

**Crowned Ridge Wind
Grant and Codington Counties, South Dakota**

**2020 Sound Level Measurement Program Protocol
September 16, 2020**

Introduction

This sound level measurement Protocol describes the methodology involved in evaluating the post-construction sound levels for the Crowned Ridge Wind Energy Center (CRW) located in Grant and Codington Counties, South Dakota. Epsilon Associates, Inc. (Epsilon) has been retained by Crowned Ridge Wind, LLC to conduct this evaluation of the post-construction sound levels. CRW is a 200-megawatt (MW) wind power generation facility composed of 87 General Electric (GE) wind turbines. All of the 87 wind turbines within the site are GE 2.3-116 units with a rotor diameter of 116 meters. Nine (9) GE 2.3-116 wind turbines have a hub height of 80 meters and 78 have a hub height of 90 meters. All wind turbines now have Low Noise Trailing Edge (LNTE) blades installed. Prior to the installation of LNTE blades on all wind turbines in the Project, a temporary curtailment program was designed, through predictive sound level modeling by EAPC, to mitigate sound levels produced by the Project such that compliance was demonstrated until all wind turbines were equipped with LNTE blades. In order to address the requirements within a temporary waiver granted by the South Dakota Public Utilities Commission (SD PUC) on January 9, 2020, a sound level measurement program was conducted by Epsilon in the late winter of 2020 to evaluate compliance with the sound level limits within CRW's permit condition. A sound level compliance evaluation report¹ dated May 13, 2020 concluded that the Project demonstrated compliance at all locations. Measurement methodologies proposed for this measurement program are consistent with those utilized in the curtailment program as described herein.

Regulatory Requirements

Order Granting Temporary Waiver

In the matter of the application by Crowned Ridge Wind, LLC for a permit of a wind energy facility in Grant and Codington Counties (EL 19-003) a temporary waiver was granted on January 9, 2020. This order included four (4) conditions as specified below:

- 1) The temporary waiver expires September 15, 2020;
- 2) Applicant shall file with the Commission beginning April 1, 2020, monthly progress reports explaining the status of the LNTE installation;
- 3) Applicant shall curtail 16 turbines at wind speeds above 6 meters per second in accordance with the sound model using a 0.3 ground attenuation factor; and

¹ Epsilon Associates, Inc. Sound Level Compliance Evaluation Report. May 13, 2020. Maynard, MA.

- 4) Applicant shall conduct post-construction sound compliance testing in accordance with Condition 26 of the Final Order during the Temporary Waiver period and again after the LNTes are installed on all turbines.

Final Decision and Order Granting Permit to Construct Facility; Notice of Entry

CRW is subject to permit conditions per the “Final Decision and Order Granting Permit to Construct Facility; Notice of Entry” (Final Decision). Condition 26 pertains to sound level limits and monitoring methodologies. The language in Condition 26 defining sound level limits is the following:

The Project, exclusive of all unrelated background noise, shall not generate a sound pressure level (10-minute equivalent continuous sound level, Leq) of more than 45 dBA as measured within 25 feet of any non-participating residence unless the owner of the residence has signed a waiver, or more than 50 dBA (10-minute equivalent continuous sound level, Leq) within 25 feet of any participating residence unless the owner of the residence has signed a waiver. The Project Owner shall, upon Commission formal request, conduct field surveys and provide monitoring data verifying compliance with specified noise level limits. If the measured wind turbine noise level exceeds a limit set forth above, then the Project Owner shall take whatever steps are necessary in accordance with prudent operating standards to rectify the situation.

Sound level monitoring methodologies described in this Protocol have been designed to abide by the procedures outlined in subparts a) through f) of Condition 26 in the Final Decision.

Codington County Ordinance

A section of CRW is within Codington County, SD and is subject to the following sound level requirements in Section 5.22.03(12) of Ordinance #65 Zoning Ordinance of Codington County, Noise subsection of General Provisions for Wind Energy Systems (WES):

Noise level generated by the wind energy system shall not exceed 50 dBA, average A-weighted Sound pressure level effects at the property line of existing non participating residences, businesses, and buildings owned and/or maintained by a governmental entity.

Noise level measurements shall be made with a sound level meter using the A-weighting scale, in accordance with standards promulgated by the American National Standards Institute. An L90 measurement shall be used and have a measurement period no less than ten minutes unless otherwise specified by the Board of Adjustment.

A complaint has been issued by a residence in the vicinity of the Project to Codrington County. As part of this study, an evaluation of sound level compliance will be made at the intervenor property line per the ordinance.

Sound Level Measurement Methodology

The Final Decision specifies that methods from the American National Standard Institute shall be followed. The monitoring program will generally follow Method #1: “General method for routine measurements” in ANSI S12.18-1994 (R2019) “Procedures for Outdoor Measurement of Sound Pressure Level”.

