EXHIBIT A10

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION BY PREVAILING WIND PARK, LLC FOR A PERMIT FOR A WIND ENERGY FACILITY IN BON HOMME, CHARLES MIX, AND HUTCHINSON COUNTIES, SOUTH DAKOTA, FOR PREVAILING WIND PARK ENERGY FACILITY

SD PUC DOCKET EL-18-026

PREFILED REBUTTAL TESTIMONY OF CHRIS HOWELL
ON BEHALF OF PREVAILING WIND PARK, LLC

September 26, 2018

I. INTRODUCTION

Q. Please state your name.

A. My name is Chris Howell.

Q. Did you provide Direct Testimony in this Docket?

A. Yes. I submitted direct testimony in this docket on May 30, 2018.

Q. What is the purpose of your Rebuttal Testimony?

A. The purpose of my Rebuttal Testimony is to provide the results of updated acoustic modeling to reflect a taller hub height for the proposed turbine, two small turbine shifts and nine (9) additional occupied residences that were identified in Prevailing Wind Park, LLC's ("Prevailing Wind Park") re-review of residences within and near the Prevailing Wind Park Project ("Project") area, as described in Bridget Canty's Rebuttal Testimony. In addition, I will respond to the testimony of Mr. David Hessler, submitted on behalf of the South Dakota Public Utilities Commission Staff ("Staff"); Mr. Richard R. James, submitted on behalf of Intervenors; and Mr. Jerry L. Punch, submitted on behalf of Intervenors.

Q. Are there any exhibits attached to your Rebuttal Testimony?

A. The following exhibit is attached to my Rebuttal Testimony:

- Exhibit 1: Memorandum Regarding Updated Modeling Results – Prevailing Wind Park

II. UPDATED ACOUSTIC MODELING

Q. Do you have any updates to your Direct Testimony?

A. Yes. We have conducted updated acoustic modeling of the Project's proposed layout to model the proposed GE 3.8-137 turbine a with a taller hub height (111.5 meters v. 110 meters), sound for the additional nine (9) receptors, the revised locations of Turbines 38 and 40, and the removal of turbine location T19. A memorandum summarizing the results of our updated acoustic modeling is included

as **Exhibit 1**. Exhibit 1 includes graphical presentation of the predicted 45 dBA contour lines overlain on aerials.

Q. Could you summarize the results of your updated acoustic modeling?

A. Yes. The updated modeling results are generally consistent with the previously submitted sound study. All residences are expected to be below 45 A-weighted decibels (dBA) and therefore meet the Bon Homme County Ordinance sound limits.[1]

Q. Can you discuss the accuracy of your analysis of the anticipated sound levels generated by the Project?

A. Yes. As I previously discussed in my Direct Testimony (Howell Direct, lines 215-22), the methods we used in this study to develop potential Project sound impacts are consistent with those we have used in most of our predictive studies. Nearly half of the projects we study each year require post-construction compliance demonstration, and that monitoring has routinely shown that our prediction methods are conservative (i.e., over-predict impacts).

III. RESPONSE TO TESTIMONY OF DAVID HESSLER

Q. What is your overall response to Mr. Hessler's testimony?

A. I have reviewed Mr. Hessler's Direct Testimony, dated September 10, 2018. Mr. Hessler concludes that our noise modeling methodology and assumptions are satisfactory. Mr. Hessler concurs with our conclusion that the Project will meet the Bon Homme County 45 dBA noise limit for all residences, including those in Charles Mix and Hutchinson counties, where no noise limits are in force (see Hessler Direct, lines 1-4). He states that 45 dBA is an appropriate and reasonably fair regulatory

[1] Bon Homme Zoning Ordinance Section 1741 provides: "Noise level produced by the LWES shall not exceed forty five (45) dBA, average A-weighted sound pressure at the perimeter of occupied residences existing at the time the permit application is filed, unless a signed waiver or easement is obtained from the owner of the residence."

noise limit for wind projects at non-participating residences (see Hessler Direct, lines 8-9). I agree with those conclusions, and I further agree with Mr. Hessler's statement that regardless of sound level, not everyone will be completely satisfied with turbine sound emissions.

