012	101	967	3171
GE87_Turbine_013	114	1001	3284
GE87_Turbine_014	114	509	1671
GE87_Turbine_015	113	615	2016
GE87_Turbine_016	114	669	2194
GE87_Turbine_017	107	1453	4768
GE87_Turbine_018	73	1394	4574
GE87_Turbine_019	73	1311	4301
GE87_Turbine_020	106	1168	3833
GE87_Turbine_021	106	896	2940
GE87_Turbine_022	106	648	2126
GE87_Turbine_023	106	520	1706
GE87_Turbine_024	106	548	1799
GE87_Turbine_025	105	577	1895
GE87_Turbine_026	103	542	1778
GE87_Turbine_027	101	1117	3664
GE87_Turbine_028	102	929	3047
GE87_Turbine_029	102	680	2232
GE87_Turbine_030	73	921	3023
GE87_Turbine_031	73	688	2258
GE87_Turbine_032	73	526	1726
GE87_Turbine_033	72	1064	3491
GE87_Turbine_034	73	1005	3298
GE87_Turbine_035	72	1082	3550
GE87_Turbine_036	73	755	2476
GE87_Turbine_037	102	1323	4339
GE87_Turbine_038	102	935	3066
GE87_Turbine_039	73	1454	4770
GE87_Turbine_040	102	1000	3282
GE87_Turbine_041	102	1152	3780
GE87_Turbine_042	74	712	2334
GE87_Turbine_043	73	1077	3534

GE87_Turbine_044	73	854	2803
GE87_Turbine_045	73	708	2322
GE87_Turbine_046	73	666	2184
GE87_Turbine_047	72	690	2265
GE87_Turbine_048	73	937	3073
GE87_Turbine_049	73	748	2455
GE87_Turbine_050	60	964	3161
GE87_Turbine_051	60	1209	3966
GE87_Turbine_052	53	868	2847
GE87_Turbine_053	53	912	2991
GE87_Turbine_054	76	664	2179
GE87_Turbine_055	62	1465	4807
GE87_Turbine_056	63	1262	4142
GE87_Turbine_057	63	989	3245
GE87_Turbine_058	63	717	2351
GE87_Turbine_059	63	449	1475
GE87_Turbine_060	63	669	2195
GE87_Turbine_061	67	735	2411
GE87_Turbine_062	67	584	1917
GE87_Turbine_063	55	573	1880
GE87_Turbine_064	60	683	2240
GE87_Turbine_065	74	798	2617
GE87_Turbine_066	60	481	1577
GE87_Turbine_067	60	577	1892
GE87_Turbine_068	60	759	2490
GE87_Turbine_069	62	764	2506
GE87_Turbine_070	62	778	2552
GE87_Turbine_071	62	891	2922
GE87_Turbine_072	64	793	2601
GE87_Turbine_073	64	527	1730
GE87_Turbine_074	55	746	2448
GE87_Turbine_075	65	602	1977
GE87_Turbine_076	67	649	2130
GE87_Turbine_077	55	531	1742
GE87_Turbine_078	54	604	1983
GE87_Turbine_079	62	959	3146
GE87_Turbine_080	56	583	1913
GE87_Turbine_081	47	809	2654
GE87_Turbine_082	47	871	2858
GE87_Turbine_083	39	457	1500
GE87_Turbine_084	65	711	2334
GE87_Turbine_085	65	952	3125
GE87_Turbine_086	50	788	2584
GE87_Turbine_087	48	722	2370
GE87_Turbine_088	50	687	2253
GE87_Turbine_089	32	628	2059
GE87_Turbine_090	32	535	1756

GE87_Turbine_091	27	572	1875
GE87_Turbine_092	29	727	2386
GE87_Turbine_093	30	846	2775
GE87_Turbine_094	23	457	1501
GE87_Turbine_095	26	476	1563
GE87_Turbine_096	26	824	2704
GE87_Turbine_097	28	525	1722
GE87_Turbine_098	11	378	1239
GE87_Turbine_099	11	648	2126
GE87_Turbine_100	119	568	1864
GE87_Turbine_101	9	668	2192
GE87_Turbine_102	11	635	2084
GE87_Turbine_103	9	542	1778
GE87_Turbine_104	9	552	1812
GE87_Turbine_105	107	1432	4698
GE87_Turbine_106	107	647	2122
GE87_Turbine_107	75	801	2627
GE87_Turbine_108	112	1219	4000
GE87_Turbine_109	54	929	3049
GE87_Turbine_110	51	964	3163
GE87_Turbine_111	52	952	3124
GE87_Turbine_112	52	668	2193
GE87_Turbine_113	52	1180	3872
GE87_Turbine_114	52	1120	3674
GE87_Turbine_115	52	1137	3730
GE87_Turbine_116	79	723	2372
GE87_Turbine_117	79	843	2765
GE87_Turbine_118	125	888	2913
GE87_Turbine_119	80	710	2329
GE87_Turbine_120	80	605	1984
GE87_Turbine_121	121	750	2462
GE87_Turbine_122	53	939	3079
GE87_Turbine_123	52	847	2778

Distance Results

Turbine ID	Receptor ID	Distance (m)	Distance (ft)
V110_Turbine_01	67	751	2463
V110_Turbine_02	67	605	1985
V110_Turbine_03	63	602	1974
V110_Turbine_04	63	854	2803
V110_Turbine_05	103	671	2201
V110_Turbine_06	65	876	2875
V110_Turbine_07	106	632	2074
V110_Turbine_08	106	971	3186
V110_Turbine_09	73	735	2410
V110_Turbine_10	73	901	2956
V110_Turbine_11	73	1146	3761
V110_Turbine_12	60	1161	3811
V110_Turbine_13	60	1001	3284
V110_Turbine_14	60	570	1870
V110_Turbine_15	76	478	1568
V110_Turbine_16	113	547	1796
V110_Turbine_17	76	813	2667
V110_Turbine_18	60	1393	4571
V110_Turbine_19	9	620	2035
V110_Turbine_20	53	884	2899
V110_Turbine_21	77	913	2994
V110_Turbine_22	48	764	2507
V110_Turbine_23	62	833	2734
V110_Turbine_24	119	474	1554
V110_Turbine_25	22	420	1377
V110_Turbine_26	73	1163	3817
V110_Turbine_27	50	687	2255
V110_Turbine_28	114	498	1634
V110_Turbine_29	102	588	1929
V110_Turbine_30	11	500	1642
V110_Turbine_31	73	1211	3974
V110_Turbine_32	72	931	3054
V110_Turbine_33	101	1443	4735
V110_Turbine_34	114	1510	4953
V110_Turbine_35	112	1137	3729
V110_Turbine_36	62	799	2623
V110_Turbine_37	105	684	2244
V110_Turbine_38	54	926	3038
V110_Turbine_39	39	581	1907
V110_Turbine_40	74	784	2572
V110_Turbine_41	41	523	1715

