

**Pleasant Ridge Wind Energy Project
Sound Study**



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PLEASANT RIDGE WIND ENERGY PROJECT SOUND STUDY

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1.0 Introduction

Pleasant Ridge Energy LLC (Pleasant Ridge) is proposing to develop a wind power generation facility in Livingston County, Illinois. The proposed Pleasant Ridge Wind Project (Project) will consist of up to 136 wind turbine generators (WTG) with a maximum generating capacity of up to 250 megawatts (MW). Pleasant Ridge retained Stantec Consulting Services Inc. (Stantec) and their sub-consultant Hankard Environmental to conduct an analysis of potential noise for the proposed Project in preparation of an application for siting approval from Livingston County.

2.0 Noise Regulations in Livingston County and the State of Illinois

A Special Use Permit is required from Livingston County prior to constructing the Project. Article VIII, Section 56-620 of the Livingston County Code of Ordinances requires that the Project shall be in compliance with applicable Illinois Pollution Control Board (IPCB) regulations. IPCB regulations (IPCB Noise Regulations, Illinois Administrative Code, Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources) specify maximum allowable noise emissions.

Allowable sound limits are based on the classification of land use of both the property on which the sound source is located and the property on which the receiver is located, as well as on time of day. The parcels on which renewable energy facilities are sited are considered a Class C (commercial and industrial) land use. Residential land use is considered Class A. Table 1 presents the IPCB regulations allowable noise emissions from a Class C property to a Class A property for both daytime and nighttime.

Table 1 Allowable Octave Band Sound Pressure Levels (dB) of Sound Emitted to any Receiving Class A Land from Class C Land

Time of Day	Octave Band (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Daytime	75	74	69	64	58	52	47	43	40
Nighttime	69	67	62	54	47	41	36	32	32

IPCB regulations also further limit the emission of “highly impulsive sound” and “prominent discrete tones” from any property-line-noise-source. Highly impulsive sound is emitted from such sources as pile drivers, and tonal noise is emitted by sources such as leaf blowers. The proposed wind turbines do not emit highly impulsive or tonal sounds, as is evident from the source data presented below and from the measurement of noise from similar turbines in Illinois.

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3.0 Noise Analysis

Noise levels at residential receptors located within the Project area were predicted using a software program that considers the sound power level from the wind turbines, the location of the turbines and receptors within the project study area, and the propagation of noise from the turbines to the receptors.

3.1 PREDICTED NOISE ANALYSIS METHODOLOGY

The potential impact of sound on receptors located within approximately 2,000 meters (1.25 miles) of the Project turbines was estimated using the Decibel module of WindPRO Version 2.9 software and checked using the CadnaA software program by DataKustik. Both models utilized maximum octave band sound power levels provided by the turbine manufacturer (GE), conservative ISO 9613-2 algorithms to estimate sound propagation, and the specific location of each turbine and each residence located within the project study area. Modeling results were compared with maximum allowable noise levels under the IPCB Noise Regulations.

Pleasant Ridge proposes to utilize one of two turbine models, the GE 1.79-100 or the GE 1.72-103 to generate up to 250 MW of power. Both turbine models have an 80-meter hub height, with 100-meter and 103-meter rotor diameters, respectively. The sound impact of both the GE 1.79-100 and GE 1.72-103 were analyzed and are summarized in this report. This analysis utilizes a combination of standard and low-noise trailing edge (LNTE) rotor blades on a total of 136 proposed turbines. Turbines identified in Table 5 (Appendix B) as WTG-ID 68, 73, 126 and 129 are proposed to be equipped with the LNTE rotor blades. The balance of the turbines will be equipped with standard rotor blades.

The modeling analysis input includes octave band sound power levels from 31.5 to 8,000 Hertz (Hz). The A-weighted octave band sound power levels (L_{wa}) for the GE 1.79-100 and GE 1.72-103 turbines using both the standard and LNTE blade configurations are given in Table 2.

Table 2 Project Turbines Maximum Octave Band Sound Power Levels (L_{wa})

Octave Band Center Frequency	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
GE-1.79-100 (standard blade)	81.1	90.8	95.7	97.5	100.4	102.7	99.4	90.3	71.3
GE-1.79-100 (LNTE blade)	81.1	90.8	94.8	94.8	96.1	101.0	100.1	91.1	72.5
GE-1.72-103 (standard blade)	80.4	90.3	96.0	97.7	100.3	102.7	99.4	89.9	72.5
GE-1.72-103 (LNTE blade)	76.2	85.5	92.7	94.7	95.9	100.8	99.8	90.2	72.4

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Sound impact is also dependent on the distance between the source turbine and sound receptor. The location of the wind turbines is based on the current layout of the wind farm provided by Pleasant Ridge. Elevations for turbines and receptors were calculated using the National Elevation Dataset acquired from the U.S. Geological Survey.