The Final Decision suggests measurements at 4 to 6 locations. Broadband A-weighted (dBA) and one-third octave-band (dB) sound levels will be measured at six (6) locations in the vicinity of the Project to collect post-construction sound level data. Per the Final Decision, measurements are to be performed at “non-participating and participating residences with the highest expected noise levels”. Sound level modeling was performed by EAPC to determine those residences predicted to experience the highest sound levels from the Project. The attached Table 1 presents the modeling results for all participating structures and the attached Table 2 presents the modeling results for all non-participating structures from which the proposed measurement locations were selected. The tables are both sorted from the highest to the lowest modeled sound level and include the measurement location ID’s that will be used in this program. In addition to the required criteria set forth in the Final Decision, five (5) measurement locations were selected to be representative of the whole Project area where wind turbines are located with a focus on measuring at non-participating residences. A sixth location is proposed based on a complaint filed with Codrington County. Measurement locations previously included in the curtailment program are also shown in the tables for reference.

The six (6) proposed measurement locations and five (5) alternate locations in Codrington and Grant Counties are shown in Figure 1 and are briefly described below. Five monitoring locations are proposed to be at a residence. At the intervenor location (ID #6), sound levels will be measured at the property line. Non-participating homeowners may be unwilling to grant permission at a particular location; if permission is not granted, measurements will be conducted at an alternate location when practical. In addition, the alternate location may be selected if site conditions realized during setup warrant relocation, e.g. unexpected local noise source. If permission cannot be obtained at a minimum of six locations, the number of measurement locations will be reduced accordingly. No alternate location is proposed for Location #6; if that homeowner declines permission, sound level measurements will be conducted at only five (5) locations. NEER will contact participating landowners to obtain permission for the sound level measurement program; the Public Liaison Officer will contact non-participating landowners for permission to test sound levels on their property. Measurement locations utilized in the curtailment program are also shown in Figure 1.

Primary

- ◆ **Location 1:** Participating – Modeling Receptor CR1-C30-P
 - Modeled Project-Only Sound Level = 47 dBA
 - Highest modeled receptor
 - Measurements were performed at this location during the curtailment measurement program
- ◆ **Location 2:** Non-Participating – Modeling Receptor CR1-G68-NP
 - Modeled Project-Only Sound Level = 42 dBA
 - Measurements were performed at this location during the curtailment measurement program
- ◆ **Location 3:** Non-Participating – Modeling Receptor CR1-C37-NP
 - Modeled Project-Only Sound Level = 44 dBA
 - Highest modeled Project-Only sound level at a non-participating receptor
- ◆ **Location 4:** Non-Participating – Modeling Receptor CR1-C46-NP
 - Modeled Project-Only Sound Level = 43 dBA
- ◆ **Location 5:** Non-Participating – Modeling Receptor CR1-C14-NP
 - Modeled Project-Only Sound Level = 43 dBA
 - Measurements were performed at this location during the curtailment measurement program
- ◆ **Location 6:** Non-Participating – Modeling Receptor CR1-C29-NP
 - Intervenor (Christianson)
 - Measurements were performed at this location during the curtailment measurement program

Alternate

- ◆ **Location 1A:** Participating – Modeling Receptor CR1-C19-P
 - Modeled Project-Only Sound Level = 46 dBA
 - This location was also a proposed alternate for the curtailment measurement program
- ◆ **Location 2A:** Non-Participating – Modeling Receptor CR1-G23-NP
 - Modeled Project-Only Sound Level = 42 dBA
- ◆ **Location 3A:** Non-Participating – Modeling Receptor CR1-C41-NP
 - Modeled Project-Only Sound Level = 43 dBA
 - Measurements were performed at this location during the curtailment measurement program (Location 3)

- ◆ **Location 4A:** Non-Participating – Modeling Receptor CR1-C62-NP
 - Modeled Project-Only Sound Level = 43 dBA
- ◆ **Location 5A:** Non-Participating – Modeling Receptor CR1-C16-NP
 - Modeled Project-Only Sound Level = 40 dBA
 - This location was also a proposed alternate for the curtailment measurement program

The Final Decision requires that compliance evaluation periods be when the five closest wind turbines to the measurement locations are operating and when the absolute closest wind turbine is operating at maximum sound power (within 1.0 dBA). Typically this condition is evaluated through a comparison of the electrical power specification and the sound power level specification. All wind turbines at CRW are operating under Enhanced Power Curve Operation (EPCO). Although preliminary confidential sound and power curve information have been made available by GE, those specifications have not been finalized and therefore cannot be relied upon to make determinations regarding maximum or worst-case conditions. Therefore, evaluation periods will conservatively be when electrical output is at its rated maximum from the wind turbines, i.e. 2,300 kW unless valid and finalized data are provided by GE prior to sound level evaluation.

There may be periods of time during the measurement program when there are elevated sound levels which are due to sources other than the wind turbines. Depending on the sound levels measured during the operational periods, it may be necessary to identify the portion of the sound attributed to CRW; therefore, sound level measurements with the wind turbines turned off (or “shutdown”) will be made during the program. The following language is provided in the Final Decision regarding shutdowns:

10 on/off tests shall be carried out during the survey period when the Project is operating at full power production irrespective of the ground level wind speed. For the on/off tests, all units in the Project shall be shut down for a 10-minute period synchronized with the monitor’s clocks (starting, for example, at the top of the hour or 10 minutes after, 20 minutes after, etc.).