V110_Turbine_42	62	916	3004
V110_Turbine_43	73	900	2951
V110_Turbine_44	29	497	1632
V110_Turbine_45	63	1198	3930
V110_Turbine_46	62	1458	4784
V110_Turbine_47	73	966	3170
V110_Turbine_48	32	676	2218
V110_Turbine_49	26	528	1731
V110_Turbine_50	72	625	2052
V110_Turbine_51	47	730	2394
V110_Turbine_52	47	783	2570
V110_Turbine_53	55	738	2422
V110_Turbine_54	55	571	1875
V110_Turbine_55	63	508	1668
V110_Turbine_56	77	1283	4210
V110_Turbine_57	62	1015	3330
V110_Turbine_58	60	599	1967
V110_Turbine_59	50	672	2206
V110_Turbine_60	73	1354	4441
V110_Turbine_61	73	712	2337
V110_Turbine_62	114	1277	4189
V110_Turbine_63	73	1009	3311
V110_Turbine_64	27	575	1887
V110_Turbine_65	106	721	2365
V110_Turbine_66	11	744	2440
V110_Turbine_67	13	440	1442
V110_Turbine_68	107	1016	3332
V110_Turbine_69	107	735	2410
V110_Turbine_70	32	570	1870
V110_Turbine_71	48	812	2665
V110_Turbine_72	114	1070	3511
V110_Turbine_73	114	765	2511
V110_Turbine_74	101	871	2858
V110_Turbine_75	75	896	2941
V110_Turbine_76	77	909	2984
V110_Turbine_77	64	647	2124
V110_Turbine_78	73	701	2300
V110_Turbine_79	102	1004	3295
V110_Turbine_80	27	868	2849
V110_Turbine_81	60	542	1778
V110_Turbine_82	12	619	2029
V110_Turbine_83	112	770	2525
V110_Turbine_84	53	746	2447
V110_Turbine_85	52	830	2724
V110_Turbine_86	114	937	3073
V110_Turbine_87	101	1206	3958
V110_Turbine_88	101	852	2794

V110_Turbine_89	10	666	2184
V110_Turbine_90	102	1538	5047
V110_Turbine_91	102	1202	3943
V110_Turbine_92	114	516	1692
V110_Turbine_93	77	1058	3472
V110_Turbine_94	52	890	2921
V110_Turbine_95	75	485	1591
V110_Turbine_96	125	638	2094
V110_Turbine_97	23	561	1839
V110_Turbine_98	102	713	2338
V110_Turbine_99	102	930	3052
V110_Turbine_00	121	742	2436

Data Collection ID	Distance to Nearest Reciever (m)	Receiver ID	Distance to Nearest Turbine (m)	Turbine ID
Noise_Receptor_01	566	11	504	97
Noise_Receptor_02	125	39	705	39
Noise_Receptor_03	332	113	271	16
Noise_Receptor_04	1821	120	5293	67

Distance Results

Turbine ID	Receptor ID	Distance (m)	Distance (ft)
G97_Turbine_89	27	385	1262
G97_Turbine_85	25	391	1282
G97_Turbine_86	21	416	1364
G97_Turbine_92	22	420	1377
G97_Turbine_72	56	449	1473
G97_Turbine_29	73	452	1484
G97_Turbine_91	26	454	1488
G97_Turbine_97	11	462	1517
G97_Turbine_10	114	476	1560
G97_Turbine_34	77	486	1594
G97_Turbine_93	23	489	1605
G97_Turbine_00	11	494	1620
G97_Turbine_60	60	505	1655
G97_Turbine_54	63	508	1668
G97_Turbine_66	66	515	1691
G97_Turbine_67	64	516	1692
G97_Turbine_09	113	547	1796
G97_Turbine_95	23	558	1829
G97_Turbine_70	54	560	1838
G97_Turbine_33	79	568	1865
G97_Turbine_76	39	572	1876
G97_Turbine_27	102	577	1893
G97_Turbine_61	60	588	1928
G97_Turbine_55	63	602	1974
G97_Turbine_25	73	602	1975
G97_Turbine_81	32	603	1979
G97_Turbine_56	67	605	1985
G97_Turbine_50	76	607	1993
G97_Turbine_96	9	620	2035
G97_Turbine_31	75	625	2049
G97_Turbine_45	72	625	2052
G97_Turbine_18	106	632	2074
G97_Turbine_87	29	641	2102
G97_Turbine_90	27	648	2127
G97_Turbine_94	12	656	2153
G97_Turbine_98	12	664	2180
G97_Turbine_20	103	671	2201
G97_Turbine_79	50	672	2206
G97_Turbine_82	32	676	2218
G97_Turbine_58	55	681	2234
G97_Turbine_19	105	684	2244

G97_Turbine_99	8	687	2254
G97_Turbine_04	107	688	2258
G97_Turbine_74	56	697	2288
G97_Turbine_59	74	700	2298
G97_Turbine_78	50	703	2307
G97_Turbine_01	112	705	2312
G97_Turbine_44	73	711	2334
G97_Turbine_17	106	721	2365
G97_Turbine_75	47	722	2369
G97_Turbine_16	114	727	2386
G97_Turbine_62	60	728	2388
G97_Turbine_83	121	736	2416
G97_Turbine_69	55	738	2422
G97_Turbine_41	73	741	2432
G97_Turbine_57	67	751	2463
G97_Turbine_80	48	764	2507
G97_Turbine_63	62	773	2535
G97_Turbine_42	73	783	2568
G97_Turbine_03	107	796	2612
G97_Turbine_68	64	803	2635
G97_Turbine_53	63	804	2638
G97_Turbine_77	48	812	2665
G97_Turbine_64	62	815	2673
G97_Turbine_73	65	859	2818
G97_Turbine_24	73	867	2845
G97_Turbine_84	27	868	2849
G97_Turbine_49	53	870	2853
G97_Turbine_23	101	872	2861
G97_Turbine_26	102	872	2862
G97_Turbine_40	73	880	2886
G97_Turbine_35	74	894	2934
G97_Turbine_08	114	895	2937
G97_Turbine_32	75	899	2951
G97_Turbine_28	73	900	2951
G97_Turbine_48	76	907	2975
G97_Turbine_88	41	907	2977
G97_Turbine_47	53	916	3005
G97_Turbine_14	106	921	3021
G97_Turbine_30	72	931	3054
G97_Turbine_46	77	946	3105
G97_Turbine_43	73	966	3170
G97_Turbine_65	62	979	3213
G97_Turbine_02	107	987	3238
G97_Turbine_71	62	1015	3330
G97_Turbine_39	73	1089	3574
G97_Turbine_37	60	1090	3575
G97_Turbine_22	114	1095	3594

G97_Turbine_52	63	1103	3619
G97_Turbine_15	106	1187	3894
G97_Turbine_05	101	1222	4010
G97_Turbine_36	60	1230	4036
G97_Turbine_07	114	1259	4129
G97_Turbine_13	73	1260	4133
G97_Turbine_21	114	1277	4189
G97_Turbine_06	101	1314	4311
G97_Turbine_12	73	1370	4495
G97_Turbine_51	63	1400	4592
G97_Turbine_38	60	1417	4650
G97_Turbine_11	107	1500	4921

Data Collection ID	Distance to Nearest Reciever (m)	Receiver ID	Distance to Nearest Turbine (m)	Turbine ID
Noise_Receptor_01	566	11	507	95
Noise_Receptor_02	125	39	695	76
Noise_Receptor_03	332	113	271	9
Noise_Receptor_04	1821	120	5609	98