Receptors within the Project area include occupied residences and other identified community resources, such as churches, hospitals, schools and cemeteries. More than 775 potential receptors were originally identified and included in a preliminary analysis. The analyses then focused on 107 receptors that are predicted to receive the highest sound levels, though still below IPCB regulations. All other receptors demonstrated sound levels well below the IPCB octave band limits. Receptors were classified as Project participants (land owners with land under Project leases/agreements) and non-participants (land owners without Project leases/agreements).

Sound attenuates between the source and the receptor due to a variety of factors, including but not limited to, atmospheric absorption, interaction with the ground, and attenuation due to vegetation and ground cover. Standard ISO 9613-2 settings for atmospheric absorption were used, assuming an ambient temperature of 10°C and 70 percent relative humidity (these are conditions that favor sound propagation). The “ground effect” relates to sound reflecting off the surface and interfering with the direct wave of sound traveling through the air. For this project, no ground attenuation was assumed (ground factor set to 0.0), which is a conservative approach.

In addition to the conservative ground attenuation factor, sound levels were calculated using other conservative parameters within the model. Sound emitted by the turbines was calculated using the maximum sound power level. The model assumes that all receivers are downwind of all turbines at all times, even though this is a physical impossibility. Also, the fact that turbines emit less sound in some directions than others was not accounted for. Finally, Invenergy recently conducted a detailed measurement of noise levels from similar GE turbines operating in Illinois. The results of that study were integrated into this one to provide a high degree of certainty that the noise levels resulting from the modeling analyses will be lower than those measured. Thus, model results are expected to be higher than the actual noise levels expected at a given receptor.

3.2 SOUND ANALYSIS RESULTS

Results of the analyses for 107 of the receptors receiving the highest sound levels are included in Appendix A (Table 3-1 and 3-2) of this report. The coordinates (UTM Zone 16) of receptors and proposed turbine locations are included in Appendix B (Table 4 and Table 5, respectively). The results demonstrate that the Pleasant Ridge Project as designed, utilizing either the Ge 1.79-100 or the GE 1.72-103 model turbines, can be operated without exceeding the limits set forth in the IPCB regulations. If a different turbine model is utilized, Pleasant Ridge will comply with these same limitations and a new noise study will be produced demonstrating compliance.

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4.0 Conclusion

The analysis of potential sound impact from the Pleasant Ridge Project on area homes and other identified sensitive community receptors indicates that noise impacts resulting from the proposed Project are within the limits set forth by the IPCB regulations. The analyses were performed using conservative parameters within the modelling software. The predicted noise levels at all receptors within the Project area comply with the IPCB regulation maximum octave band noise levels at inhabited structures. Pleasant Ridge certifies that it will comply with the IPCB noise Regulations.

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Appendix A

Sound Study Results

Table 3-1 - Pleasant Ridge Sound Analysis Results Summary (GE 1.79-100 Turbine Model)

<i>All Values in dB</i>	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
IPCB Daytime		75	74	69	64	58	52	47	43	40
IPCB Nighttime		69	67	62	54	47	41	36	32	32
Reference ID	Participation Status and Results									
R-005	Non-Participant	64	60	54	47	44	41	31	5	-77
R-006	Non-Participant	63	60	54	47	43	40	31	8	-61
R-007	Non-Participant	63	59	53	46	42	39	28	-2	-96
R-008	Non-Participant	63	60	54	47	43	40	30	4	-70
R-009	Non-Participant	63	60	54	47	42	39	27	-6	-106
R-010	Non-Participant	64	60	54	47	43	39	28	-4	-100
R-011	Participant	64	60	54	47	43	40	30	3	-79
R-012	Non-Participant	64	60	54	47	43	40	31	3	-80
R-013	Participant	64	61	55	47	44	41	33	10	-59
R-014	Participant	64	60	54	47	43	40	31	4	-80
R-021	Non-Participant	63	60	54	47	43	40	30	5	-68
R-022	Participant	64	60	54	48	44	41	32	8	-62
R-023	Participant	63	59	53	46	43	39	29	3	-72
R-028	Participant	63	59	54	47	44	41	33	11	-51
R-038	Non-Participant	63	59	54	47	43	41	31	5	-74
R-039	Non-Participant	63	59	53	47	43	40	31	6	-73
R-041	Non-Participant	60	56	50	42	34	34	22	-12	-119
R-043	Non-Participant	61	57	51	44	41	38	30	8	-59
R-059	Participant	63	59	53	46	43	40	29	0	-88
R-060	Participant	64	60	54	47	44	41	33	10	-57
R-063	Non-Participant	63	59	53	46	43	40	30	5	-68
R-085	Non-Participant	63	59	53	46	42	40	30	5	-67
R-091	Participant	64	60	55	48	44	41	31	6	-66
R-092	Non-Participant	64	60	55	48	44	41	31	4	-73
R-093	Participant	63	59	53	46	43	40	30	3	-80
R-099	Non-Participant	63	59	53	46	42	39	29	2	-77
R-100	Non-Participant	63	59	53	46	42	39	29	5	-67
R-101	Non-Participant	63	60	54	47	43	40	30	3	-79
R-102	Non-Participant	64	60	54	47	44	41	32	8	-64
R-122	Participant	62	59	53	46	42	39	29	1	-86
R-142	Non-Participant	63	60	53	46	42	39	29	3	-75
R-160	Non-Participant	63	59	53	47	43	40	30	5	-67
R-166	Non-Participant	63	59	54	47	43	41	31	5	-74
R-168	Non-Participant	63	59	53	47	43	40	31	8	-62