I do not agree with Mr. Hessler's assertion that Burns & McDonnell Engineering Company, Inc. ("Burns & McDonnell") should attempt to study or model the subjective reactions of the community. That type of evaluation is not required, and in my opinion, would be highly speculative.

Q. Mr. Hessler faults your analysis for not "assessing or addressing in any way the potential for an adverse community reaction to project noise." Do you agree with this criticism?

A. I agree that our analysis did not assess the potential for an adverse community reaction to Project noise, but I do not agree that it should have done so. The Burns & McDonnell analysis identified the Project's anticipated sound level impacts, using industry-accepted methods, to determine whether the Project will comply with Bon Homme County's applicable and quantifiable noise limit of 45 dBA at currently inhabited dwellings. Community reaction is subjective and based on a number of factors other than the sound levels actually produced.[2] This is true whether that reaction is positive or negative. Thus, the potential for adverse community reaction to Project noise is neither an objective standard for the Project to meet nor the applicable regulatory standard.

[2] Michaud, David S., et. al. "Personal and situational variables associated with wind turbine noise annoyance." J. Acoust. Soc. Am. 139 (3), March 2016.

Haac, R., K. Kaliski, M. Landis, B. Hoen, J. Firestone, J. Rand. (2018) Predicting audibility of and annoyance to wind power project sounds using modeled sound. Lawrence Berkley National Laboratory. Preliminary Results Webinar. February 27, 2018.

Q. Are you familiar with the work of Australian acoustician Steven Cooper, as referenced by Mr. Hessler?

A. Yes, I am familiar with Mr. Cooper of The Acoustics Group in Australia and his work. Mr. Hessler refers to a paper that Mr. Cooper authored.[3] The referenced paper discusses a very specific method for monitoring and reproducing sound from wind farms for a select group of people identified as being sensitized to wind turbine noise. The paper is an extension of a sound level measurement study at the Cape Bridgewater Wind Farm near Victoria, Australia, for which Mr. Cooper was the lead investigator. Among other things, Mr. Cooper sought to measure infrasound and low frequency sound, recreate those sounds in a laboratory, and correlate that sound to adverse health effects.

Q. What is your opinion of Mr. Cooper's study?

A. I do not believe that the study provides helpful information to the Commission with respect to the Project. It has methodological flaws and does not reproduce a realistic environment. The study suggests that people who are more sensitive to low frequency noise are able to identify low frequency noise in a controlled environment. While a control group consisting of nine people (one who is hearing impaired and four acousticians) was used in the study, the main test group consisted entirely of people self-identified as being sensitive to wind turbine noise. The study did not reproduce the types of noise that one would actually experience near a wind farm; there is a significant difference in the characteristics and amplitude of the measured indoor sound levels and what was reproduced in the laboratory environment. The sound levels generated within Mr. Cooper's laboratory, which represent the noise recorded within a single home at the Cape Bridgewater project, are significantly higher (10 to 20 dB) than the ambient sound level for low frequencies and the mid frequencies. Generating specific audio files in a controlled environment does not actually replicate the sound a person would experience outside of a laboratory. As

[3] Cooper, S., Chan, C. (2017). *Subjective perception of wind turbine noise - The stereo approach*. Proc. Mtgs. Acoust. Vol. 31, 040001.

such, the sounds generated and amplified for the test subjects to experience are not realistic.

Q. Do you agree with Mr. Hessler's analysis of Mr. Cooper's study?

A. I do not agree that the Commission should rely on Mr. Cooper's study. As I noted previously, the study has methodological flaws, making it unreliable. It also does not replicate the sound that individuals will actually experience near a wind farm.