Distance Results

Turbine ID	Receptor ID	Distance (m)	Distance (ft)
GW87_Turbine_001	112	1654	5427
GW87_Turbine_002	112	1437	4715
GW87_Turbine_003	101	1220	4003
GW87_Turbine_004	101	1298	4257
GW87_Turbine_005	114	1353	4438
GW87_Turbine_006	114	1046	3433
GW87_Turbine_007	114	480	1574
GW87_Turbine_008	107	948	3109
GW87_Turbine_009	107	746	2448
GW87_Turbine_010	107	698	2291
GW87_Turbine_011	101	1179	3867
GW87_Turbine_012	101	967	3171
GW87_Turbine_013	114	1001	3284
GW87_Turbine_014	114	509	1671
GW87_Turbine_015	113	615	2016
GW87_Turbine_016	114	669	2194
GW87_Turbine_017	73	1442	4731
GW87_Turbine_018	73	1338	4391
GW87_Turbine_019	73	1284	4213
GW87_Turbine_020	106	1108	3636
GW87_Turbine_021	106	880	2887
GW87_Turbine_022	106	648	2126
GW87_Turbine_023	106	520	1706
GW87_Turbine_024	106	548	1799
GW87_Turbine_025	105	577	1895
GW87_Turbine_026	103	542	1778
GW87_Turbine_027	101	1117	3664
GW87_Turbine_028	102	800	2624
GW87_Turbine_029	102	522	1714
GW87_Turbine_030	73	921	3023
GW87_Turbine_031	73	526	1726
GW87_Turbine_032	72	1069	3506
GW87_Turbine_033	73	1005	3298
GW87_Turbine_034	72	1082	3550
GW87_Turbine_035	73	755	2476
GW87_Turbine_036	102	1267	4156
GW87_Turbine_037	102	911	2989
GW87_Turbine_038	102	1467	4811
GW87_Turbine_039	102	973	3194
GW87_Turbine_040	102	1099	3606
GW87_Turbine_041	74	694	2278

GW87_Turbine_042	73	1209	3968
GW87_Turbine_043	73	784	2574
GW87_Turbine_044	73	685	2247
GW87_Turbine_045	73	680	2232
GW87_Turbine_046	72	690	2265
GW87_Turbine_047	73	937	3073
GW87_Turbine_048	73	775	2543
GW87_Turbine_049	60	1037	3401
GW87_Turbine_050	60	1259	4132
GW87_Turbine_051	53	866	2841
GW87_Turbine_052	53	912	2991
GW87_Turbine_053	76	664	2179
GW87_Turbine_054	62	1465	4807
GW87_Turbine_055	63	1262	4142
GW87_Turbine_056	63	989	3245
GW87_Turbine_057	63	717	2351
GW87_Turbine_058	63	449	1475
GW87_Turbine_059	63	669	2195
GW87_Turbine_060	67	735	2411
GW87_Turbine_061	67	584	1917
GW87_Turbine_062	55	573	1880
GW87_Turbine_063	60	683	2240
GW87_Turbine_064	74	798	2617
GW87_Turbine_065	60	481	1577
GW87_Turbine_066	60	604	1981
GW87_Turbine_067	60	788	2584
GW87_Turbine_068	62	762	2500
GW87_Turbine_069	62	781	2561
GW87_Turbine_070	62	891	2924
GW87_Turbine_071	64	793	2601
GW87_Turbine_072	64	527	1730
GW87_Turbine_073	55	746	2448
GW87_Turbine_074	65	602	1977
GW87_Turbine_075	67	649	2130
GW87_Turbine_076	55	531	1742
GW87_Turbine_077	54	604	1983
GW87_Turbine_078	62	959	3146
GW87_Turbine_079	56	583	1913
GW87_Turbine_080	47	809	2654
GW87_Turbine_081	47	871	2858
GW87_Turbine_082	39	457	1500
GW87_Turbine_083	65	711	2334
GW87_Turbine_084	65	952	3125
GW87_Turbine_085	48	787	2581
GW87_Turbine_086	48	723	2371
GW87_Turbine_087	50	728	2387
GW87_Turbine_088	32	628	2059

GW87_Turbine_089	32	535	1756
GW87_Turbine_090	27	572	1875
GW87_Turbine_091	29	727	2386
GW87_Turbine_092	30	846	2775
GW87_Turbine_093	23	457	1501
GW87_Turbine_094	26	476	1563
GW87_Turbine_095	26	824	2704
GW87_Turbine_096	28	525	1722
GW87_Turbine_097	11	378	1239
GW87_Turbine_098	11	648	2126
GW87_Turbine_099	119	568	1864
GW87_Turbine_100	9	668	2192
GW87_Turbine_101	11	635	2084
GW87_Turbine_102	9	542	1778
GW87_Turbine_103	9	552	1812
GW87_Turbine_104	107	1429	4690
GW87_Turbine_105	107	647	2122
GW87_Turbine_106	75	798	2619
GW87_Turbine_107	112	1219	4000
GW87_Turbine_108	54	929	3049
GW87_Turbine_109	51	964	3163
GW87_Turbine_110	52	952	3124
GW87_Turbine_111	52	668	2193
GW87_Turbine_112	52	1180	3872
GW87_Turbine_113	52	1120	3674
GW87_Turbine_114	52	1137	3730
GW87_Turbine_115	79	723	2372
GW87_Turbine_116	79	843	2765
GW87_Turbine_117	125	888	2913
GW87_Turbine_118	80	710	2329
GW87_Turbine_119	80	605	1984
GW87_Turbine_120	121	750	2462
GW87_Turbine_121	53	939	3079
GW87_Turbine_122	52	847	2778
GW87_Turbine_123	76	594	1949
GW87_Turbine_124	73	1293	4243
GW87_Turbine_125	107	1473	4833
GW87_Turbine_126	73	918	3011
GW87_Turbine_127	53	596	1956
GW87_Turbine_128	113	1272	4174
GW87_Turbine_129	73	688	2258
GW87_Turbine_130	50	687	2253
GW87_Turbine_131	51	729	2392
GW87_Turbine_132	80	588	1930
GW87_Turbine_133	80	719	2360

Data Collection ID	Distance to Nearest Reciever (m)	Receiver ID	Distance to Nearest Turbine (m)	Turbine ID
Noise_Receptor_01	566	11	718	97
Noise_Receptor_02	125	39	582	82
Noise_Receptor_03	332	113	382	15
Noise_Receptor_04	1821	120	5732	98