Table 3-1 - Pleasant Ridge Sound Analysis Results Summary (GE 1.79-100 Turbine Model)

All Values in dB	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R-169	Non-Participant	62	58	52	46	42	40	31	9	-55
R-183	Participant	63	59	53	46	42	40	31	8	-58
R-185	Participant	64	61	55	48	44	41	31	4	-77
R-186	Non-Participant	64	60	54	47	43	40	30	1	-85
R-187	Non-Participant	63	60	54	47	43	39	28	0	-81
R-191	Participant	63	60	54	47	43	40	32	8	-62
R-210	Non-Participant	63	59	53	46	43	40	29	2	-79
R-216	Non-Participant	63	59	53	47	43	41	33	10	-59
R-217	Participant	62	58	52	46	42	40	32	10	-53
R-221	Participant	63	59	53	47	43	40	31	6	-65
R-222	Non-Participant	63	59	54	47	43	40	31	6	-64
R-236	Non-Participant	63	59	53	47	43	40	31	10	-52
R-237	Participant	63	60	54	47	44	41	33	12	-50
R-239	Non-Participant	64	60	54	47	44	41	31	5	-70
R-240	Participant	64	60	54	47	44	41	31	6	-64
R-241	Non-Participant	64	60	54	48	44	41	32	6	-68
R-242	Non-Participant	64	60	54	47	43	41	30	2	-80
R-243	Non-Participant	64	60	54	47	44	41	32	8	-63
R-244	Participant	64	60	54	48	44	41	32	6	-72
R-270	Non-Participant	63	60	54	47	44	41	31	5	-71
R-311	Non-Participant	64	60	54	47	44	41	31	6	-70
R-313	Non-Participant	64	60	55	48	44	41	32	7	-67
R-314	Participant	64	60	55	48	44	41	31	4	-78
R-317	Non-Participant	64	60	54	47	43	40	30	3	-76
R-318	Non-Participant	63	60	54	47	43	39	28	1	-80
R-319	Non-Participant	64	60	54	47	43	40	29	0	-87
R-321	Non-Participant	63	59	54	47	43	41	32	9	-61
R-324	Participant	64	60	54	47	43	40	31	5	-70
R-326	Non-Participant	63	59	53	46	42	39	30	5	-71
R-327	Participant	64	60	54	47	44	41	31	4	-78
R-329	Non-Participant	64	61	55	47	43	41	34	13	-50
R-345	Non-Participant	64	60	54	48	44	41	32	7	-64
R-354	Participant	63	59	53	46	43	40	32	10	-53
R-355	Non-Participant	63	59	53	46	42	39	30	3	-78
R-363	Participant	62	59	53	46	42	40	30	5	-70
R-369	Non-Participant	63	59	53	47	43	41	31	3	-77
R-382	Non-Participant	63	59	53	46	43	40	31	8	-60
R-387	Non-Participant	63	59	53	47	43	39	28	-3	-96

Table 3-1 - Pleasant Ridge Sound Analysis Results Summary (GE 1.79-100 Turbine Model)