IV. RESPONSE TO TESTIMONY OF RICHARD R. JAMES

Q. Have you reviewed the Prefiled Testimony of Richard R. James, submitted on behalf of intervenors in this proceeding?

A. Yes. I have reviewed Mr. James' testimony, as well as the exhibits attached to his testimony.

Q. Mr. James critiques your assessment of the Project using a 45 dBA sound limit. How do you respond to his critique?

A. The Project did not independently choose to apply the 45 dBA sound level. Rather, the Bon Homme County ordinance limit of 45 dBA sound level for non-participants was identified as the applicable regulatory noise limit for the Project. The Project is voluntarily applying the same 45 dBA standard in Charles Mix and Hutchinson Counties, neither of which has an applicable noise limit. Additionally, this is the level that Mr. Hessler testifies is an appropriate and reasonable level.

Q. Mr. James states that "the maximum sound level for audible sounds should be 35 dBA (Leq) and 50 dBC, especially for nighttime wind turbine noise." (James Direct, lines 101-02) How do you respond?

A. I do not agree. First, C-weighted levels are of no significance to sounds created by wind farms. Second, as noted by Mr. Hessler in his Direct Testimony, the 45 dBA level is appropriate and C-weighting also has other serious technical problems.

Q. Are you familiar with the paper titled *Noise: Wind Farms* included as Exhibit 2 to Mr. James' testimony?

A. Yes. The paper describes wind turbines in general, and how they make noise. It goes on to recommend that further research should be conducted as there is no definitive evidence of wind turbine noise and direct health effects.

Q. Do you believe that the *Noise: Wind Farms* paper provides the Commission with important information related to the Project?

A. I believe the paper makes it clear that complaints arising from wind farms are more related to how people feel about the wind farm than the actual sound levels emitted by the wind farm. Because of this, the paper is not very useful to the Commission in relation to the Project.

Q. Are you familiar with the work of Dr. Paul Schomer, titled *A Possible Criterion for Wind Farms*, included as Exhibit 3 to Mr. James' testimony?

A. Yes. Dr. Schomer attempts to identify a single metric to use for determining acceptability of a wind farm's sound levels based on an assumed percentage of residents that would be highly annoyed. Dr. Schomer argues that the percent of people highly annoyed is relatable to specific noise metrics and levels. He summarizes that a day-night average sound level, where a 10 dB penalty is applied to nighttime hours (DNL), is related to an equivalent sound level for a 24-hour period (Leq 24-hour). Dr. Schomer's proposed metric is based on subjective perceptions rather than measurable metrics. In my opinion, that is why the proposed metric has not been accepted in the acoustical community.

Q. Do you agree with Mr. James' analysis of Dr. Schomer's paper?

A. No. Mr. James appears to argue that Dr. Schomer makes recommendations similar to those of Mr. James regarding noise thresholds in rural communities. Dr. Schomer's analysis does not support the use of dBC criteria, which runs counter to Mr. James' recommendation that a 50 dBC limit be used. Additionally, as I discussed above, I disagree that using a 24-hour average limit is appropriate for

sound produced by a wind farm, as it is likely to misrepresent the sound level of a wind farm at any given time. A 24-hour Leq limit may be less restrictive than a lower sound level over a shorter-duration, such as the 45 dBA limit applied with respect to the Project.

Q. Mr. James appears to assert that the Project should apply noise limits to property lines as opposed to occupied residences. Do you agree?

A. No. As I discussed above, the only applicable noise limit with respect to the Project is that set by Bon Homme County. I agree with Mr. Hessler's testimony that the sound levels at residences is the appropriate measurement and consistent with the generally accepted methodology.

Q. Have you reviewed Exhibit 6 to Mr. James' testimony?

A. Yes, I have looked at Mr. James' Exhibit 6. There are various figures and descriptions for measuring infrasound at several residences.

Q. Do you believe that Exhibit 6 to Mr. James' testimony presents useful information to the Commission with respect to this Project?

A. No, I do not. The graphics and charts demonstrate that the sound levels measured at a different, non-similar project are all significantly below the levels of perception presented within numerous studies of infrasound perception and hearing from ISO 226.

Q. Mr. James notes that ISO 9613-2 "states it is not applicable for noise sources that are more than 30 meters above the ground or receiver elevation" (James Direct, lines 249-350) and Mr. James indicates that ISO 9613-2 is not appropriate for wind turbine noise. How do you respond?

