



February 4, 2019

Epsilon Ref. 4965

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Tara Corbett
 Project Manager
 Atwell, LLC
 6200 S. Syracuse Way, Suite 470
 Greenwood Village, CO 80111

**Subject: Burke Wind, LLC
 Addendum to the Sound Assessment Report**

Dear Ms. Corbett:

Epsilon Associates, Inc. (Epsilon) completed a sound assessment report for the Burke County Wind Energy Center dated November 6, 2018 (Case Number PU-18-344, Docket Number 18). This letter serves as an addendum to that report and includes updated modeling results. This addendum was created in order to address updates and changes to the sound level modeling based upon a new receptor dataset, new land status dataset, and feedback on the format of submittals for other recent projects in North Dakota. The project layout and sound level modeling parameters are identical to the ones used for the original sound assessment report.

ASSOCIATES

- Richard M. Lampeter, INCE
- Geoff Starsiak, LEED AP BD+C
- Marc Bergeron, PWS, CWS

Structures

Based on a review of aerial imagery within 1.5 miles of the Project Boundary, structures not previously identified were added to the receptor dataset. The new dataset provided by Atwell, LLC (Atwell) on January 18, 2019 also included minor adjustments to the coordinates of the structures to ensure that they were positioned at the center point of structures. Occupancy status of the structures in the updated dataset are categorized as occupied, potentially occupied or unoccupied. The locations of these structures are presented in Figure 1.

Modeling Receptors

Structures identified as occupied or potentially occupied were modeled as discrete points, i.e. receptors. The applicable sound level limits only apply at inhabited structures, and therefore locations in the unoccupied category were not modeled. Conservatively all potentially occupied structures were assumed to be occupied and included in the analysis. The County and State limits require sound levels to be

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assessed within 50 and 100 feet of inhabited structures respectively. In order to address this criteria, four (4) additional receptors were conservatively placed at 150-foot offsets¹ from each original receptor in the four cardinal directions (north, south, east, and west). This modeling approach is consistent with the approach described in the November 6, 2018 report. There are 56 occupied or potentially occupied structures within 1.5 miles of the Project Boundary. Therefore, a total of 280 receptors were modeled and evaluated.

Project Area Land Status

Updates were made to the land status of parcels within the Project Area, and include the following three categories: Participating, Non-Participating, and Non-Participating Parcel, Participating Owner. This third category applies to non-participating parcels with a landowner that has an agreement in place for other parcels in the Project Area. The updated land status information was sent to Epsilon via email by Atwell on January 18, 2019. Using the updated land status dataset, Epsilon assigned participation status to each modeling receptor.

Updated Sound Modeling Results

The November 6, 2018 sound assessment report presented broadband (dBA) L_{eq} sound levels at 340 receptors (68 center points and 292 receptors at 150-foot offsets). The sound levels ranged from 20 to 47 dBA. The maximum L_{eq} sound level at a modeling receptor was 47 dBA, which was on a participating parcel. The maximum L_{eq} sound level at a modeling receptor on a non-participating parcel was 46 dBA.

The updated sound model predicted broadband (dBA) L_{eq} sound levels at 280 receptors. The sound levels range from 23 to 47 dBA. As described above, sound levels were calculated at five different points for each occupied or potentially occupied structure. The results presented in Tables 1 through 3 are the single highest sound level of these five points predicted for each structure.

Table 1 presents the highest predicted sound levels at all structures categorized as occupied or potentially occupied that occur on participating parcels. The maximum L_{eq} sound level at a modeling receptor is 47 dBA (Receptor #34) which is on a participating parcel.

¹ A value greater than 100 feet was selected to account for the dimensions of the home.

Table 2 presents the highest predicted sound levels at all structures categorized as occupied or potentially occupied that occur on non-participating parcels with a participating owner. The maximum L_{eq} sound level at a modeling receptor on a non-participating parcel with a participating landowner is 42 dBA at Receptor #18.

Table 3 presents the highest predicted sound levels at all structures categorized as occupied or potentially occupied that occur on non-participating parcels. The maximum L_{eq} sound level at a modeling receptor on a non-participating parcel is 46 dBA at Receptor #11.

As part of this addendum, new figures have been created to display all results of the sound assessment. Figure 2 shows the center points of all modeling receptors (occupied and potentially occupied structures) and their participation status. Callouts at each modeled receptor center point have been added displaying the receptor ID, landowner name, highest modeled sound level, ID number of the closest wind turbine and distance to the closest wind turbine. Sound level isolines generated from the modeling grid are also presented on this figure.

Conclusions

Project sound levels at all revised modeling receptor locations are below the most restrictive county limit of 49 dBA, therefore, the Project meets the requirements with respect to sound in the regulations.

If you have any questions on the content of this letter, please feel free to call me at (978) 461-6205, or e-mail me at RLampeter@epsilonassociates.com.