Although full power production for the Project is stated, based on the other components of the condition and Epsilon’s experience in measuring sound levels at wind energy facilities, this requirement is being applied to the closest operating wind turbine to each of the measurement locations. NextEra Energy Resources, LLC (NEER) personnel will monitor wind forecasts and actual operating conditions specifically for the key wind turbines and will conduct the shutdowns accordingly when electrical output is 2,300 KW (2.3 MW) at the closest operating wind turbines to the measurement locations. All wind turbines in the Project will be shut down for these “off” tests. Once all wind turbines are completely shut down², the operator must wait for a full 10-minute clock-synchronized period (e.g. 1:00 - 1:10 PM) to pass before the wind turbines are turned back on. As wind conditions can vary significantly over the course of two weeks, shutdown

² The blades will be allowed to pinwheel.

requirements over the course of the measurement program are specified herein to allow for a sufficient number of shutdowns which will exceed 10:

- a) When all six identified wind turbines³ are operating at maximum electrical output (2,300 kW) for a period of 10 minutes synchronized with the monitor's clocks, a site-wide wind turbine shut down will be initiated. Following the end of a shutdown period (one full 10-minute time-synchronized period), the wind turbines will be allowed to operate normally for three (3) full 10-minute periods (30 minutes) until another shutdown is implemented if output conditions persist. This will provide opportunity for the collection of several valid operational sound measurement periods. This approach of identifying the desired electrical output conditions and shutting down wind turbines will continue until 10 such shutdowns have occurred. Shutdowns as described below do not count towards that total.
- b) A minimum of one (1) shutdown must occur during each nighttime period (10:00 PM – 7:00 AM). If none of the 10 required maximum output shutdowns are planned for that period based on wind forecasts, a shutdown is to occur at 1:00 AM. If the forecast does indicate the potential for a shutdown later at night but those conditions do not occur resulting in no shutdowns prior to 6:00 AM, a shutdown is to occur at 6:00 AM.
- c) A minimum of one (1) shutdown must occur during each daytime period (7:00 AM – 10:00 PM). If none of the 10 required maximum output shutdowns are planned for that period based on wind forecasts, a shutdown is to occur at 1:00 PM. If the forecast does indicate the potential for a shutdown later during the day but those conditions do not occur resulting in no shutdowns prior to 7:00 PM, a shutdown is to occur at 7:00 PM.

The shutdowns will be performed by the NEER Renewable Operations Control Center (ROCC).

Measurement Equipment

The sound level measurements will be made using Larson Davis (LD) model 831 sound level meters (or equivalent). The meters meet "Type 1 Precision" requirements set forth in American National Standards Institute (ANSI) S1.4-2014 (R2019) standard for sound level meters. The meters will log values of various broadband A-weighted (dBA) sound level measurement parameters including the L_{eq} , L_{max} , and L_{90} , and one-third octave band sound levels. The meters will be programmed to log these statistical data on a 10-minute basis. In addition, a subset of these data will be collected by the meters at one-second intervals. The microphones will be tripod-mounted at a height of 1.5 meters (5 feet) above ground. A 7-inch windscreen will be placed on all microphones. Audio recordings will be made during the sound level measurements. These recordings will be either continuous or made only if the sound levels at the location exceed 45 dBA.

³ The closest wind turbine to each of the six measurement locations

The measurement equipment will be calibrated in the field before and after the surveys with the manufacturer's acoustical calibrator (or equivalent) which meets the standards of IEC 942 Class 1L and ANSI S1.40-2006 (R2016). All calibrations will be within ± 1.0 dB from the most recent calibration otherwise the data collected during that period will be discarded. The meters are calibrated and certified as accurate to standards set by the National Institute of Standards and Technology by an independent laboratory within the past 12 months.

Ground-level wind speed data will be continuously measured at all sound level monitoring locations for the duration of the study per the Final Decision. A HOBO H21-002 micro-weather station, or comparable instrumentation, with a tripod and data logger will be used at the monitoring locations. The wind speed sensors will be mounted at an approximately 2-meter height and log data every 10 minutes to be consistent with the sound level measurements. This wind instrument has a measurement range of 0 to 45 m/s (100 mph) and an accuracy of ± 1.1 m/s (2.4 mph). The starting threshold is ≤ 1 m/s (2.2 mph).

Additional meteorological parameters, e.g. temperature, precipitation, etc. will be collected through additional instrumentation (ATMOS 41 weather station) deployed by Epsilon at one location and downloaded from the closest National Weather Service station.

Schedule

The sound level measurement program is planned to commence during the week of October 19th, 2020. Following the approach outlined in the Final Decision, the sound level measurement program will run for at least two weeks (14 days). The equipment will not be staffed continuously; however, observations will be made four times during the program (see below). The field scientist will leave the site either the same day or the day after all equipment is running and return in approximately one week. The observation periods will be as follows:

- ◆ Upon deployment (daytime),
- ◆ During the 1st night when all monitors are running (nighttime),
- ◆ During the 1-week interim check (daytime), and
- ◆ During the pick-up (daytime).