Appendix D

Projected Noise Levels

Projected Noise Levels - GE 1.6 - 87 Turbine

Receptor ID	Turbine Impact (Calculated)	Background Sound Levels + Turbine Impact (dBA)					
		35.0	40.0	45.0	50.0	55.0	60.0
1	0	35.0	40.0	45.0	50.0	55.0	60.0
2	0	35.0	40.0	45.0	50.0	55.0	60.0
3	0	35.0	40.0	45.0	50.0	55.0	60.0
4	0	35.0	40.0	45.0	50.0	55.0	60.0
5	22.1	35.2	40.1	45.0	50.0	55.0	60.0
6	37	39.1	41.8	45.6	50.2	55.1	60.0
7	33	37.1	40.8	45.3	50.1	55.0	60.0
8	38.5	40.1	42.3	45.9	50.3	55.1	60.0
9	40.5	41.6	43.3	46.3	50.5	55.2	60.0
10	39.8	41.0	42.9	46.1	50.4	55.1	60.0
11	41.5	42.4	43.8	46.6	50.6	55.2	60.1
12	34.9	38.0	41.2	45.4	50.1	55.0	60.0
13	32.6	37.0	40.7	45.2	50.1	55.0	60.0
14	31.5	36.6	40.6	45.2	50.1	55.0	60.0
15	0	35.0	40.0	45.0	50.0	55.0	60.0
16	0	35.0	40.0	45.0	50.0	55.0	60.0
17	0	35.0	40.0	45.0	50.0	55.0	60.0
18	0	35.0	40.0	45.0	50.0	55.0	60.0
19	21.8	35.2	40.1	45.0	50.0	55.0	60.0
20	28.2	35.8	40.3	45.1	50.0	55.0	60.0
21	33.6	37.4	40.9	45.3	50.1	55.0	60.0
22	39.6	40.9	42.8	46.1	50.4	55.1	60.0
23	39.2	40.6	42.6	46.0	50.3	55.1	60.0
24	39.2	40.6	42.6	46.0	50.3	55.1	60.0
25	36.9	39.1	41.7	45.6	50.2	55.1	60.0
26	40	41.2	43.0	46.2	50.4	55.1	60.0
27	38.9	40.4	42.5	46.0	50.3	55.1	60.0
28	39.1	40.5	42.6	46.0	50.3	55.1	60.0
29	38.4	40.0	42.3	45.9	50.3	55.1	60.0
30	32.6	37.0	40.7	45.2	50.1	55.0	60.0
31	31.5	36.6	40.6	45.2	50.1	55.0	60.0
32	39.2	40.6	42.6	46.0	50.3	55.1	60.0
33	38	39.8	42.1	45.8	50.3	55.1	60.0
34	0	35.0	40.0	45.0	50.0	55.0	60.0
35	0	35.0	40.0	45.0	50.0	55.0	60.0
36	33.2	37.2	40.8	45.3	50.1	55.0	60.0
37	29.9	36.2	40.4	45.1	50.0	55.0	60.0
38	25	35.4	40.1	45.0	50.0	55.0	60.0
39	41.4	42.3	43.8	46.6	50.6	55.2	60.1
40	32.1	36.8	40.7	45.2	50.1	55.0	60.0
41	34.5	37.8	41.1	45.4	50.1	55.0	60.0
42	32.2	36.8	40.7	45.2	50.1	55.0	60.0
43	33.5	37.3	40.9	45.3	50.1	55.0	60.0

44	35.8	38.4	41.4	45.5	50.2	55.1	60.0
45	37.9	39.7	42.1	45.8	50.3	55.1	60.0
46	34.6	37.8	41.1	45.4	50.1	55.0	60.0
47	38.6	40.2	42.4	45.9	50.3	55.1	60.0
48	38.1	39.8	42.2	45.8	50.3	55.1	60.0
49	33.5	37.3	40.9	45.3	50.1	55.0	60.0
50	37.5	39.4	41.9	45.7	50.2	55.1	60.0
51	35.5	38.3	41.3	45.5	50.2	55.0	60.0
52	39.6	40.9	42.8	46.1	50.4	55.1	60.0
53	40.9	41.9	43.5	46.4	50.5	55.2	60.1
54	41.3	42.2	43.7	46.5	50.5	55.2	60.1
55	41.3	42.2	43.7	46.5	50.5	55.2	60.1
56	40.7	41.7	43.4	46.4	50.5	55.2	60.1
57	36.4	38.8	41.6	45.6	50.2	55.1	60.0
58	37.1	39.2	41.8	45.7	50.2	55.1	60.0
59	38.3	40.0	42.2	45.8	50.3	55.1	60.0
60	42.7	43.4	44.6	47.0	50.7	55.2	60.1
61	36.7	38.9	41.7	45.6	50.2	55.1	60.0
62	39.6	40.9	42.8	46.1	50.4	55.1	60.0
63	42.8	43.5	44.6	47.0	50.8	55.3	60.1
64	41.6	42.5	43.9	46.6	50.6	55.2	60.1
65	41.7	42.5	43.9	46.7	50.6	55.2	60.1
66	41.7	42.5	43.9	46.7	50.6	55.2	60.1
67	40	41.2	43.0	46.2	50.4	55.1	60.0
68	0	35.0	40.0	45.0	50.0	55.0	60.0
69	0	35.0	40.0	45.0	50.0	55.0	60.0
70	0	35.0	40.0	45.0	50.0	55.0	60.0
71	38.2	39.9	42.2	45.8	50.3	55.1	60.0
72	39.9	41.1	43.0	46.2	50.4	55.1	60.0
73	43.7	44.2	45.2	47.4	50.9	55.3	60.1
74	41	42.0	43.5	46.5	50.5	55.2	60.1
75	37.7	39.6	42.0	45.7	50.2	55.1	60.0
76	38.6	40.2	42.4	45.9	50.3	55.1	60.0
77	36.1	38.6	41.5	45.5	50.2	55.1	60.0
78	35	38.0	41.2	45.4	50.1	55.0	60.0
79	37.6	39.5	42.0	45.7	50.2	55.1	60.0
80	38.5	40.1	42.3	45.9	50.3	55.1	60.0
81	37.4	39.4	41.9	45.7	50.2	55.1	60.0
82	31	36.5	40.5	45.2	50.1	55.0	60.0
83	25.9	35.5	40.2	45.1	50.0	55.0	60.0
84	0	35.0	40.0	45.0	50.0	55.0	60.0
85	28.4	35.9	40.3	45.1	50.0	55.0	60.0
86	26.2	35.5	40.2	45.1	50.0	55.0	60.0
87	0	35.0	40.0	45.0	50.0	55.0	60.0
88	0	35.0	40.0	45.0	50.0	55.0	60.0
89	0	35.0	40.0	45.0	50.0	55.0	60.0
90	0	35.0	40.0	45.0	50.0	55.0	60.0

91	0	35.0	40.0	45.0	50.0	55.0	60.0
92	0	35.0	40.0	45.0	50.0	55.0	60.0
93	0	35.0	40.0	45.0	50.0	55.0	60.0
94	0	35.0	40.0	45.0	50.0	55.0	60.0
95	0	35.0	40.0	45.0	50.0	55.0	60.0
96	0	35.0	40.0	45.0	50.0	55.0	60.0
97	0	35.0	40.0	45.0	50.0	55.0	60.0
98	0	35.0	40.0	45.0	50.0	55.0	60.0
99	0	35.0	40.0	45.0	50.0	55.0	60.0
100	35.1	38.1	41.2	45.4	50.1	55.0	60.0
101	36.8	39.0	41.7	45.6	50.2	55.1	60.0
102	40.3	41.4	43.2	46.3	50.4	55.1	60.0
103	38.7	40.2	42.4	45.9	50.3	55.1	60.0
104	33.5	37.3	40.9	45.3	50.1	55.0	60.0
105	41	42.0	43.5	46.5	50.5	55.2	60.1
106	42	42.8	44.1	46.8	50.6	55.2	60.1
107	39.2	40.6	42.6	46.0	50.3	55.1	60.0
108	38.3	40.0	42.2	45.8	50.3	55.1	60.0
109	32.7	37.0	40.7	45.2	50.1	55.0	60.0
110	30.5	36.3	40.5	45.2	50.0	55.0	60.0
111	30.7	36.4	40.5	45.2	50.1	55.0	60.0
112	33.7	37.4	40.9	45.3	50.1	55.0	60.0
113	39.7	41.0	42.9	46.1	50.4	55.1	60.0
114	42.1	42.9	44.2	46.8	50.7	55.2	60.1
115	0	35.0	40.0	45.0	50.0	55.0	60.0
116	22	35.2	40.1	45.0	50.0	55.0	60.0
117	0	35.0	40.0	45.0	50.0	55.0	60.0
118	0	35.0	40.0	45.0	50.0	55.0	60.0
119	39.3	40.7	42.7	46.0	50.4	55.1	60.0
120	0	35.0	40.0	45.0	50.0	55.0	60.0
121	37.1	39.2	41.8	45.7	50.2	55.1	60.0
122	27.7	35.7	40.2	45.1	50.0	55.0	60.0
123	32.9	37.1	40.8	45.3	50.1	55.0	60.0
124	33.3	37.2	40.8	45.3	50.1	55.0	60.0
125	37.6	39.5	42.0	45.7	50.2	55.1	60.0