A. Using a model based on ISO 9613-2 methods for wind farm sound is a good predictor of what will be measured upon completion of the Project, and is the international standard approach for acoustical studies for wind farms. The modeling results have been proven accurate when compared to measured results in

numerous studies by professionals in the industry, standards develpers, and government agencies.

Q. Mr. James comments on the values for ground attenuation reflected in the Burns & McDonnell sound model, stating that the values used for ground attention were not disclosed and that the "proper value for ground attenuation is '0' to turn off any calculations of ground effect." (James Direct, lines 354-55) How do you respond?

A. Using "0" for ground absorption is considered overly conservative, and is representative of "hard ground" (i.e., paving, water, ice, concrete). The Project area is predominantly agricultural in nature, which according to ISO 9613-2 is considered "porous ground." ISO 9613-2 suggests a ground absorption value of 1.0 for "porous ground." As a conservative assumption for the Project, we used a ground absorption value of 0.5 within the model to simulate mixed ground (equally hard and porous).

According to ISO 9613-2, ground absorption plays a role in three distinct areas: the source, the middle, and the receiver. While the source and middle are at significant elevations, the receiver area is near grade and will be influenced by the ground absorption. The influence of ground absorption due to elevation of the source and receiver, and therefore the middle area, is automatically determined within the model. Again, assuming "0" for ground absorption near the receiver is considered overly conservative.

Q. Do you agree with Mr. James' conclusion that predicted sound levels at receptors in and near the Project are at least 5 dBA less than what should be expected under operating conditions?

A. No. We are confident that our modeling results are conservative and that the noise levels predicted in our modeling will not be exceeded when the Project is operational. Models can be set up to under predict or over predict. In a regulatory setting in which compliance is based on actual wind turbine sound levels (as is the

case in Bon Homme County), it does not benefit the Project to under predict potential sound levels. As a result, we use conservative values when practical. We have developed and refined our modeling techniques using actual measurement data as a basis for comparison, and generally, in a manner that has been proven accurate throughout the years. As I discussed in my Direct Testimony and above, post-construction monitoring results of projects for which we have completed predictive sound studies are typically lower than our predictions.

V. RESPONSE TO TESTIMONY OF JERRY L. PUNCH

Q. Dr. Punch suggests that LAmax is the optimal noise measurement metric. Why didn't Burns & McDonnell use LAmax as a noise measurement metric in its Sound Study?

A. LAmax is not appropriate as a noise measurement metric for noise from wind turbines. According to the World Health Organization's (2009) Night Guidelines ("WHO Guidelines"), LAmax is useful to predict short-term or instantaneous noise sources, such as that from barking dogs, clapping thunder, or passing cars. Thus, LAmax is designed to quantify sound levels emitted from very infrequent sources of noise. Wind turbines create noise on a more regular basis.

Additionally, the WHO Guidelines do not suggest LAmax as a guideline limit. Rather, they suggest an Lnight, outdoor level of 40 dBA. This is an average sound level during all nighttime hours (8-hour period) over each night of an entire year, and the metric is inclusive of any sound that may occur. Lnight, outdoor is generally not an appropriate metric for wind projects, as there will be many nights when the wind turbines are not operating and would reduce the Lnight, outdoor level. The predicted sound levels for the Project will be below 45 dBA would apply on any given night, would not be averaged out over an entire year, and would differentiate wind turbine noise from other intrusive sounds.

Q. Dr. Punch suggests that, as an alternative to LAmax, 36-38 dBA, based on a 24-hour measurement period, is an appropriate noise limit. Do you agree?

A. As discussed above, a 24-hour Leq limit is not appropriate for this type of source, and is likely to misjudge the sound level of a wind farm at any given time. As such, a 24-hour Leq limit may be less restrictive than a lower sound level over a shorter-duration, such as the 45 dBA limit applied with respect to the Project.

Q. Dr. Punch critiques the Burns & McDonnell sound study for not including a discussion of the annoyance and adverse health impacts of the Project. Do you agree with Dr. Punch's assessment?