Epsilon expects to provide a preliminary summary of the basic results (the measured project-only sound levels at the test points) to the Commission within 45 days after the completion of the field survey. A report, which summarizes the measurement program that will include figures depicting the wind turbine and measurement locations and tabular results, will be submitted on or before January 15, 2021.

Evaluation of the Sound Levels

The 'total' L_{eq} sound level (wind turbines + background) measured during each of at least 10 periods meeting the conditions specified in the Final Decision will initially be compared to the wind energy facility limits. This is conservative since it includes both wind turbines plus background. The sound level during background conditions will be measured during a period

when wind turbines are shutdown but would otherwise be operating. If necessary, a representative background sound level will be subtracted (on an energy basis) from the operational sound level to obtain the “wind turbine only” L_{eq} sound pressure level. This subtraction procedure is supported by ANSI S12.18. The “wind turbine only” sound pressure level will then be compared to the wind energy facility limits.

In order to compare the measured sound data to the applicable sound pressure level limits, Epsilon will evaluate the sound level data meeting the following criteria:

1. There is no precipitation during the measurement period.⁴
2. The average ground level wind speed is 5 m/s (11.2 mph) or less.⁵
3. According to ANSI S12.18 the sound level measurements are to be during a wind direction under which the measurement location is ± 45 degrees within the downwind direction of the sound source.⁶ Evaluating only downwind periods is not a specific requirement identified in the conditions of the Final Decision. In addition, according to a 2016 Massachusetts Clean Energy Center report⁷ on wind turbine acoustics, wind direction only affects sound levels by “generally less than 1 dB”. Therefore, it is reasonable to include additional wind directions in the analysis when downwind periods meeting the other criteria are not present and potentially uncommon.
4. Operational condition - Closest five wind turbines are operating. Closest wind turbine operating at maximum sound power (within 1.0 dBA). As the sound power determination cannot be made based on a comparison to wind turbine electrical output due to insufficient data on the EPCO operations, maximum electrical output, i.e. 2,300 kW, will be necessary at the closest wind turbine. If valid data are provided by GE in advance of the evaluation, it will be incorporated into the analysis.
5. The L_{10} and L_{90} sound levels were reasonably close together (≤ 4.0 dBA) indicating a steady sound, possibly from the wind turbines.⁸
6. Ground-level wind speed gusts were approximately 7 m/s or less.⁹

⁴ According to ANSI S12.18-1994 (R2019), “No measurements shall be made during measurable precipitation or freezing rain.” This condition is also required per the Final Decision.

⁵ According to ANSI S12.18-1994 (R2019), “No sound level measurement shall be made when the average wind velocity exceeds 5 m/s when measured at a height of 2 ± 0.2 m above the ground.” This condition is also required per the Final Decision.

⁶ Orientation between the source and receiver required for Method #1 in the ANSI standard. One exception is during an inversion with low ground level winds.

⁷ RSG et al, “Massachusetts Study on Wind Turbine Acoustics,” Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016.

⁸ Based on professional experience; Epsilon has found this relationship exists during periods of steady sound from sources such as wind turbines.

⁹ Based on professional experience; Momentary gusts can have a significant effect on the sound levels with impacts depending on the variation and speed of the wind and the sound level metric.

Each period meeting the criteria will be analyzed following the approach outlined above and compared to the broadband sound level limit. The sound level measurement program and analysis will be summarized in a comprehensive report.

Table 1 - Modeled Participating Structures (Sorted High to Low)