Projected Noise Levels - V110-2.0 Turbine

Receptor ID	Turbine Impact (Calculated)	Background Sound Levels + Turbine Impact (dBA)					
		35.0	40.0	45.0	50.0	55.0	60.0
1	0	35.0	40.0	45.0	50.0	55.0	60.0
2	0	35.0	40.0	45.0	50.0	55.0	60.0
3	0	35.0	40.0	45.0	50.0	55.0	60.0
4	0	35.0	40.0	45.0	50.0	55.0	60.0
5	23.7	35.3	40.1	45.0	50.0	55.0	60.0
6	36.5	38.8	41.6	45.6	50.2	55.1	60.0
7	30.8	36.4	40.5	45.2	50.1	55.0	60.0
8	39.1	40.5	42.6	46.0	50.3	55.1	60.0
9	39.3	40.7	42.7	46.0	50.4	55.1	60.0
10	39.6	40.9	42.8	46.1	50.4	55.1	60.0
11	41.2	42.1	43.7	46.5	50.5	55.2	60.1
12	35.1	38.1	41.2	45.4	50.1	55.0	60.0
13	32.7	37.0	40.7	45.2	50.1	55.0	60.0
14	31.2	36.5	40.5	45.2	50.1	55.0	60.0
15	0	35.0	40.0	45.0	50.0	55.0	60.0
16	0	35.0	40.0	45.0	50.0	55.0	60.0
17	0	35.0	40.0	45.0	50.0	55.0	60.0
18	23.4	35.3	40.1	45.0	50.0	55.0	60.0
19	27.4	35.7	40.2	45.1	50.0	55.0	60.0
20	27.9	35.8	40.3	45.1	50.0	55.0	60.0
21	34.2	37.6	41.0	45.3	50.1	55.0	60.0
22	37.7	39.6	42.0	45.7	50.2	55.1	60.0
23	33.3	37.2	40.8	45.3	50.1	55.0	60.0
24	33.3	37.2	40.8	45.3	50.1	55.0	60.0
25	35	38.0	41.2	45.4	50.1	55.0	60.0
26	39.3	40.7	42.7	46.0	50.4	55.1	60.0
27	40.1	41.3	43.1	46.2	50.4	55.1	60.0
28	40.3	41.4	43.2	46.3	50.4	55.1	60.0
29	40.4	41.5	43.2	46.3	50.5	55.1	60.0
30	33.3	37.2	40.8	45.3	50.1	55.0	60.0
31	32.1	36.8	40.7	45.2	50.1	55.0	60.0
32	39.2	40.6	42.6	46.0	50.3	55.1	60.0
33	38.1	39.8	42.2	45.8	50.3	55.1	60.0
34	0	35.0	40.0	45.0	50.0	55.0	60.0
35	0	35.0	40.0	45.0	50.0	55.0	60.0
36	34.8	37.9	41.1	45.4	50.1	55.0	60.0
37	31.3	36.5	40.5	45.2	50.1	55.0	60.0
38	26.5	35.6	40.2	45.1	50.0	55.0	60.0
39	40.8	41.8	43.4	46.4	50.5	55.2	60.1
40	32.7	37.0	40.7	45.2	50.1	55.0	60.0
41	35.8	38.4	41.4	45.5	50.2	55.1	60.0
42	33.4	37.3	40.9	45.3	50.1	55.0	60.0
43	33.4	37.3	40.9	45.3	50.1	55.0	60.0

44	35.4	38.2	41.3	45.5	50.1	55.0	60.0
45	36.1	38.6	41.5	45.5	50.2	55.1	60.0
46	33.9	37.5	41.0	45.3	50.1	55.0	60.0
47	39.9	41.1	43.0	46.2	50.4	55.1	60.0
48	40.2	41.3	43.1	46.2	50.4	55.1	60.0
49	37.1	39.2	41.8	45.7	50.2	55.1	60.0
50	41.1	42.1	43.6	46.5	50.5	55.2	60.1
51	39.9	41.1	43.0	46.2	50.4	55.1	60.0
52	42.5	43.2	44.4	46.9	50.7	55.2	60.1
53	42.4	43.1	44.4	46.9	50.7	55.2	60.1
54	42.8	43.5	44.6	47.0	50.8	55.3	60.1
55	38.9	40.4	42.5	46.0	50.3	55.1	60.0
56	38.7	40.2	42.4	45.9	50.3	55.1	60.0
57	36.5	38.8	41.6	45.6	50.2	55.1	60.0
58	37.1	39.2	41.8	45.7	50.2	55.1	60.0
59	37.1	39.2	41.8	45.7	50.2	55.1	60.0
60	43.3	43.9	45.0	47.2	50.8	55.3	60.1
61	37	39.1	41.8	45.6	50.2	55.1	60.0
62	40.6	41.7	43.3	46.3	50.5	55.2	60.0
63	44.3	44.8	45.7	47.7	51.0	55.4	60.1
64	41.8	42.6	44.0	46.7	50.6	55.2	60.1
65	41.3	42.2	43.7	46.5	50.5	55.2	60.1
66	41.8	42.6	44.0	46.7	50.6	55.2	60.1
67	41.4	42.3	43.8	46.6	50.6	55.2	60.1
68	0	35.0	40.0	45.0	50.0	55.0	60.0
69	0	35.0	40.0	45.0	50.0	55.0	60.0
70	0	35.0	40.0	45.0	50.0	55.0	60.0
71	39.5	40.8	42.8	46.1	50.4	55.1	60.0
72	41.7	42.5	43.9	46.7	50.6	55.2	60.1
73	45	45.4	46.2	48.0	51.2	55.4	60.1
74	40.9	41.9	43.5	46.4	50.5	55.2	60.1
75	37.9	39.7	42.1	45.8	50.3	55.1	60.0
76	41.3	42.2	43.7	46.5	50.5	55.2	60.1
77	37.7	39.6	42.0	45.7	50.2	55.1	60.0
78	35.8	38.4	41.4	45.5	50.2	55.1	60.0
79	38.6	40.2	42.4	45.9	50.3	55.1	60.0
80	42	42.8	44.1	46.8	50.6	55.2	60.1
81	39.9	41.1	43.0	46.2	50.4	55.1	60.0
82	34.4	37.7	41.1	45.4	50.1	55.0	60.0
83	31.6	36.6	40.6	45.2	50.1	55.0	60.0
84	28.3	35.8	40.3	45.1	50.0	55.0	60.0
85	33.7	37.4	40.9	45.3	50.1	55.0	60.0
86	36.2	38.7	41.5	45.5	50.2	55.1	60.0
87	0	35.0	40.0	45.0	50.0	55.0	60.0
88	0	35.0	40.0	45.0	50.0	55.0	60.0
89	0	35.0	40.0	45.0	50.0	55.0	60.0
90	0	35.0	40.0	45.0	50.0	55.0	60.0