All Values in dB	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R-388	Non-Participant	64	60	54	48	44	41	31	4	-75
R-389	Non-Participant	64	60	54	47	44	41	31	6	-71
R-394	Non-Participant	64	60	54	47	43	41	32	9	-57
R-395	Participant	64	60	54	47	43	40	30	2	-81
R-396	Non-Participant	65	61	55	48	44	41	32	7	-68
R-397	Participant	64	60	54	47	43	40	29	-2	-95
R-398	Non-Participant	63	59	53	46	42	39	29	3	-73
R-399	Non-Participant	63	60	54	47	43	40	31	5	-71
R-400	Non-Participant	64	60	54	47	44	41	31	2	-84
R-401	Participant	64	60	54	47	44	41	31	4	-80
R-408	Non-Participant	63	59	53	46	43	40	31	7	-62
R-409	Non-Participant	63	59	53	46	42	39	31	8	-61
R-417	Participant	62	58	52	46	43	40	32	11	-51
R-423	Non-Participant	63	59	53	46	43	41	32	10	-55
R-438	Non-Participant	64	60	54	47	44	41	33	11	-51
R-439	Non-Participant	64	60	54	48	44	41	32	9	-62
R-443	Non-Participant	62	58	53	46	42	40	30	5	-74
R-444	Non-Participant	62	59	53	46	42	40	31	7	-64
R-453	Non-Participant	62	58	52	46	42	40	30	3	-79
R-475	Participant	63	59	53	47	43	40	30	5	-70
R-484	Non-Participant	63	59	53	46	43	40	31	5	-73
R-498	Non-Participant	63	59	53	47	43	41	32	11	-51
R-500	Participant	63	60	54	47	43	40	29	0	-90
R-501	Non-Participant	64	60	55	48	44	41	32	7	-66
R-502	Non-Participant	64	60	54	47	44	41	30	2	-82
R-503	Non-Participant	64	60	54	48	44	41	31	4	-76
R-515	Participant	64	60	54	47	43	41	33	9	-62
R-582	Non-Participant	63	59	53	46	42	39	28	-2	-96
R-588	Non-Participant	64	60	54	47	44	40	30	-1	-95
R-597	Non-Participant	63	59	53	46	43	40	31	8	-64
R-632	Participant	64	60	55	48	44	41	33	8	-71
R-748	Non-Participant	63	60	54	47	44	41	32	7	-65
R-754	Participant	64	60	54	47	44	41	32	7	-67
R-773	Participant	61	57	51	44	41	38	30	8	-58
SR-C6	Non-Participant	62	59	53	46	42	39	29	1	-86

Table 3-2 - Pleasant Ridge Sound Analysis Results Summary (GE 1.72-103 Turbine Model)

<i>All Values in dB</i>	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
IPCB Daytime		75	74	69	64	58	52	47	43	40
IPCB Nighttime		69	67	62	54	47	41	36	32	32
Reference ID	Participation Status and Results									
R-005	Non-Participant	63	59	54	48	44	41	31	4	-76
R-006	Non-Participant	63	59	54	47	43	40	31	7	-59
R-007	Non-Participant	63	59	54	47	42	39	28	-3	-95
R-008	Non-Participant	63	59	54	47	43	40	30	4	-69
R-009	Non-Participant	63	59	54	47	42	39	27	-6	-104
R-010	Non-Participant	63	59	54	47	42	39	28	-5	-99
R-011	Participant	63	59	54	47	43	40	30	2	-77
R-012	Non-Participant	63	59	54	47	43	40	31	3	-79
R-013	Participant	63	59	54	48	43	41	33	9	-58
R-014	Participant	63	59	54	47	43	40	31	3	-79
R-021	Non-Participant	63	59	54	47	43	40	30	5	-67
R-022	Participant	63	60	55	48	44	41	32	7	-61
R-023	Participant	63	59	54	47	42	39	29	3	-71
R-028	Participant	63	59	54	47	44	41	33	11	-50
R-038	Non-Participant	63	59	54	47	43	41	31	4	-73
R-039	Non-Participant	62	59	53	47	43	40	31	5	-72
R-041	Non-Participant	59	55	50	42	38	34	22	-13	-118
R-043	Non-Participant	60	56	51	44	41	38	30	8	-57
R-059	Participant	62	58	53	47	42	40	29	0	-86
R-060	Participant	63	59	54	48	44	41	33	10	-55
R-063	Non-Participant	62	58	53	46	42	40	30	5	-66
R-085	Non-Participant	62	58	53	46	42	40	30	5	-66
R-091	Participant	63	60	55	48	44	41	31	6	-65
R-092	Non-Participant	63	60	55	48	44	41	31	4	-72
R-093	Participant	62	59	53	47	43	40	30	2	-78
R-099	Non-Participant	62	59	53	46	42	39	29	1	-76
R-100	Non-Participant	62	59	53	46	42	39	29	5	-65
R-101	Non-Participant	63	59	54	47	43	40	30	3	-78
R-102	Non-Participant	63	59	54	47	43	41	32	8	-63
R-122	Participant	62	58	53	46	42	39	29	0	-84
R-142	Non-Participant	62	59	54	47	42	39	29	2	-73
R-160	Non-Participant	62	59	54	47	43	40	30	5	-66
R-166	Non-Participant	63	59	54	47	43	41	31	5	-73
R-168	Non-Participant	62	59	54	47	43	40	31	7	-61