A. I agree that we did not perform an analysis of annoyance. That is not a criterion for compliance and would be speculative at best. The Burns & McDonnell sound study focused on demonstrating compliance with the applicable sound regulations for the Project.

Q. What is your response to Dr. Punch's identification of shortcomings in your study of background sounds?

A. Dr. Punch indicated that the Burns & McDonnell ambient study showed high sound levels. The report does show that an ambient L90 sound level of 45 dBA was measured, but states that it was one measurement location during early evening hours. All other measurements were less than 40 dBA. Sources of extraneous noise were provided in Appendix A of the report. For this particular instance, birds and high-speed cars are noted during the evening hours when the ambient sound level reached 45 dBA. This is a reasonable early-evening sound level near a roadway.

Another of the items Dr. Punch takes exception to is the use of A-weighting as "misleading" in how it handles low frequencies. The report does not mislead the reader and clearly states that the A-weighting network emphasizes the middle frequencies and deemphasizes sounds in the low and high frequencies. A-weighting is fully appropriate because the noise limit for comparison is A-weighted.

Additionally, as I previously discussed, using other weightings is not appropriate for wind farms.

VI. CONCLUSION

Q. Does this conclude your Rebuttal Testimony?

A. Yes.

Dated this 26th day of September, 2018.

Chris Howell

64846409

Memorandum

BURNS McDONNELL

Date: September 26, 2018

To: Prevailing Winds Project Team

From: Burns & McDonnell

Subject: Updated Modeling Results – Prevailing Wind Park

Prevailing Wind Park, LLC (Developer) is proposing to construct the Prevailing Wind Park near Avon, South Dakota, in Bon Homme, Hutchinson, and Charles Mix Counties (Project). The Project will consist of 60-62 wind turbines with a maximum nameplate capacity of up to 219.6 megawatts (MW), although output at the point of interconnection will be limited to a maximum of 200 MW. A total of 62 wind turbine sites were analyzed for the sound model, General Electric (GE) 3.8-137[1]. Directly north of the Project, NorthWestern Energy operates 43, 1.85-MW GE 1.85-87 wind turbines as part of the Beethoven Wind Farm. Sound emitted by the Beethoven Wind Farm turbines were not included in this analysis. This sound assessment was completed to model the sound that would be generated by the Project and to determine if the Project could operate in compliance with the applicable sound regulations.

The Bon Homme County ordinance limits sound levels of wind energy systems to 45 dBA at occupied receptors, unless a signed waiver or easement is obtained from the owner of the residence. There are no zoning requirements for this Project within Charles Mix County. Hutchinson County has no numeric noise ordinance. Therefore, the Bon Homme County ordinance sound level limit was used as the design goal for all areas of the Project.

Sound Modeling

The program used to model the turbines was the Computer Aided Noise Abatement (CadnaA), Version 2018, published by DataKustik, Ltd., Munich, Germany. The 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 Project contains 62 wind turbine locations. Predictive modeling was conducted to determine the impacts from the new turbines at the nearest occupied residences. Wind turbine heights and acoustical emissions were input into the model. The nacelles of each wind turbine are mounted on towers 111.5 meters high.

The sound emissions data supplied by GE was developed using the International Electrotechnical Commission (IEC) 61400-11 acoustic measurement standards. The Project also includes a collection substation with one transformer designed to 82 dBA at 2 meters. The octave band sound levels for the transformer were based on the National Environmental Management Authority (NEMA) sound pressure level rating from the environmental noise guide. The

[1] Prevailing Wind Park, LLC directed us to remove turbine location T19 for purposes of this analysis.

expected sound power levels for each turbine and the collection substation transformer are displayed in Table 1.

Table 1: Maximum Sound Power Levels

Sound Source	Height (m)	Sound Power Level (dBA)									
		31.5	63	125	250	500	1000	2000	4000	8000	dBA
GE 3.8-137	111.5	78.5	86.8	92.6	96.4	99.4	102.1	102.0	93.7	79.2	**107.0**
Transformer[a]	4.5	99.0	105.0	107.0	102.0	102.0	96.0	91.0	86.0	79.0	**102.4**

a) Transformer sound power level is based on the NEMA standard sound level for a transformer rated to 82 dBA at 6 meters.