91	0	35.0	40.0	45.0	50.0	55.0	60.0
92	0	35.0	40.0	45.0	50.0	55.0	60.0
93	0	35.0	40.0	45.0	50.0	55.0	60.0
94	0	35.0	40.0	45.0	50.0	55.0	60.0
95	0	35.0	40.0	45.0	50.0	55.0	60.0
96	27.1	35.7	40.2	45.1	50.0	55.0	60.0
97	28.7	35.9	40.3	45.1	50.0	55.0	60.0
98	24.5	35.4	40.1	45.0	50.0	55.0	60.0
99	34.1	37.6	41.0	45.3	50.1	55.0	60.0
100	36.1	38.6	41.5	45.5	50.2	55.1	60.0
101	37.6	39.5	42.0	45.7	50.2	55.1	60.0
102	39.6	40.9	42.8	46.1	50.4	55.1	60.0
103	38.4	40.0	42.3	45.9	50.3	55.1	60.0
104	33.6	37.4	40.9	45.3	50.1	55.0	60.0
105	40.8	41.8	43.4	46.4	50.5	55.2	60.1
106	41.9	42.7	44.1	46.7	50.6	55.2	60.1
107	37.7	39.6	42.0	45.7	50.2	55.1	60.0
108	40	41.2	43.0	46.2	50.4	55.1	60.0
109	33.7	37.4	40.9	45.3	50.1	55.0	60.0
110	32.5	36.9	40.7	45.2	50.1	55.0	60.0
111	33.8	37.5	40.9	45.3	50.1	55.0	60.0
112	37.5	39.4	41.9	45.7	50.2	55.1	60.0
113	41.7	42.5	43.9	46.7	50.6	55.2	60.1
114	43.1	43.7	44.8	47.2	50.8	55.3	60.1
115	0	35.0	40.0	45.0	50.0	55.0	60.0
116	23.3	35.3	40.1	45.0	50.0	55.0	60.0
117	0	35.0	40.0	45.0	50.0	55.0	60.0
118	0	35.0	40.0	45.0	50.0	55.0	60.0
119	36	38.5	41.5	45.5	50.2	55.1	60.0
120	0	35.0	40.0	45.0	50.0	55.0	60.0
121	38.2	39.9	42.2	45.8	50.3	55.1	60.0
122	0	35.0	40.0	45.0	50.0	55.0	60.0
123	31.8	36.7	40.6	45.2	50.1	55.0	60.0
124	32.1	36.8	40.7	45.2	50.1	55.0	60.0
125	39.9	41.1	43.0	46.2	50.4	55.1	60.0

Projected Noise Levels - G97 - 2.0 Turbine

Receptor ID	Turbine Impact (Calculated)	Background Sound Levels + Turbine Impact (dBA)					
		35.0	40.0	45.0	50.0	55.0	60.0
1	0	35.0	40.0	45.0	50.0	55.0	60.0
2	0	35.0	40.0	45.0	50.0	55.0	60.0
3	0	35.0	40.0	45.0	50.0	55.0	60.0
4	0	35.0	40.0	45.0	50.0	55.0	60.0
5	22	35.2	40.1	45.0	50.0	55.0	60.0
6	34.8	37.9	41.1	45.4	50.1	55.0	60.0
7	29.1	36.0	40.3	45.1	50.0	55.0	60.0
8	37.4	39.4	41.9	45.7	50.2	55.1	60.0
9	37.6	39.5	42.0	45.7	50.2	55.1	60.0
10	37.9	39.7	42.1	45.8	50.3	55.1	60.0
11	39.5	40.8	42.8	46.1	50.4	55.1	60.0
12	33.4	37.3	40.9	45.3	50.1	55.0	60.0
13	31	36.5	40.5	45.2	50.1	55.0	60.0
14	29.5	36.1	40.4	45.1	50.0	55.0	60.0
15	0	35.0	40.0	45.0	50.0	55.0	60.0
16	0	35.0	40.0	45.0	50.0	55.0	60.0
17	0	35.0	40.0	45.0	50.0	55.0	60.0
18	21.7	35.2	40.1	45.0	50.0	55.0	60.0
19	25.7	35.5	40.2	45.1	50.0	55.0	60.0
20	26.2	35.5	40.2	45.1	50.0	55.0	60.0
21	32.5	36.9	40.7	45.2	50.1	55.0	60.0
22	36	38.5	41.5	45.5	50.2	55.1	60.0
23	31.6	36.6	40.6	45.2	50.1	55.0	60.0
24	31.6	36.6	40.6	45.2	50.1	55.0	60.0
25	33.3	37.2	40.8	45.3	50.1	55.0	60.0
26	37.6	39.5	42.0	45.7	50.2	55.1	60.0
27	38.4	40.0	42.3	45.9	50.3	55.1	60.0
28	38.6	40.2	42.4	45.9	50.3	55.1	60.0
29	38.7	40.2	42.4	45.9	50.3	55.1	60.0
30	31.6	36.6	40.6	45.2	50.1	55.0	60.0
31	30.4	36.3	40.5	45.1	50.0	55.0	60.0
32	37.5	39.4	41.9	45.7	50.2	55.1	60.0
33	36.4	38.8	41.6	45.6	50.2	55.1	60.0
34	0	35.0	40.0	45.0	50.0	55.0	60.0
35	0	35.0	40.0	45.0	50.0	55.0	60.0
36	33.1	37.2	40.8	45.3	50.1	55.0	60.0
37	29.6	36.1	40.4	45.1	50.0	55.0	60.0
38	24.8	35.4	40.1	45.0	50.0	55.0	60.0
39	39.1	40.5	42.6	46.0	50.3	55.1	60.0
40	31	36.5	40.5	45.2	50.1	55.0	60.0
41	34.1	37.6	41.0	45.3	50.1	55.0	60.0
42	31.7	36.7	40.6	45.2	50.1	55.0	60.0
43	31.7	36.7	40.6	45.2	50.1	55.0	60.0