Table 3-2 - Pleasant Ridge Sound Analysis Results Summary (GE 1.72-103 Turbine Model)

All Values in dB	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R-169	Non-Participant	61	58	53	46	42	40	31	9	-54
R-183	Participant	62	58	53	46	42	40	31	8	-57
R-185	Participant	63	60	55	48	44	41	31	3	-75
R-186	Non-Participant	63	59	54	47	43	40	30	1	-85
R-187	Non-Participant	63	59	54	47	43	39	28	0	-80
R-191	Participant	63	59	54	47	43	40	32	8	-61
R-210	Non-Participant	62	59	53	47	43	40	29	1	-78
R-216	Non-Participant	62	58	53	47	43	41	33	10	-58
R-217	Participant	61	58	53	46	42	40	32	10	-52
R-221	Participant	62	59	54	47	43	40	31	6	-64
R-222	Non-Participant	62	59	54	47	43	40	31	6	-63
R-236	Non-Participant	62	59	54	47	43	40	31	10	-51
R-237	Participant	63	59	54	47	44	41	33	11	-49
R-239	Non-Participant	63	59	54	47	44	41	31	4	-69
R-240	Participant	63	59	54	47	44	41	31	6	-63
R-241	Non-Participant	63	59	54	48	44	41	32	6	-66
R-242	Non-Participant	63	59	54	47	43	41	30	2	-78
R-243	Non-Participant	63	59	54	48	44	41	32	7	-61
R-244	Participant	63	60	55	48	44	41	32	6	-71
R-270	Non-Participant	63	59	54	47	44	41	31	5	-69
R-311	Non-Participant	63	59	54	48	44	41	31	6	-69
R-313	Non-Participant	63	60	55	48	44	41	32	7	-66
R-314	Participant	63	60	55	48	44	41	31	3	-77
R-317	Non-Participant	63	59	54	47	43	40	30	2	-75
R-318	Non-Participant	63	59	54	47	43	39	28	0	-79
R-319	Non-Participant	63	59	54	47	43	40	29	-1	-86
R-321	Non-Participant	63	59	54	47	43	41	32	8	-60
R-324	Participant	63	59	54	47	43	40	31	4	-69
R-326	Non-Participant	62	58	53	46	42	39	30	4	-71
R-327	Participant	63	59	54	48	44	41	31	4	-76
R-329	Non-Participant	63	59	54	47	43	41	34	12	-50
R-345	Non-Participant	63	60	55	48	44	41	32	7	-63
R-354	Participant	62	59	54	47	43	40	32	10	-51
R-355	Non-Participant	62	58	53	46	42	39	30	3	-77
R-363	Participant	62	58	53	46	42	40	30	5	-69
R-369	Non-Participant	62	59	54	47	43	41	31	3	-76
R-382	Non-Participant	62	58	53	46	43	40	31	7	-59
R-387	Non-Participant	63	59	54	47	43	39	28	-3	-95

Table 3-2 - Pleasant Ridge Sound Analysis Results Summary (GE 1.72-103 Turbine Model)