Results

The maximum model-predicted L_{eq} sound pressure levels at each receiver (the logarithmic addition of sound levels from each frequency from every turbine and transformer) are included in Attachment 1. The highest predicted sound level at an occupied residence is 41.9 dBA. These values represent only the noise emitted by the GE wind turbines. There are no expected exceedances of the identified regulations due to operation of any of the proposed wind turbine locations of the Project.

GDW

Attachment 1 – Predicted Sound Pressure Levels
Attachment 2 – Sound Contour Figure

Memorandum

BURNS McDONNELL

Attachment 1 – Predicted Sound Pressure Levels

Attachment 1 - Modeling Results

All Turbines: GE 3.8-137, 111.5 m hub height

Receiver	Coordinates		Base Elevation (m)	Modeled LAeq	Exceed 45 dBA? (Y/N)
	Easting (m)	Northing (m)			
REC-001	583178.93	4781949.36	473.94	24.7	N
REC-002	578731.00	4782428.97	540.99	29.1	N
REC-003	580506.89	4783273.92	505.27	33.7	N
REC-004	582678.66	4780104.52	480.03	32.4	N
REC-005	583326.78	4778396.84	476.81	27.5	N
REC-006	583615.28	4778695.43	471.94	26.2	N
REC-007	579386.45	4783171.84	519.65	29.7	N
REC-008	579364.54	4780122.78	515.18	38.2	N
REC-009	582485.70	4779597.03	481.47	35.1	N
REC-010	570706.40	4779232.69	531.85	20.3	N
REC-011	568954.92	4779049.93	516.88	23.1	N
REC-012	575450.96	4778869.67	571.47	-	N
REC-013	570834.43	4777923.92	539.22	27.4	N
REC-014	578568.31	4777265.47	526.35	38.1	N
REC-015	578578.94	4777228.45	526.13	38.3	N
REC-016	569437.95	4774776.35	523.53	38.9	N
REC-017	567999.72	4773683.50	489.60	36.8	N
REC-018	575893.85	4773069.05	525.25	32.7	N
REC-019	568870.35	4772837.61	510.51	36.3	N
REC-020	568170.58	4772373.09	491.63	30.5	N
REC-021	574122.73	4771641.66	507.46	34.9	N
REC-022	574117.98	4771913.43	508.31	34.5	N
REC-023	567115.19	4771132.04	470.89	-	N
REC-024	569455.79	4770885.60	499.55	34.2	N
REC-025	582409.59	4770691.28	486.10	26.3	N
REC-026	582205.90	4770538.43	489.18	27.7	N
REC-027	569450.78	4770122.57	499.25	32.0	N
REC-028	578915.96	4770106.59	519.65	30.5	N
REC-029	567890.47	4769896.98	472.42	19.1	N
REC-030	574057.84	4769738.20	530.58	35.4	N
REC-031	571038.40	4769099.63	510.51	36.6	N
REC-032	579594.58	4768433.69	507.46	40.2	N
REC-033	574388.42	4768112.11	502.26	28.9	N
REC-034	575856.91	4767968.51	509.35	34.0	N
REC-035	568988.11	4768088.17	487.50	27.6	N
REC-036	574139.54	4767903.27	507.06	28.0	N
REC-037	580534.75	4767955.77	497.42	40.6	N
REC-038	569570.52	4767693.73	493.87	33.1	N
REC-039	575753.59	4767511.52	511.25	33.3	N
REC-040	575853.92	4767408.85	513.56	34.2	N
REC-041	577365.54	4767429.45	496.85	41.4	N
REC-042	580534.93	4768649.62	501.93	40.0	N
REC-043	582314.18	4767105.01	476.98	30.8	N
REC-044	577581.91	4766535.38	501.37	35.6	N
REC-045	580459.53	4766528.35	495.27	37.9	N
REC-046	570892.00	4766384.10	500.34	39.9	N
REC-047	576071.91	4766099.10	511.58	28.5	N
REC-048	575888.47	4765484.03	507.46	26.2	N
REC-049	579136.06	4765003.57	501.37	36.3	N
REC-050	575594.26	4764877.78	513.56	22.9	N
REC-051	577014.96	4764806.12	483.08	32.7	N
REC-052	571034.71	4764976.49	483.08	32.4	N
REC-053	575751.76	4763553.72	504.89	18.1	N
REC-054	579261.02	4763508.83	493.92	26.2	N
REC-055	575738.19	4763383.18	501.37	18.7	N
REC-056	578784.40	4763423.45	495.27	26.7	N
REC-057	575728.70	4763020.56	496.19	-	N
REC-058	574689.98	4762905.51	489.18	-	N
REC-059	574608.88	4762765.31	484.23	-	N
REC-060	575719.36	4763758.78	507.46	19.6	N
REC-061	566590.17	4774005.26	470.89	25.5	N
REC-062	566794.52	4771446.01	467.84	-	N

