



5372 Sweetland Wind - 190206L Revision\_Sound & Flicker Analyses Summary\_v3.docx

**PRINCIPALS**

July 10, 2019

Epsilon Ref. 5372

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**Subject: Revisions to the March 5, 2019 Sound & Shadow Flicker Analyses  
 Sweetland Wind Project – Hand County, South Dakota**

Dear Mr. Wengierski:

Sound level and shadow flicker analyses were performed for the Sweetland Wind Project with the results presented in reports dated March 5, 2019. Since that time, modifications were made to the wind turbine layout. One wind turbine was removed from the layout (T43) and one wind turbine was changed to standard wind turbine blades as opposed to the low noise trailing edge (LNTE) blades. This modified layout has been modeled to predict the sound levels and the annual expected durations of shadow flicker due to the operation of the proposed wind turbines at occupied residences in Hand County.

It should also be noted that on May 10, 2019, the Project team received confirmation from the Hand County Tax Assessor that the residence of Dale G. Christiansen (modeling receptor 34) is not an occupied residence. Receptor 34 has therefore been excluded from these revised sound level and shadow flicker analyses.

Based on the modifications to the wind turbine layout, the sound levels at all 40 modeling receptors showed no appreciable change (i.e. less than 1 dBA change). The predicted worst-case sound levels from the Sweetland Wind Project are at or below the 50 dBA limit at participating residences and are at or below 42 dBA at non-participating residences. The highest modeled sound level at a pending participating residence is 41 dBA. An updated table from Appendix B in the March 5, 2019 report is attached as Table B-1 Rev (S) which contains the latest residence participation.

Based on the modifications to the wind turbine layout, the shadow flicker durations at 38 of the 40 modeling receptors showed no change. The Aalbers residence (modeling receptor

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5) incurred an annual expected shadow flicker reduction from 23 hours, 31 minutes to 20 hours, 49 minutes. The Fanning residence (modeling receptor 6) incurred an annual expected shadow flicker reduction from 55 hours, 23 minutes to 21 hours, 15 minutes. The predicted annual shadow flicker durations range from 0 hours, 0 minutes to 45 hours, 27 minutes at the modeled receptors. The maximum modeled expected duration of shadow flicker (45 hours, 27 minutes) is predicted at a participating residence. The maximum modeled expected duration of shadow flicker predicted at a non-participating residence is 7 hours, 5 minutes. The maximum modeled expected duration of shadow flicker predicted at a pending participating residence is 14 hours, 49 minutes. An updated table from Appendix B in the March 5, 2019 report is attached as Table B-1 Rev (F) which contains the latest residence participation.

If you have any questions, please call me at (978) 461-6236, or e-mail me at [roneal@epsilonassociates.com](mailto:roneal@epsilonassociates.com).

Sincerely,

EPSILON ASSOCIATES, INC.



Robert D. O'Neal, CCM, INCE Bd. Cert.  
Managing Principal

Table B-1 Rev (S): Modeled Sound Pressure Levels at Occupied Residences

Receptor ID	Description	Coordinates UTM NAD83 Zone 14N		Participation Status	Source Only Broadband L <sub>eq</sub> Sound Level (dBA)
		X (m)	Y (m)		
1	Dale& Leanna Resel	510861.20	4922299.80	Participating	47
2	Dale& Leanna Resel	510617.45	4921033.54	Participating	47
3	John& Kimberly Fanning	511084.98	4919693.62	Participating	50
4	Jeremy& Marci Stevens	509240.44	4918553.74	Participating	47
5	James& Renae Aalbers	511442.82	4917952.72	Participating	50
6	Eric Fanning	512329.39	4917967.20	Participating	50
7	Jason D Resel	515363.03	4919055.61	Participating	49
8	Lyle& Rebecca Resel	516342.30	4921246.06	Participating	43
9	James Major	515803.65	4922429.04	Participating	45
10	36891 St	515499.23	4922661.77	Participating	47
11	Steve Runge	515658.09	4923385.39	Non-Participating	42
12	Craig& Cheryl Van Asperen	517511.88	4916440.42	Participating	46
13	Cole Mehling	518901.01	4916154.62	Participating	41
14	Karen& Clinton Haigh	515701.85	4915097.07	Participating	49
15	Gilbert& Stephanie Rodgers	518930.64	4914440.16	Pending Participating	41
16	Reynolds Family Farms LLC	520879.37	4913213.26	Non-Participating	38
17	L Brewer 37386	523539.62	4913117.77	Non-Participating	32
18	Jay Anderberg	517896.23	4912672.02	Participating	49
19	Jay Anderberg cabin	517856.16	4912818.41	Participating	47
20	Jeremy& Marci Stevens	515809.40	4912961.25	Participating	50
21	Wayne& Joan Horsley Residence	518872.55	4911572.32	Participating	49
22	Travis Letsche	514315.01	4909824.50	Participating	35
23	Robert Duxbury	522266.31	4909368.02	Non-Participating	33
24	Paul Duxbury	522159.03	4909019.95	Non-Participating	33
25	Dean Duxbury	522748.18	4908152.95	Non-Participating	30
26	Leon& Lori Boomsma	515422.97	4908930.39	Participating	35
27	Scot Parmely	514136.35	4907279.00	Non-Participating	31
28	Non-valuation property	520868.09	4906901.58	Non-Participating	31
29	Non-valuation property	517417.40	4907112.62	Non-Participating	27
30	M Anson	517347.17	4906873.43	Non-Participating	32
31	Joe Jensen	513813.93	4906527.92	Non-Participating	30
32	Howard Jensen	513722.68	4906535.03	Non-Participating	30
33	Kevin& Marcie Bertsch	507556.69	4923810.27	Non-Participating	33
36	Larry& Deanne Rowen	517289.54	4921647.66	Non-Participating	39
37	Robert& Patricia Moriarty	510971.00	4912975.40	Non-Participating	38
38	Jerrit Mehling	520521.55	4916748.02	Non-Participating	36
39	Deborah A Mehling Rev Trust	520543.07	4915750.09	Non-Participating	36
40	Gregory Roy Mehling	520533.48	4914986.86	Non-Participating	36
41	Kenneth& Dianne Wedge	522108.26	4913867.58	Non-Participating	34
42	Daniel W Jensen	512549.23	4909816.85	Non-Participating	33