All Values in dB	Octave Band Center Frequency	31.5 Hz	62.5 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R-388	Non-Participant	63	60	55	48	44	41	31	4	-73
R-389	Non-Participant	63	59	54	47	44	41	31	6	-69
R-394	Non-Participant	63	59	54	47	43	41	32	9	-56
R-395	Participant	63	59	54	47	43	40	30	2	-80
R-396	Non-Participant	63	60	55	48	44	41	32	6	-67
R-397	Participant	63	59	54	47	43	40	29	-2	-94
R-398	Non-Participant	62	59	53	46	42	39	29	3	-72
R-399	Non-Participant	63	59	54	47	43	40	31	5	-70
R-400	Non-Participant	63	59	54	47	44	41	31	2	-83
R-401	Participant	63	59	54	48	44	41	31	3	-78
R-408	Non-Participant	62	59	53	47	43	40	31	7	-60
R-409	Non-Participant	62	58	53	46	42	39	31	7	-60
R-417	Participant	61	57	52	46	42	40	32	11	-50
R-423	Non-Participant	62	59	53	47	43	41	32	10	-53
R-438	Non-Participant	63	59	54	48	44	41	33	11	-49
R-439	Non-Participant	63	59	54	48	44	41	32	8	-61
R-443	Non-Participant	62	58	53	46	42	40	30	4	-73
R-444	Non-Participant	62	58	53	46	42	40	31	6	-63
R-453	Non-Participant	61	58	53	46	42	40	30	3	-78
R-475	Participant	62	59	54	47	43	40	30	5	-69
R-484	Non-Participant	62	58	53	47	43	40	31	5	-72
R-498	Non-Participant	62	59	54	47	43	41	32	11	-49
R-500	Participant	63	59	54	47	43	40	29	0	-89
R-501	Non-Participant	63	60	55	48	44	41	32	7	-64
R-502	Non-Participant	63	59	54	48	44	41	30	2	-80
R-503	Non-Participant	63	60	55	48	44	41	31	4	-75
R-515	Participant	63	59	54	47	43	41	32	8	-62
R-582	Non-Participant	62	58	53	46	42	39	28	-3	-95
R-588	Non-Participant	63	59	54	47	43	40	30	-2	-94
R-597	Non-Participant	62	58	53	46	42	40	31	8	-63
R-632	Participant	63	59	54	48	44	41	33	7	-70
R-748	Non-Participant	63	59	54	48	44	41	32	7	-64
R-754	Participant	63	59	54	48	44	41	32	7	-66
R-773	Participant	60	57	51	44	41	38	30	8	-57
SR-C6	Non-Participant	62	58	53	46	42	39	29	0	-85

PLEASANT RIDGE WIND ENERGY PROJECT
SOUND STUDY

October 7, 2014

Appendix B

Receptor and Turbine Coordinates

(UTM Zone 16)

Table 4 - Pleasant Ridge Sound Receptor Coordinates

Reference ID	Participation Status	X (UTM)*	Y (UTM)*
R-005	Non-Participant	375,811	4,519,436
R-006	Non-Participant	385,700	4,517,940
R-007	Non-Participant	385,986	4,516,382
R-008	Non-Participant	384,592	4,516,352
R-009	Non-Participant	384,170	4,515,554
R-010	Non-Participant	384,087	4,515,634
R-011	Non-Participant	381,791	4,516,099
R-012	Non-Participant	379,945	4,514,644
R-013	Participant	380,134	4,514,802
R-014	Participant	380,168	4,514,624
R-021	Non-Participant	386,940	4,516,257
R-022	Participant	387,529	4,516,717
R-023	Participant	387,295	4,515,795
R-028	Participant	373,254	4,518,100
R-038	Non-Participant	376,617	4,506,577
R-039	Non-Participant	375,247	4,506,595
R-041	Non-Participant	374,358	4,507,370
R-043	Non-Participant	373,389	4,506,613
R-059	Participant	379,229	4,504,681
R-060	Participant	379,310	4,504,336
R-063	Non-Participant	377,671	4,503,851
R-085	Non-Participant	379,066	4,519,531
R-091	Participant	376,434	4,517,831
R-092	Non-Participant	375,968	4,517,760
R-093	Participant	374,711	4,516,340
R-099	Non-Participant	384,167	4,512,850
R-100	Non-Participant	384,173	4,512,570
R-101	Non-Participant	385,481	4,512,305
R-102	Non-Participant	385,164	4,512,063
R-122	Participant	375,315	4,503,379
R-142	Non-Participant	380,702	4,516,353
R-160	Non-Participant	378,627	4,506,585
R-166	Non-Participant	376,712	4,502,332
R-168	Non-Participant	378,067	4,502,552
R-169	Non-Participant	378,765	4,502,070
R-183	Participant	374,460	4,515,899
R-185	Participant	384,389	4,514,577
R-186	Non-Participant	384,112	4,514,643