44	33.7	37.4	40.9	45.3	50.1	55.0	60.0
45	34.4	37.7	41.1	45.4	50.1	55.0	60.0
46	32.2	36.8	40.7	45.2	50.1	55.0	60.0
47	38.2	39.9	42.2	45.8	50.3	55.1	60.0
48	38.5	40.1	42.3	45.9	50.3	55.1	60.0
49	35.4	38.2	41.3	45.5	50.1	55.0	60.0
50	39.4	40.7	42.7	46.1	50.4	55.1	60.0
51	38.2	39.9	42.2	45.8	50.3	55.1	60.0
52	40.8	41.8	43.4	46.4	50.5	55.2	60.1
53	40.7	41.7	43.4	46.4	50.5	55.2	60.1
54	41.1	42.1	43.6	46.5	50.5	55.2	60.1
55	37.2	39.2	41.8	45.7	50.2	55.1	60.0
56	37	39.1	41.8	45.6	50.2	55.1	60.0
57	34.8	37.9	41.1	45.4	50.1	55.0	60.0
58	35.4	38.2	41.3	45.5	50.1	55.0	60.0
59	35.4	38.2	41.3	45.5	50.1	55.0	60.0
60	41.6	42.5	43.9	46.6	50.6	55.2	60.1
61	35.3	38.2	41.3	45.4	50.1	55.0	60.0
62	38.9	40.4	42.5	46.0	50.3	55.1	60.0
63	42.6	43.3	44.5	47.0	50.7	55.2	60.1
64	40.1	41.3	43.1	46.2	50.4	55.1	60.0
65	39.6	40.9	42.8	46.1	50.4	55.1	60.0
66	40.1	41.3	43.1	46.2	50.4	55.1	60.0
67	39.7	41.0	42.9	46.1	50.4	55.1	60.0
68	0	35.0	40.0	45.0	50.0	55.0	60.0
69	0	35.0	40.0	45.0	50.0	55.0	60.0
70	0	35.0	40.0	45.0	50.0	55.0	60.0
71	37.8	39.6	42.0	45.8	50.3	55.1	60.0
72	40	41.2	43.0	46.2	50.4	55.1	60.0
73	43.3	43.9	45.0	47.2	50.8	55.3	60.1
74	39.2	40.6	42.6	46.0	50.3	55.1	60.0
75	36.2	38.7	41.5	45.5	50.2	55.1	60.0
76	39.6	40.9	42.8	46.1	50.4	55.1	60.0
77	36	38.5	41.5	45.5	50.2	55.1	60.0
78	34.1	37.6	41.0	45.3	50.1	55.0	60.0
79	36.9	39.1	41.7	45.6	50.2	55.1	60.0
80	40.3	41.4	43.2	46.3	50.4	55.1	60.0
81	38.2	39.9	42.2	45.8	50.3	55.1	60.0
82	32.7	37.0	40.7	45.2	50.1	55.0	60.0
83	29.9	36.2	40.4	45.1	50.0	55.0	60.0
84	26.6	35.6	40.2	45.1	50.0	55.0	60.0
85	32	36.8	40.6	45.2	50.1	55.0	60.0
86	34.5	37.8	41.1	45.4	50.1	55.0	60.0
87	0	35.0	40.0	45.0	50.0	55.0	60.0
88	0	35.0	40.0	45.0	50.0	55.0	60.0
89	0	35.0	40.0	45.0	50.0	55.0	60.0
90	0	35.0	40.0	45.0	50.0	55.0	60.0

91	0	35.0	40.0	45.0	50.0	55.0	60.0
92	0	35.0	40.0	45.0	50.0	55.0	60.0
93	0	35.0	40.0	45.0	50.0	55.0	60.0
94	0	35.0	40.0	45.0	50.0	55.0	60.0
95	0	35.0	40.0	45.0	50.0	55.0	60.0
96	25.4	35.5	40.1	45.0	50.0	55.0	60.0
97	27	35.6	40.2	45.1	50.0	55.0	60.0
98	22.8	35.3	40.1	45.0	50.0	55.0	60.0
99	32.4	36.9	40.7	45.2	50.1	55.0	60.0
100	34.4	37.7	41.1	45.4	50.1	55.0	60.0
101	35.9	38.5	41.4	45.5	50.2	55.1	60.0
102	37.9	39.7	42.1	45.8	50.3	55.1	60.0
103	36.7	38.9	41.7	45.6	50.2	55.1	60.0
104	31.9	36.7	40.6	45.2	50.1	55.0	60.0
105	39.1	40.5	42.6	46.0	50.3	55.1	60.0
106	40.2	41.3	43.1	46.2	50.4	55.1	60.0
107	36	38.5	41.5	45.5	50.2	55.1	60.0
108	38.3	40.0	42.2	45.8	50.3	55.1	60.0
109	32	36.8	40.6	45.2	50.1	55.0	60.0
110	30.8	36.4	40.5	45.2	50.1	55.0	60.0
111	32.1	36.8	40.7	45.2	50.1	55.0	60.0
112	35.8	38.4	41.4	45.5	50.2	55.1	60.0
113	40	41.2	43.0	46.2	50.4	55.1	60.0
114	41.4	42.3	43.8	46.6	50.6	55.2	60.1
115	0	35.0	40.0	45.0	50.0	55.0	60.0
116	21.6	35.2	40.1	45.0	50.0	55.0	60.0
117	0	35.0	40.0	45.0	50.0	55.0	60.0
118	0	35.0	40.0	45.0	50.0	55.0	60.0
119	34.3	37.7	41.0	45.4	50.1	55.0	60.0
120	0	35.0	40.0	45.0	50.0	55.0	60.0
121	36.5	38.8	41.6	45.6	50.2	55.1	60.0
122	0	35.0	40.0	45.0	50.0	55.0	60.0
123	30.1	36.2	40.4	45.1	50.0	55.0	60.0
124	30.4	36.3	40.5	45.1	50.0	55.0	60.0
125	38.2	39.9	42.2	45.8	50.3	55.1	60.0

Projected Noise Levels - Goldwind G87 Turbine

Receptor ID	Turbine Impact (Calculated)	Background Sound Levels + Turbine Impact (dBA)					
		35.0	40.0	45.0	50.0	55.0	60.0
1	0	35.0	40.0	45.0	50.0	55.0	60.0
2	0	35.0	40.0	45.0	50.0	55.0	60.0
3	0	35.0	40.0	45.0	50.0	55.0	60.0
4	0	35.0	40.0	45.0	50.0	55.0	60.0
5	19.8	35.1	40.0	45.0	50.0	55.0	60.0
6	34.7	37.9	41.1	45.4	50.1	55.0	60.0
7	30.7	36.4	40.5	45.2	50.1	55.0	60.0
8	36.2	38.7	41.5	45.5	50.2	55.1	60.0
9	38.2	39.9	42.2	45.8	50.3	55.1	60.0
10	37.5	39.4	41.9	45.7	50.2	55.1	60.0
11	39.2	40.6	42.6	46.0	50.3	55.1	60.0
12	32.6	37.0	40.7	45.2	50.1	55.0	60.0
13	30.3	36.3	40.4	45.1	50.0	55.0	60.0
14	29.1	36.0	40.3	45.1	50.0	55.0	60.0
15	0	35.0	40.0	45.0	50.0	55.0	60.0
16	0	35.0	40.0	45.0	50.0	55.0	60.0
17	0	35.0	40.0	45.0	50.0	55.0	60.0
18	19.7	35.1	40.0	45.0	50.0	55.0	60.0
19	24.8	35.4	40.1	45.0	50.0	55.0	60.0
20	25.9	35.5	40.2	45.1	50.0	55.0	60.0
21	32.2	36.8	40.7	45.2	50.1	55.0	60.0
22	37.3	39.3	41.9	45.7	50.2	55.1	60.0
23	36.9	39.1	41.7	45.6	50.2	55.1	60.0
24	36.9	39.1	41.7	45.6	50.2	55.1	60.0
25	34.8	37.9	41.1	45.4	50.1	55.0	60.0
26	37.6	39.5	42.0	45.7	50.2	55.1	60.0
27	36.6	38.9	41.6	45.6	50.2	55.1	60.0
28	36.8	39.0	41.7	45.6	50.2	55.1	60.0
29	36.1	38.6	41.5	45.5	50.2	55.1	60.0
30	30.3	36.3	40.4	45.1	50.0	55.0	60.0
31	29.2	36.0	40.3	45.1	50.0	55.0	60.0
32	36.9	39.1	41.7	45.6	50.2	55.1	60.0
33	35.7	38.4	41.4	45.5	50.2	55.1	60.0
34	0	35.0	40.0	45.0	50.0	55.0	60.0
35	0	35.0	40.0	45.0	50.0	55.0	60.0
36	30.9	36.4	40.5	45.2	50.1	55.0	60.0
37	27.6	35.7	40.2	45.1	50.0	55.0	60.0
38	22.7	35.2	40.1	45.0	50.0	55.0	60.0
39	39.1	40.5	42.6	46.0	50.3	55.1	60.0
40	29.8	36.1	40.4	45.1	50.0	55.0	60.0
41	32.2	36.8	40.7	45.2	50.1	55.0	60.0
42	29.9	36.2	40.4	45.1	50.0	55.0	60.0
43	31.1	36.5	40.5	45.2	50.1	55.0	60.0