Sincerely,

EPSILON ASSOCIATES, INC.



Richard Lampeter, INCE
Associate

Table 1: Sound Level Analysis- Participating Landowners

Modeling ID	Landowner Name	Occupancy Status	Source Only Broadband Sound Level (dBA) ¹	Nearest Wind Turbine ID ²	Distance to Nearest Wind Turbine (ft) ²
34	WATTERUD, LYNN E	Occupied	47	33	2739
23	BURAU, THOMAS F	Occupied	46	9	2808
74	ONEIL, HUGH M	Occupied	45	24	2839
39	CORY CARLSON	Occupied	44	35	2966
19	PRIEBE, MARK	Occupied	44	3	2714
76	WEIPPERT, EDWARD	Occupied	44	38	2793
60	RONHOLDT, Dorene	Occupied	42	53	2885
85	BONSNESS, THOMAS L	Occupied	42	52	3204
57	NESS, DOUGLAS W	Occupied	42	45	3713
43	ULSRUD, OAKLEY BENTON	Potentially Occupied	39	54	4342
101	BEARD, HELENE	Occupied	39	76	3702
21	WATTERUD, BYRON K	Occupied	38	3	5055
92	OAS, GAYLEN K	Occupied	38	61	6286
22	WATTERUD, BYRON K	Occupied	38	3	5557
78	ONEIL, HUGH	Occupied	36	37	5938
64	BERG FARMS LLC,	Occupied	36	62	6660
3	NELSON, JOHN TERRY	Occupied	36	1	6033
100	GREENFIELD, RALPH	Occupied	35	76	4995
97	GREENFIELD, RYAN MICHAEL	Occupied	35	76	5403
110	HELSETH, ROGER L	Occupied	35	48	6326
104	GREENFIELD, RALPH	Occupied	34	75	6355
126	THE ALLEN WITTY FAMILY LLP,	Potentially Occupied	34	15	10269
123	HELSETH, ROGER L	Occupied	32	52	10966
113	HELSETH, ROGER L	Occupied	31	65	13311
124	HELSETH, ROGER L	Occupied	31	65	13048

1) In order to address the County and State sound level limits, which apply at 50 and 100 feet of an inhabited structure, sound levels were calculated at 4 receptors conservatively placed at 150 foot offsets in the four cardinal directions (N,S,E,W) from the structure center point. Results in this column are the highest sound level predicted at any of those offset points.

2) The distances presented are calculated from the receptor (assumed building center point) to the closest wind turbine and are not intended for the evaluation of setback requirements.

Table 2: Sound Level Analysis- Non-Participating Parcels, Participating Owner

Modeling ID	Landowner Name	Occupancy Status	Source Only Broadband Sound Level (dBA) ¹	Nearest Wind Turbine ID ²	Distance to Nearest Wind Turbine (ft) ²
18	BRODAL, LYNN	Occupied	42	3	3606
128	DIHLE, DARRELL A	Occupied	34	47	7800
107	SMITH, INEZ B	Occupied	31	75	11570

1) In order to address the County and State sound level limits, which apply at 50 and 100 feet of an inhabited structure, sound levels were calculated at 4 receptors conservatively placed at 150 foot offsets in the four cardinal directions (N,S,E,W) from the structure center point. Results in this column are the highest sound level predicted at any of those offset points.