Attachment 1 - Modeling Results

All Turbines: GE 3.8-137, 111.5 m hub height

Receiver	Coordinates		Base Elevation (m)	Modeled LAeq	Exceed 45 dBA? (Y/N)
	Easting (m)	Northing (m)			
REC-063	567575.59	4773523.26	480.49	32.1	N
REC-064	568169.85	4775221.75	493.83	37.4	N
REC-065	568402.45	4770548.21	483.08	24.8	N
REC-066	569474.73	4776605.15	525.75	39.0	N
REC-067	569782.41	4765373.88	493.98	36.0	N
REC-068	570301.18	4776152.11	533.82	35.8	N
REC-069	570320.63	4776086.07	530.62	36.0	N
REC-070	570930.65	4767169.47	502.79	37.7	N
REC-071	571246.87	4765598.42	488.81	38.5	N
REC-072	571847.73	4767001.23	507.46	41.7	N
REC-073	572712.41	4764371.30	476.98	25.2	N
REC-074	572760.45	4768609.65	494.96	35.3	N
REC-075	572875.14	4775183.93	528.80	39.1	N
REC-076	573023.77	4775137.74	528.80	39.6	N
REC-077	573104.39	4767558.79	488.61	31.1	N
REC-078	572689.83	4764269.58	472.84	24.7	N
REC-079	572840.24	4766532.05	483.08	35.8	N
REC-080	574527.24	4771635.20	508.86	33.7	N
REC-081	574606.23	4772084.46	513.56	33.9	N
REC-082	575265.41	4775117.32	552.59	41.9	N
REC-083	575384.42	4771695.61	513.56	34.9	N
REC-084	575459.57	4773771.95	533.47	39.3	N
REC-085	576210.31	4770611.18	524.57	35.2	N
REC-086	576537.52	4765598.06	498.89	30.2	N
REC-087	576971.43	4770447.24	531.85	40.6	N
REC-088	577659.69	4765661.22	489.18	38.1	N
REC-089	577747.37	4768859.92	513.80	40.5	N
REC-090	577878.24	4764078.53	490.80	32.8	N
REC-091	577915.85	4763844.06	489.18	30.5	N
REC-092	578531.67	4767119.28	501.56	37.6	N
REC-093	578575.67	4778618.52	525.75	36.7	N
REC-094	578514.65	4776677.36	519.65	37.9	N
REC-095	578804.05	4764274.93	501.37	32.8	N
REC-096	578827.98	4768793.31	520.74	37.4	N
REC-097	578943.49	4770454.51	519.65	29.0	N
REC-098	579475.34	4767289.07	507.32	40.3	N
REC-099	579720.64	4762441.83	480.38	-	N
REC-100	580720.17	4765706.10	489.18	32.2	N
REC-101	580991.94	4762540.89	476.98	-	N
REC-102	581560.41	4763175.20	470.14	-	N
REC-103	581721.12	4767420.32	484.05	35.9	N
REC-104	581794.35	4770381.50	494.21	30.1	N
REC-105	581890.50	4769063.10	495.27	40.1	N
REC-106	581882.94	4766984.50	478.66	32.1	N
REC-107	582089.90	4770568.08	488.75	27.9	N
REC-108	582148.44	4764102.27	470.89	-	N
REC-109	582609.65	4767582.94	483.08	31.6	N
REC-110	583963.39	4770430.23	460.42	18.2	N
REC-111	582577.80	4767332.36	480.99	30.7	N
REC-112	570034.28	4777428.88	531.85	33.7	N
REC-113	580225.65	4778670.25	516.61	41.3	N
REC-114	580643.69	4779065.86	510.51	40.5	N
REC-115	580812.98	4776797.89	507.54	39.5	N
REC-116	581676.22	4775653.66	495.49	37.4	N
REC-117	579367.75	4775404.23	525.75	36.8	N
REC-118	580095.28	4784336.60	507.46	25.3	N
REC-119	581867.73	4783246.46	489.52	29.7	N
REC-120	582410.57	4781467.20	486.13	30.9	N
REC-121	582256.16	4783054.99	483.20	28.4	N
REC-122	582261.38	4777793.15	487.45	33.8	N
REC-123	581460.71	4785645.95	483.97	-	N
REC-124	577505.30	4781336.06	557.16	19.3	N