44	33.5	37.3	40.9	45.3	50.1	55.0	60.0
45	35.5	38.3	41.3	45.5	50.2	55.0	60.0
46	32.3	36.9	40.7	45.2	50.1	55.0	60.0
47	36.6	38.9	41.6	45.6	50.2	55.1	60.0
48	36.6	38.9	41.6	45.6	50.2	55.1	60.0
49	33.3	37.2	40.8	45.3	50.1	55.0	60.0
50	37.1	39.2	41.8	45.7	50.2	55.1	60.0
51	35.4	38.2	41.3	45.5	50.1	55.0	60.0
52	37.5	39.4	41.9	45.7	50.2	55.1	60.0
53	39.6	40.9	42.8	46.1	50.4	55.1	60.0
54	39.5	40.8	42.8	46.1	50.4	55.1	60.0
55	39.2	40.6	42.6	46.0	50.3	55.1	60.0
56	38.4	40.0	42.3	45.9	50.3	55.1	60.0
57	34	37.5	41.0	45.3	50.1	55.0	60.0
58	34.7	37.9	41.1	45.4	50.1	55.0	60.0
59	36.1	38.6	41.5	45.5	50.2	55.1	60.0
60	40.3	41.4	43.2	46.3	50.4	55.1	60.0
61	34.4	37.7	41.1	45.4	50.1	55.0	60.0
62	37.3	39.3	41.9	45.7	50.2	55.1	60.0
63	40.5	41.6	43.3	46.3	50.5	55.2	60.0
64	39.3	40.7	42.7	46.0	50.4	55.1	60.0
65	39.4	40.7	42.7	46.1	50.4	55.1	60.0
66	39.4	40.7	42.7	46.1	50.4	55.1	60.0
67	37.7	39.6	42.0	45.7	50.2	55.1	60.0
68	0	35.0	40.0	45.0	50.0	55.0	60.0
69	0	35.0	40.0	45.0	50.0	55.0	60.0
70	0	35.0	40.0	45.0	50.0	55.0	60.0
71	35.9	38.5	41.4	45.5	50.2	55.1	60.0
72	37.6	39.5	42.0	45.7	50.2	55.1	60.0
73	41.7	42.5	43.9	46.7	50.6	55.2	60.1
74	39.1	40.5	42.6	46.0	50.3	55.1	60.0
75	36.6	38.9	41.6	45.6	50.2	55.1	60.0
76	37.9	39.7	42.1	45.8	50.3	55.1	60.0
77	34.2	37.6	41.0	45.3	50.1	55.0	60.0
78	33	37.1	40.8	45.3	50.1	55.0	60.0
79	35.4	38.2	41.3	45.5	50.1	55.0	60.0
80	38.4	40.0	42.3	45.9	50.3	55.1	60.0
81	36.6	38.9	41.6	45.6	50.2	55.1	60.0
82	32.2	36.8	40.7	45.2	50.1	55.0	60.0
83	28.9	36.0	40.3	45.1	50.0	55.0	60.0
84	19	35.1	40.0	45.0	50.0	55.0	60.0
85	30	36.2	40.4	45.1	50.0	55.0	60.0
86	29.4	36.1	40.4	45.1	50.0	55.0	60.0
87	0	35.0	40.0	45.0	50.0	55.0	60.0
88	0	35.0	40.0	45.0	50.0	55.0	60.0
89	0	35.0	40.0	45.0	50.0	55.0	60.0
90	0	35.0	40.0	45.0	50.0	55.0	60.0

91	0	35.0	40.0	45.0	50.0	55.0	60.0
92	0	35.0	40.0	45.0	50.0	55.0	60.0
93	0	35.0	40.0	45.0	50.0	55.0	60.0
94	0	35.0	40.0	45.0	50.0	55.0	60.0
95	0	35.0	40.0	45.0	50.0	55.0	60.0
96	0	35.0	40.0	45.0	50.0	55.0	60.0
97	0	35.0	40.0	45.0	50.0	55.0	60.0
98	0	35.0	40.0	45.0	50.0	55.0	60.0
99	0	35.0	40.0	45.0	50.0	55.0	60.0
100	32.8	37.0	40.8	45.3	50.1	55.0	60.0
101	34.5	37.8	41.1	45.4	50.1	55.0	60.0
102	39.2	40.6	42.6	46.0	50.3	55.1	60.0
103	36.4	38.8	41.6	45.6	50.2	55.1	60.0
104	31.2	36.5	40.5	45.2	50.1	55.0	60.0
105	38.7	40.2	42.4	45.9	50.3	55.1	60.0
106	39.8	41.0	42.9	46.1	50.4	55.1	60.0
107	37.1	39.2	41.8	45.7	50.2	55.1	60.0
108	36.5	38.8	41.6	45.6	50.2	55.1	60.0
109	30.7	36.4	40.5	45.2	50.1	55.0	60.0
110	28.2	35.8	40.3	45.1	50.0	55.0	60.0
111	28.4	35.9	40.3	45.1	50.0	55.0	60.0
112	31.4	36.6	40.6	45.2	50.1	55.0	60.0
113	37.7	39.6	42.0	45.7	50.2	55.1	60.0
114	39.7	41.0	42.9	46.1	50.4	55.1	60.0
115	0	35.0	40.0	45.0	50.0	55.0	60.0
116	19.7	35.1	40.0	45.0	50.0	55.0	60.0
117	0	35.0	40.0	45.0	50.0	55.0	60.0
118	0	35.0	40.0	45.0	50.0	55.0	60.0
119	37	39.1	41.8	45.6	50.2	55.1	60.0
120	0	35.0	40.0	45.0	50.0	55.0	60.0
121	34.8	37.9	41.1	45.4	50.1	55.0	60.0
122	25.4	35.5	40.1	45.0	50.0	55.0	60.0
123	30.6	36.3	40.5	45.2	50.0	55.0	60.0
124	31	36.5	40.5	45.2	50.1	55.0	60.0
125	36.7	38.9	41.7	45.6	50.2	55.1	60.0