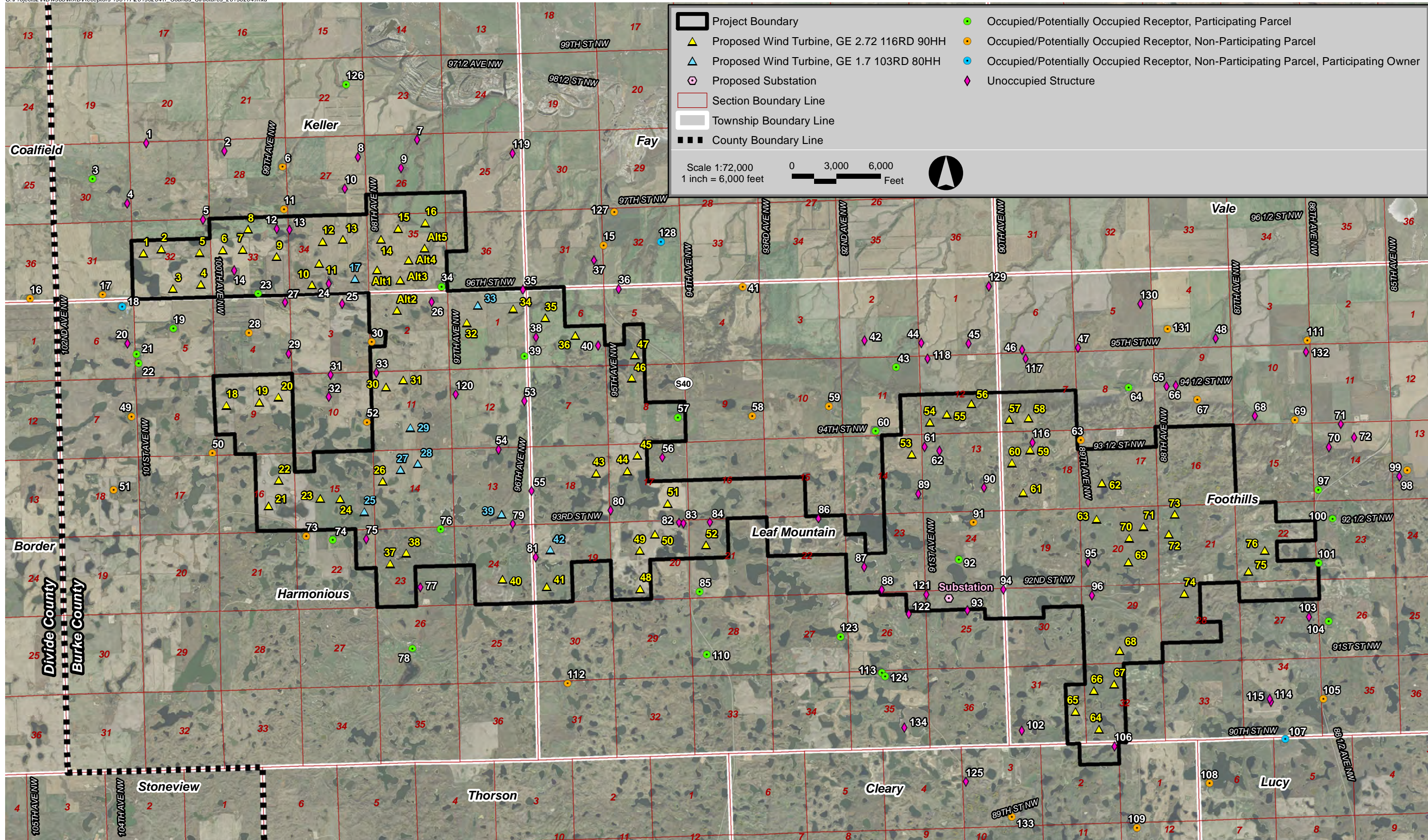
2) The distances presented are calculated from the receptor (assumed building center point) to the closest wind turbine and are not intended for the evaluation of setback requirements.

Table 3: Sound Level Analysis- Non-Participating Landowners

Modeling ID	Landowner Name	Occupancy Status	Source Only Broadband Sound Level (dBA) ¹	Nearest Wind Turbine ID ²	Distance to Nearest Wind Turbine (ft) ²
11	ALTRINGER, JAY	Occupied	46	8	2740
30	ROSENQUIST, GERALD O	Occupied	46	Alt2	2734
52	FAGERBAKKE FARMS INC,	Occupied	45	30	2723
73	GROSSMAN, JAMES L	Occupied	45	23	2743
63	Unknown	Occupied	44	62	3217
28	DHUYVETTER, GERALD	Potentially Occupied	43	4	4628
50	Unknown	Occupied	42	18	3365
91	VELO, JOHN	Occupied	41	61	3933
6	BURAU, SHANNON	Occupied	40	8	4773
17	BRODAL FARMS LTD,	Occupied	40	1	3911
15	BENSON, BERNIECE	Occupied	37	35	6243
59	THINGVOLD, JON E	Occupied	36	53	6447
49	SHORB, RYAN	Occupied	36	18	6420
58	BRUSVEN, SANDRA K	Occupied	36	45	8154
112	SHEFSTAD,	Occupied	35	41	6685
127	BENSON, BERNIECE	Occupied	34	35	8465
16	BRODAL, ANNE	Occupied	33	1	8212
51	MONTANYE, TODD	Potentially Occupied	33	18	9498
108	WEINMANN, EARL W	Occupied	32	64	8291
109	PETERS, RONALD L	Occupied	32	64	7137
131	WINZENBURG, DOUGLAS	Potentially Occupied	32	58	11077
67	DOWNIE, CARRIE D	Occupied	31	73	7836
133	SMITH, WILLIAM R	Occupied	31	65	8346
41	ENGSTROM, BRUCE B	Occupied	31	47	8589
105	ATWOOD, RAYMOND E	Occupied	31	75	9961
111	NELSON, DAN	Occupied	28	76	14375
69	WINZENBURG, DONALD	Occupied	27	76	8979
99	GRANDALL, EARL C	Potentially Occupied	23	76	10951

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2) The distances presented are calculated from the receptor (assumed building center point) to the closest wind turbine and are not intended for the evaluation of setback requirements.



Burke County Wind Energy Center Burke County, North Dakota