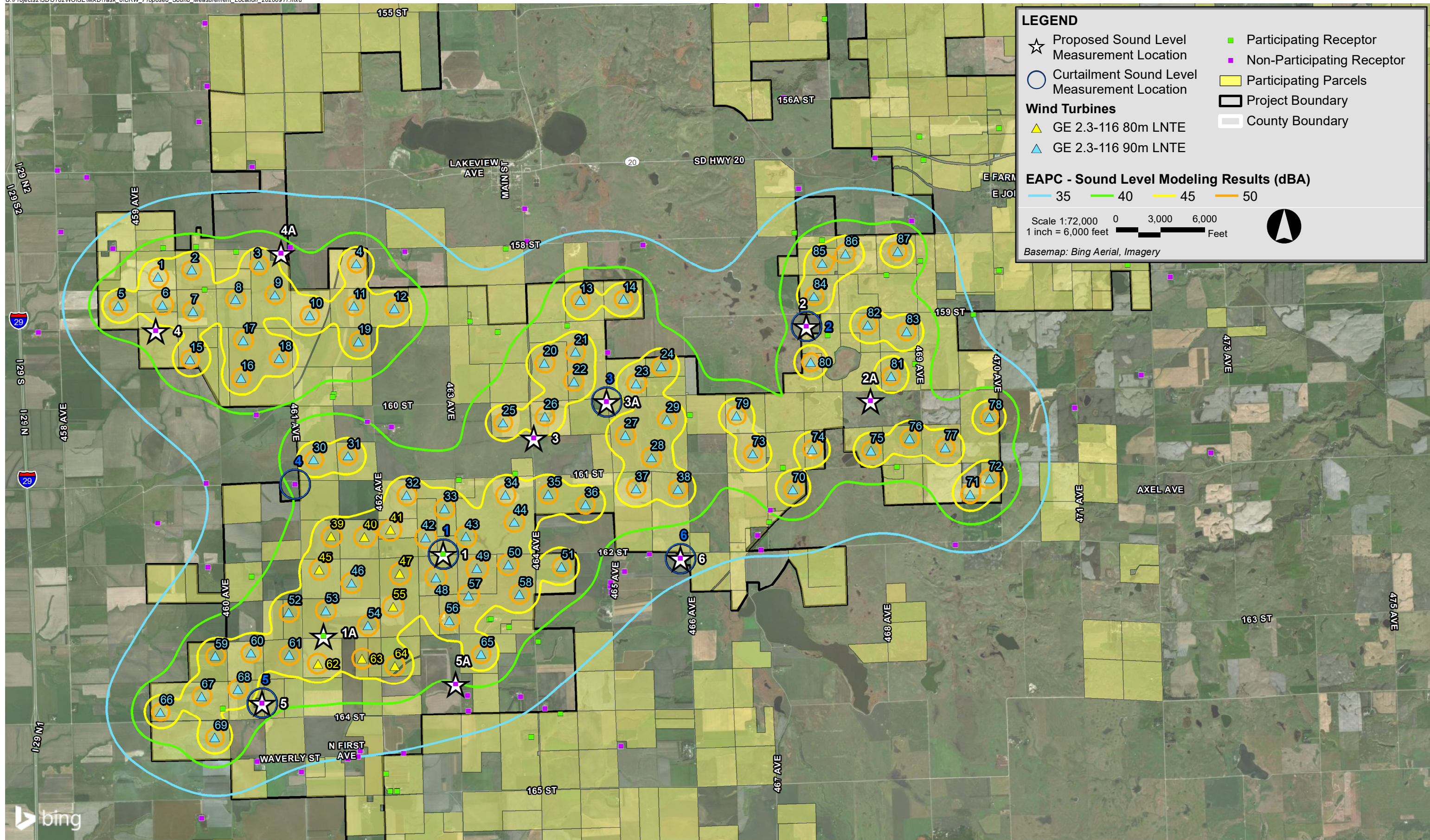
Modeling Receptor ID	Landowner	Participation Status	Easting (m)	Northing (m)	Modeled Project-Only Sound Level (dBA)	Proposed Sound Level Measurement Location ID	Curtailment Measurement ID
CR1-C30-P	BARSNESS DANIEL H	Participant	661,699	4,988,957	47	1	1
CR1-C50-P	SCHMELING RANDALL	Participant	656,806	4,994,388	46	-	-
CR1-C19-P	COMES KENNETH N & COMES JOANN A	Participant	659,243	4,987,276	46	1A	-
CR2-C150-P	TIMOTHY A NELSON REVOCABLE TRUST	Participant	657,178	4,985,788	45	-	-
CR1-C36-P	HOWEY ALBERT J	Participant	663,181	4,990,600	45	-	-
CR1-C17-P	DOUGLAS D OR DIANE M STORMO ETAL	Participant	658,031	4,986,373	44	-	-
CR1-G32-P	PEKELDER KRIS & ANNA E	Participant	669,477	4,995,401	44	-	-
CR1-C68-P	KOUSTRUP JOEL	Participant	662,652	4,987,606	44	-	-
CR1-G18-P	LINDBERG TERRY L & CHARLOTTE	Participant	668,678	4,990,722	44	-	-
CR1-C69-P	KOUSTRUP JOEL	Participant	662,685	4,987,619	44	-	-
CR1-C48-P	WAEGE LYNN K & WAEGE LANA L	Participant	664,247	4,993,646	44	-	-
CR1-G21-P	RUHR MARY B ET AL	Participant	666,766	4,991,807	44	-	-
CR1-C57-P	BURT DAVIS BONES JR FAMILY TRUST	Participant	656,628	4,995,266	43	-	-
CR1-C35-P	ZEMLICKA DEWEY L & ZEMLICKA BRYAN A	Participant	662,025	4,990,475	43	-	-
CR1-C51-P	SELCHERT DEAN C	Participant	657,455	4,995,160	43	-	-
CR1-G25-P	FIELDS ROBERT A & ARLENE	Participant	671,391	4,992,858	43	-	-
CR1-C20-P	WIENTJES WILLIAM & WIENTJES DANIELLE	Participant	663,054	4,987,455	43	-	-
CR1-G19-P	DAHLGREN KEVIN & DAWN	Participant	671,018	4,990,744	43	-	-
CR1-G66-P	C D FARM INC	Participant	670,802	4,994,681	42	-	-
CR1-C56-P	SCHMELING JOEL D	Participant	655,953	4,995,244	42	-	-
CR1-G67-P	PEKELDER ROBERT & SHARLYN	Participant	669,597	4,993,440	42	-	-
CR1-G65-P	DOLEN DUANE A & DONNA J	Participant	671,496	4,994,973	42	-	-
CR1-C42-P	ZEMLICKA DARON A & ZEMLICKA VALERIE K	Participant	659,458	4,992,229	39	-	-
CR1-C64-P	ZEMLICKA DARON A & ZEMLICKA VALERIE K	Participant	659,436	4,992,174	39	-	-
CR1-C26-P	TIMOTHY A NELSON REVOCABLE TRUST	Participant	657,767	4,988,493	39	-	-
CR1-G24-P	PEKELDER RYAN R & AMY M	Participant	673,058	4,992,440	39	-	-
CR1-C18-P	STRICHERZ CHRISTOPHER L & STRICHERZ TAMARA	Participant	663,651	4,987,157	39	-	-
CR1-G33-P	LARSEN DONALD A & ERMA L	Participant	668,911	4,995,550	39	-	-
CR1-G15-P	MILLER KEVIN R & DENISE M	Participant	668,396	4,989,607	39	-	-