Table 4 - Pleasant Ridge Sound Receptor Coordinates

Reference ID	Participation Status	X (UTM)*	Y (UTM)*
R-187	Non-Participant	385,813	4,515,019
R-191	Participant	384,213	4,511,663
R-210	Non-Participant	374,377	4,517,089
R-216	Non-Participant	370,659	4,519,094
R-217	Participant	371,200	4,518,946
R-221	Participant	375,987	4,504,858
R-222	Non-Participant	376,315	4,505,043
R-236	Non-Participant	376,924	4,503,383
R-237	Participant	375,850	4,504,052
R-239	Non-Participant	376,831	4,519,523
R-240	Participant	377,008	4,519,527
R-241	Non-Participant	377,631	4,519,660
R-242	Non-Participant	377,700	4,519,525
R-243	Non-Participant	378,632	4,519,530
R-244	Participant	378,242	4,519,553
R-270	Non-Participant	376,068	4,506,734
R-311	Non-Participant	378,569	4,517,922
R-313	Non-Participant	377,742	4,517,942
R-314	Participant	376,115	4,517,925
R-317	Non-Participant	377,228	4,517,834
R-318	Non-Participant	377,711	4,517,313
R-319	Non-Participant	377,437	4,517,057
R-321	Non-Participant	376,809	4,514,638
R-324	Participant	379,778	4,514,771
R-326	Non-Participant	387,064	4,513,119
R-327	Participant	384,406	4,513,127
R-329	Non-Participant	382,561	4,513,998
R-345	Participant	386,985	4,517,665
R-354	Participant	379,165	4,507,197
R-355	Non-Participant	379,349	4,507,024
R-363	Participant	375,048	4,502,417
R-369	Non-Participant	376,887	4,500,499
R-382	Non-Participant	373,855	4,516,788
R-387	Non-Participant	377,644	4,516,183
R-388	Non-Participant	376,080	4,515,729
R-389	Non-Participant	375,972	4,515,331
R-394	Non-Participant	381,206	4,514,953
R-395	Participant	382,244	4,514,739

Table 4 - Pleasant Ridge Sound Receptor Coordinates

Reference ID	Participation Status	X (UTM)*	Y (UTM)*
R-396	Non-Participant	383,692	4,514,713
R-397	Participant	384,238	4,514,709
R-398	Non-Participant	387,187	4,514,659
R-399	Non-Participant	387,961	4,514,721
R-400	Non-Participant	388,979	4,515,763
R-401	Participant	388,897	4,515,877
R-408	Non-Participant	385,719	4,511,322
R-409	Non-Participant	385,784	4,510,402
R-417	Participant	369,631	4,518,681
R-423	Non-Participant	374,618	4,515,245
R-438	Non-Participant	377,680	4,505,329
R-439	Non-Participant	378,684	4,505,054
R-443	Non-Participant	374,441	4,504,373
R-444	Non-Participant	374,341	4,504,390
R-453	Non-Participant	376,724	4,498,961
R-475	Participant	390,191	4,517,853
R-484	Non-Participant	390,558	4,516,471
R-498	Non-Participant	390,455	4,520,206
R-500	Participant	387,387	4,517,586
R-501	Non-Participant	388,327	4,517,996
R-502	Non-Participant	388,892	4,517,230
R-503	Non-Participant	388,961	4,517,077
R-515	Participant	380,799	4,515,804
R-582	Non-Participant	374,367	4,516,930
R-588	Non-Participant	375,924	4,516,019
R-597	Non-Participant	374,768	4,515,039
R-632	Participant	386,656	4,513,050
R-748	Non-Participant	375,908	4,506,701
R-754	Participant	378,926	4,503,474
R-773	Participant	373,444	4,506,607
SR-C6	Non-Participant	375,222	4,503,540

* Coordinates are in UTM Zone 16 - meters; Datum-NAD 1983

Table 5 - Pleasant Ridge Proposed Turbine Locations

Reference ID	X (UTM)*	Y (UTM)*
WTG-001	375,960	4,520,160
WTG-002	376,317	4,520,223
WTG-003	377,075	4,520,116
WTG-004	377,955	4,520,191
WTG-005	378,398	4,520,204
WTG-006	378,805	4,520,086
WTG-007	375,423	4,518,850
WTG-008	375,746	4,518,653
WTG-009	376,338	4,518,593
WTG-010	377,357	4,518,506
WTG-011	378,000	4,518,509
WTG-012	378,359	4,518,551
WTG-013	379,930	4,518,592
WTG-014	372,888	4,517,765
WTG-015	373,162	4,517,413
WTG-016	373,443	4,517,169
WTG-017	374,816	4,517,648
WTG-018	375,464	4,517,325
WTG-019	375,265	4,516,831
WTG-020	374,947	4,515,648
WTG-021	375,318	4,515,296
WTG-022	376,570	4,517,237
WTG-023	376,744	4,516,715
WTG-024	376,804	4,516,256
WTG-025	376,745	4,515,847
WTG-026	376,639	4,515,181
WTG-027	377,364	4,515,003
WTG-028	378,427	4,517,276
WTG-029	379,982	4,517,170
WTG-030	380,293	4,516,889
WTG-031	378,630	4,515,665
WTG-032	380,029	4,515,361
WTG-033	382,018	4,517,219
WTG-034	383,229	4,516,728
WTG-035	382,881	4,515,977
WTG-036	383,142	4,515,829
WTG-037	382,187	4,515,511
WTG-038	382,813	4,515,201
WTG-039	383,314	4,515,218
WTG-040	389,181	4,520,211
WTG-041	389,643	4,519,974
WTG-042	390,161	4,519,815
WTG-043	389,956	4,519,129
WTG-044	387,631	4,520,109
WTG-045	388,097	4,520,020
WTG-046	388,574	4,519,842