Table B-1 Rev (F): Shadow Flicker Modeling Results at Occupied Residences

Modeling ID	Description	Participation Status	Coordinates NAD83 UTM Zone 14N (meters)		Expected Shadow Flicker Hours per Year
			X (Easting)	Y (Northing)	(HH:MM/year)
1	Dale & Leanna Resel	Participating	510861.20	4922299.80	24:33
2	Dale & Leanna Resel	Participating	510617.45	4921033.54	12:18
3	John & Kimberly Fanning	Participating	511084.98	4919693.62	23:21
4	Jeremy & Marci Stevens	Participating	509240.44	4918553.74	45:27
5	James & Renae Aalbers	Participating	511442.82	4917952.72	20:49
6	Eric Fanning	Participating	512329.39	4917967.20	21:15
7	Jason D Resel	Participating	515363.03	4919055.61	5:43
8	Lyle & Rebecca Resel	Participating	516342.30	4921246.06	9:16
9	James Major	Participating	515803.65	4922429.04	14:06
10	36891 St	Participating	515499.23	4922661.77	23:31
11	Steve Runge	Non-Participating	515658.09	4923385.39	7:05
12	Craig & Cheryl Van Asperen	Participating	517511.88	4916440.42	12:06
13	Cole Mehling	Participating	518901.01	4916154.62	2:11
14	Karen & Clinton Haigh	Participating	515701.85	4915097.07	7:26
15	Gilbert & Stephanie Rodgers	Pending Participating	518930.64	4914440.16	14:49
16	Reynolds Family Farms LLC	Non-Participating	520879.37	4913213.26	0:00
17	L Brewer 37386	Non-Participating	523539.62	4913117.77	0:00
18	Jay Anderberg	Participating	517896.23	4912672.02	5:14
19	Jay Anderberg cabin	Participating	517856.16	4912818.41	13:50
20	Jeremy & Marci Stevens	Participating	515809.40	4912961.25	11:31
21	Wayne & Joan Horsley Residence	Participating	518872.55	4911572.32	40:35
22	Travis Letsche	Participating	514315.01	4909824.50	0:00
23	Robert Duxbury	Non-Participating	522266.31	4909368.02	0:00
24	Paul Duxbury	Non-Participating	522159.03	4909019.95	0:00
25	Dean Duxbury	Non-Participating	522748.18	4908152.95	0:00
26	Leon & Lori Boomsma	Participating	515422.97	4908930.39	0:00
27	Scot Parmely	Non-Participating	514136.35	4907279.00	0:00
28	Non-valuated property	Non-Participating	520868.09	4906901.58	0:00
29	Non-valuated property	Non-Participating	517417.40	4907112.62	0:00
30	M Anson	Non-Participating	517347.17	4906873.43	0:00
31	Joe Jensen	Non-Participating	513813.93	4906527.92	0:00
32	Howard Jensen	Non-Participating	513722.68	4906535.03	0:00
33	Kevin & Marcie Bertsch	Non-Participating	507556.69	4923810.27	0:00
36	Larry & Deanne Rowen	Non-Participating	517289.54	4921647.66	1:19
37	Robert & Patricia Moriarty	Non-Participating	510971.00	4912975.40	0:00
38	Jerrit Mehling	Non-Participating	520521.55	4916748.02	0:00
39	Deborah A Mehling Rev Trust	Non-Participating	520543.07	4915750.09	0:00
40	Gregory Roy Mehling	Non-Participating	520533.48	4914986.86	0:00
41	Kenneth & Dianne Wedge	Non-Participating	522108.26	4913867.58	0:00
42	Daniel W Jensen	Non-Participating	512549.23	4909816.85	0:00