CR1-C47-P	NOELDNER CHARLES A	Participant	662,825	4,993,508	38	-	-
CR1-C49-P	JALBERT JAMISON B & JALBERT JANE M	Participant	662,250	4,993,731	37	-	-
CR1-G26-P	FOX JOHN L & SUSAN E	Participant	672,589	4,993,869	35	-	-
CR1-C6-P	NOELDNER JOYCE SNOOZY & NOELDNER CHARLES A	Participant	662,989	4,995,228	34	-	-
CR1-C8-P	JAMES DANIEL & JAMES BECKY THYEN & THYEN PENNY	Participant	660,532	4,984,445	34	-	-
CR1-C11-P	STRICHERZ CLYDE L	Participant	664,111	4,985,679	34	-	-
CR1-C10-P	FRANSEN MARK L	Participant	663,510	4,985,195	33	-	-
CR1-C21-P	JAMES DANIEL & JAMES BECKY THYEN & THYEN PENNY	Participant	660,756	4,984,086	33	-	-
CR1-C22-P	JAMES DANIEL & JAMES BECKY THYEN & THYEN PENNY	Participant	660,755	4,984,082	33	-	-
CR1-C23-P	THYEN JAMES R & THYEN PENNY J	Participant	660,619	4,984,078	33	-	-
CR1-G28-P	SCHULTZ LARRY A	Participant	673,113	4,994,772	32	-	-
CR1-G41-P	BERG JAMES B & SUSAN J	Participant	671,563	4,997,050	31	-	-
CR1-G81-P	RANSOM NELSON E	Participant	671,478	4,997,523	30	-	-
CR1-G38-P	GRANQUIST GARY & KATHY LV TR	Participant	673,972	4,996,493	28	-	-
CR1-G129-P	REDEEN DENNIS M & DELORES D	Participant	673,111	4,997,703	28	-	-
CR1-G59-P	BERKNER REVOCABLE TRUST	Participant	675,755	4,994,888	27	-	-
CR1-G127-P	ERICKSON HENRY C & BETTY LOU	Participant	669,534	4,999,939	26	-	-
CR1-G60-P	BERKNER REVOCABLE TRUST	Participant	675,830	4,995,687	26	-	-
CR1-C59-P	HENRICHS MICHAEL D & HENRICHS LINDA M	Participant	661,548	5,000,754	26	-	-
CR1-G124-P	STAHL JAMES	Participant	669,843	5,000,605	25	-	-
CR1-G108-P	WOLLMAN MICHAEL J JR	Participant	669,516	5,001,186	25	-	-
CR1-G126-P	STEMSRUD MARILYN R	Participant	672,157	5,000,446	25	-	-
CR1-G128-P	MARKO RONALD & MINDY	Participant	670,242	5,001,314	24	-	-
CR1-G149-P	SCHLEUSNER DAIRY INC	Participant	669,284	5,003,283	23	-	-
CR1-G136-P	FISH DUANE & DONNA REV TR	Participant	667,706	5,004,861	22	-	-
CR1-G137-P	FISH RICHARD J & KERRY L ETA	Participant	666,501	5,005,136	22	-	-
CR1-G131-P	HANSEN RICHARD & SANDRA	Participant	668,466	5,005,145	21	-	-
CR1-G132-P	HANSEN ERIC T	Participant	669,098	5,004,948	21	-	-
CR1-G135-P	HANSEN ROGER	Participant	668,616	5,005,161	21	-	-
CR1-G133-P	DAVIS RUBY ELLA TERESIA	Participant	669,881	5,005,460	21	-	-
CR1-G138-P	CAPP LYNN	Participant	664,809	5,006,456	21	-	-
CR1-G140-P	STORM STEVEN N & WENDY	Participant	664,546	5,007,269	20	-	-
CR1-G139-P	HAACKER DONALD	Participant	668,199	5,008,062	19	-	-