Table 5 - Pleasant Ridge Proposed Turbine Locations

Reference ID	X (UTM)*	Y (UTM)*
WTG-047	389,229	4,519,175
WTG-048	389,500	4,518,765
WTG-049	388,621	4,518,527
WTG-050	389,608	4,517,597
WTG-051	390,210	4,517,063
WTG-052	389,317	4,516,490
WTG-053	389,660	4,516,487
WTG-054	389,926	4,516,200
WTG-055	386,069	4,518,369
WTG-056	386,431	4,518,273
WTG-057	388,159	4,517,192
WTG-058	385,328	4,516,906
WTG-059	386,667	4,517,168
WTG-060	386,973	4,516,881
WTG-061	387,940	4,515,915
WTG-062	388,255	4,515,528
WTG-063	388,645	4,515,003
WTG-064	385,117	4,515,987
WTG-065	385,375	4,515,600
WTG-066	385,122	4,514,208
WTG-067	385,426	4,514,049
WTG-068	383,659	4,514,026
WTG-069	384,449	4,513,890
WTG-070	384,748	4,513,809
WTG-071	386,019	4,513,460
WTG-072	386,490	4,513,721
WTG-073	386,801	4,513,721
WTG-074	387,626	4,514,162
WTG-075	384,782	4,512,526
WTG-076	386,031	4,512,792
WTG-077	387,887	4,518,535
WTG-078	384,780	4,511,557
WTG-079	386,789	4,511,090
WTG-080	386,088	4,510,882
WTG-081	386,679	4,510,231
WTG-082	384,683	4,508,381
WTG-083	384,435	4,507,969
WTG-084	383,526	4,507,906
WTG-085	383,791	4,507,644
WTG-086	381,988	4,505,314
WTG-087	383,533	4,505,643
WTG-088	382,219	4,505,622
WTG-089	378,973	4,505,631
WTG-091	375,709	4,507,267
WTG-092	375,377	4,507,270
WTG-093	376,650	4,507,262

Table 5 - Pleasant Ridge Proposed Turbine Locations

Reference ID	X (UTM)*	Y (UTM)*
WTG-094	373,384	4,506,062
WTG-095	375,570	4,505,998
WTG-096	377,072	4,502,901
WTG-097	376,309	4,505,635
WTG-098	377,033	4,506,014
WTG-099	377,208	4,505,460
WTG-100	373,811	4,504,651
WTG-101	375,141	4,504,383
WTG-102	375,558	4,504,440
WTG-103	378,659	4,507,203
WTG-104	380,288	4,507,632
WTG-105	379,594	4,506,314
WTG-106	379,900	4,506,002
WTG-107	378,620	4,505,633
WTG-108	378,267	4,504,022
WTG-109	378,745	4,504,069
WTG-110	379,740	4,504,011
WTG-111	378,406	4,503,019
WTG-112	378,808	4,502,595
WTG-113	374,601	4,503,087
WTG-114	375,645	4,502,644
WTG-115	375,954	4,502,256
WTG-116	376,300	4,501,698
WTG-117	376,898	4,501,195
WTG-118	375,971	4,500,243
WTG-119	376,570	4,499,670
WTG-120	376,969	4,499,662
WTG-121	377,420	4,499,664
WTG-122	375,921	4,499,393
WTG-123	379,453	4,513,811
WTG-124	379,802	4,513,811
WTG-125	380,133	4,513,811
WTG-126	380,483	4,515,296
WTG-127	381,337	4,515,476
WTG-128	382,051	4,513,663
WTG-129	383,053	4,514,047
WTG-130	383,580	4,511,397
WTG-131	383,510	4,509,152
WTG-132	382,023	4,507,629
WTG-133	366,760	4,518,751
WTG-134	367,077	4,518,599
WTG-135	370,116	4,518,596
WTG-136	370,430	4,518,559
WTG-137	370,866	4,518,559

* Coordinates are in UTM Zone 16 - meters; Datum-NAD 1983