Attachment 1 - Modeling Results

All Turbines: GE 3.8-137, 111.5 m hub height

Receiver	Coordinates		Base Elevation (m)	Modeled LAeq	Exceed 45 dBA? (Y/N)
	Easting (m)	Northing (m)			
REC-125	580995.88	4773976.31	501.99	29.4	N
REC-126	580915.69	4774830.29	502.29	38.6	N
REC-127	581473.61	4775075.61	495.27	37.0	N
REC-128	581468.21	4774997.26	495.27	36.4	N
REC-129	576815.58	4779814.18	556.23	21.4	N
REC-130	567502.00	4781060.00	502.37	-	N
REC-131	568850.00	4781446.00	523.04	-	N
REC-132	570408.00	4783811.00	527.44	-	N
REC-133	570806.00	4783497.00	538.25	-	N
REC-134	570845.00	4782153.00	543.29	-	N
REC-135	573665.00	4780153.00	564.37	-	N
REC-136	579049.00	4772150.00	519.65	-	N
REC-137	579104.00	4772978.00	519.65	17.9	N
REC-138	573105.45	4772224.12	513.56	37.1	N
REC-139 Schoenfelder House	569781.24	4772133.60	510.51	35.5	N
REC-140 Gramkow-Vesper Cemetery	580689.30	4768952.27	507.46	43.2	N
REC-141	577129.69	4782270.05	574.52	-	N
REC-142	584339.55	4769092.88	460.78	19.4	N
REC-143	582521.68	4766643.44	470.89	27.4	N
REC-144	582964.12	4764513.68	462.13	-	N
REC-145	568186.44	4765929.46	457.18	26.7	N
REC-146	576220.57	4771526.69	525.75	34.4	N
REC-147	575778.28	4770360.98	519.65	37.3	N
REC-148	568806.39	4770128.32	487.99	27.0	N
REC-149 Presbyterian-Bohemian Cemetery	567762.65	4773526.07	482.79	33.8	N

"-" represents no expected impacts at the receiver location

Attachment 2 – Sound Contour Figure

EXHIBIT A10-1

Project Area
45 dBA Contour
Occupied Residence
Turbine
Removed from Project Layout
MET Tower
Laydown Yard
O&M
Project Substation
Access Road
Collector Line
Crane Path

NORTH

1.2 0.6 0 1.2

Scale in Miles

BURNS McDONNELL

Figure 2-1
Prevailing Wind Park
Wind Energy Facility
SDPUC Application

Source: ESRI, Burns & McDonnell Engineering Company, Inc., South Dakota GIS, Prevailing Winds, LLC

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Path: Z:\Clients\ENS\SPowerGroup\104294_PrevailingWind\Studies\Permitting\Modeling\Noise\GIS\105644_PrevailingWinds_Update_Noise_Contours2.mxd gweger 9/26/2018

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