Table 2 - Modeled Non-Participating Structures (Sorted High to Low)

Modeling Receptor ID	Landowner	Participation Status	Easting (m)	Northing (m)	Modeled Project-Only Sound Level (dBA)	Proposed Sound Level Measurement Location ID	Curtailment Measurement ID
CR1-C37-NP	LINDGREN TIMOTHY J	Non-Participant	663,563	4,991,342	44	3	-
CR1-C46-NP	OSTHUS GRANT	Non-Participant	655,802	4,993,540	43	4	-
CR1-C41-NP	WELDER ROBERT J	Non-Participant	665,053	4,992,084	43	3A	3
CR1-C44-NP	LIVING LEWIS & LIVING PATRICIA RADERSCHADT TRUST	Non-Participant	665,076	4,993,095	43	-	-
CR1-C62-NP	LUECK MARK S & LUECK NANCY F	Non-Participant	658,375	4,995,138	43	4A	-
CR1-C14-NP	HOWELL BRADFORD J & HOWELL CHERI M	Non-Participant	657,982	4,985,894	43	5	5
CR1-G68-NP	SPANGENBERG CLAYTON & SUSAN	Non-Participant	669,159	4,993,632	42	2	2
CR1-G23-NP	JOHNSON LANE PARKER & BEVERL	Non-Participant	670,471	4,992,104	42	2A	-
CR1-C34-NP	MATHEWS RUSSELL J	Non-Participant	658,661	4,990,389	41	-	4
CR1-C63-NP	CARLSON MILTON E & CARLSON ALICE R	Non-Participant	658,566	4,995,254	41	-	-
CR1-G16-NP	MULHOLLAND MICHAEL D & SUSAN	Non-Participant	668,419	4,989,861	41	-	-
CR1-C39-NP	ZEMLICKA LEON C	Non-Participant	660,144	4,991,670	40	-	-
CR1-C16-NP	JOHNSON PAUL J	Non-Participant	661,960	4,986,288	40	5A	-
CR1-C40-NP	GRIEPP ALLEN O & GRIEPP MARJORIE A	Non-Participant	657,865	4,991,818	40	-	-
CR1-C38-NP	ZEMLICKA SHIRLEY M TRUST & ZEMLICKA TRUST	Non-Participant	660,639	4,991,557	39	-	-
CR1-G34-NP	PETERSON PAUL D & VERLA J	Non-Participant	671,320	4,995,798	39	-	-
CR1-C12-1-NP	LIVING DENNIS D & DAWN M THYEN REV LIVING TRUST	Non-Participant	662,199	4,986,047	39	-	-
CR1-C71-NP	CARPENTER BEVERLY	Non-Participant	665,137	4,988,378	38	-	-
CR1-C55-NP	LOWE LONNIE L	Non-Participant	660,914	4,995,169	38	-	-
CR1-C70-NP	CARPENTER BEVERLY	Non-Participant	665,135	4,988,293	38	-	-
CR1-C28-NP	MOORE JAMES JOSEPH SR	Non-Participant	665,429	4,988,598	38	-	-
CR1-C31-NP	STRANG JOHN C & STRANG SARAH L	Non-Participant	665,939	4,988,950	38	-	-
CR1-C72-NP	CARPENTER BEVERLY	Non-Participant	665,158	4,988,170	38	-	-
CR1-C3-NP	WHITTED JASON & WHITTED LORNA	Non-Participant	657,888	4,984,697	37	-	-
CR1-C52-NP	KELLEN VINCENT T & KELLEN KATIE R	Non-Participant	654,924	4,995,231	37	-	-
CR1-C12-NP	LIVING DENNIS D & DAWN M THYEN REV LIVING TRUST	Non-Participant	662,222	4,985,736	37	-	-
CR1-G14-NP	TUTTLE ROBERT A	Non-Participant	668,156	4,989,332	37	-	-
CR1-C15-NP	STRICHERZ LAVERNE B & STRICHERZ BARBARA J	Non-Participant	663,291	4,986,026	36	-	-
CR1-C29-NP	CHRISTENSON AMBER KAYE	Non-Participant	666,572	4,988,867	36	6	6
CR1-C27-NP	JOHNSON MELISSA M & LYNCH PATRICK M	Non-Participant	656,876	4,988,683	36	-	-
CR1-C67-NP	GRIDLEY CATHERINE GRACE	Non-Participant	659,789	4,985,057	36	-	-
CR1-C66-NP	WEST MIRIAM C	Non-Participant	659,718	4,985,032	36	-	-
CR1-G13-NP	NOWICK TIMOTHY D JR	Non-Participant	672,216	4,989,142	36	-	-
CR1-C65-NP	JOHNSON BRANDON L & JOHNSON LAURIE A	Non-Participant	665,805	4,995,305	36	-	-
CR1-G12-NP	COOK STEVEN L & KAREN E	Non-Participant	668,229	4,989,039	36	-	-
CR1-C112-NP	Waverly School	Non-Participant	660,002	4,984,908	35	-	-
CR1-C33-NP	BRESKE TONY & BRESKE GWEN	Non-Participant	656,839	4,990,404	35	-	-
CR1-C5-NP	COMES, DOUGLAS	Non-Participant	659,958	4,984,794	35	-	-
CR1-C4-NP	FOSTER TERRY	Non-Participant	659,744	4,984,749	35	-	-
CR1-C7-NP	MATTHEW G WHITNEY L/E LORRAINE Y WHITNEY	Non-Participant	660,893	4,984,861	35	-	-
CR1-C2-NP	HEYDUK RICHARD E & HEYDUK LINDA S	Non-Participant	658,791	4,984,483	35	-	-
CR1-C13-NP	COMES ROBERT	Non-Participant	663,792	4,985,785	35	-	-
CR1-C54-NP	KOLL CHARLES L & KOLL GAYLE MARIE	Non-Participant	663,421	4,995,376	35	-	-
CR1-G37-NP	WALDNER RONNIE E & AMANDA K	Non-Participant	668,998	4,996,452	34	-	-
CR1-C32-NP	MOHR ROGER D	Non-Participant	655,843	4,989,581	33	-	-
CR1-C58-NP	HAMANN GARY F & HAMANN DAWN E	Non-Participant	657,781	4,996,906	33	-	-
CR1-C1-NP	KLEIN FAMILY FARMS INC	Non-Participant	656,743	4,983,525	33	-	-
CR1-C53-NP	WHITNEY JERRY	Non-Participant	663,376	4,996,043	33	-	-
CR1-C45-NP	ZUBKE JACKIE L & ZUBKE GRACE M	Non-Participant	653,390	4,993,503	32	-	-
CR1-C111-NP	HUFFMAN TONY & HUFFMAN ALICA	Non-Participant	653,857	4,995,573	32	-	-
CR1-G42-NP	OWEN KEVIN M	Non-Participant	670,566	4,997,097	32	-	-
CR1-G22-NP	GRANQUIST BRUCE & JANET	Non-Participant	674,670	4,991,955	32	-	-
CR1-C110-NP	IRISH JOHN L & IRISH SHARON L	Non-Participant	654,385	4,996,686	31	-	-
CR1-C9-NP	DAGEL KENNETH & DAGEL KATHLEEN M	Non-Participant	665,352	4,985,004	31	-	-
CR1-C61-NP	BOOZE DAVID R & BOOZE PATTY L	Non-Participant	656,690	4,997,831	31	-	-
CR1-C109-NP	LAVONNE J SELCHERT ETAL	Non-Participant	653,780	4,996,828	30	-	-
CR1-C60-NP	SCHROEDER JEFFREY J & SCHROEDER DEBRA J	Non-Participant	656,855	4,998,565	29	-	-
CR1-G105-NP	OWEN KELLY W IRREVOCABLE TRU	Non-Participant	668,696	4,998,325	29	-	-
CR1-G36-NP	HWY RTY	Non-Participant	673,559	4,996,344	29	-	-
CR1-G77-NP	GRANQUIST NATHAN B & BRITTNE	Non-Participant	676,031	4,992,629	28	-	-
CR1-C107-NP	RANCH DOUBLE J	Non-Participant	656,811	4,999,855	27	-	-
CR1-G130-NP	RUDE DALTON H & BARBARA J	Non-Participant	668,147	5,000,233	26	-	-
CR1-G109-NP	RAMOS KARLA ETAL	Non-Participant	667,064	5,000,425	26		
CR1-G27-NP	O'DONNELL SCOTT & VICKI	Non-Participant	676,630	4,994,642	26		
CR1-G125-NP	RUDE DALTON H & BARBARA J	Non-Participant	668,289	5,000,643	26		
CR1-G70-NP	ROBISH ALLEN E & SHIRLEY	Non-Participant	677,465	4,991,043	26		
CR1-C105-NP	ADAIR NANCY C	Non-Participant	658,372	5,001,257	25		
CR1-G43-NP	WISNEWSKI CHAD E & SUSAN	Non-Participant	661,141	5,001,721	25		
CR1-G44-NP	KOWALSKI STEPHEN V &	Non-Participant	661,781	5,001,732	25		
CR1-G117-NP	TANAKA LAND TRUST	Non-Participant	663,801	5,005,084	22		

Table 2 - Modeled Non-Participating Structures (Sorted High to Low)

Modeling Receptor ID	Landowner	Participation Status	Easting (m)	Northing (m)	Modeled Project-Only Sound Level (dBA)	Proposed Sound Level Measurement Location ID	Curtailment Measurement ID
CR1-G113-NP	URBAN JAMES S & JOANNE M	Non-Participant	666,228	5,005,549	21		
CR1-G110-NP	HICKS JOHN T & PAULINE E	Non-Participant	671,218	5,005,064	21		
CR1-G115-NP	FAETH ROBERT S. & DUSTIN K.	Non-Participant	664,933	5,006,731	21		
CR1-G114-NP	GRANT-ROBERTS RURAL WATER	Non-Participant	666,214	5,006,667	20		
CR1-G600-NP	MOGEN PETER & KRISTI	Non-Participant	674,301	5,005,773	19		



Crowned Ridge Wind Energy Center Grant and Codington Counties, South Dakota