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NEXTERA ENERGY CANADA, ULC SUMMERHAVEN WIND ENERGY CENTRE APPLICATION FOR A RENEWABLE ENERGY APPROVAL

Noise Study Report

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REPORT

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1.0 INTRODUCTION

This Noise Study Report (the Report) has been prepared to provide information to the public, Aboriginal communities, municipalities and local authorities regarding the proposed Summerhaven Wind Energy Centre (the Project). The Report is a required component of an Application for a Renewable Energy Approval (REA) Application under Ontario Regulation (O. Reg.) 359/09 made under the *Environmental Protection Act (EPA)*.

This Report has been prepared in accordance with O. Reg. 359/09, Technical Bulletin Six: Required Setbacks for Wind Turbines (MOE, 2010), and MOE publication PIBS 4709e "Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities (October 2008)" (MOE, 2008).

Additional information about the Project can currently be found in the Construction Plan Report (Golder, 2011a), Design and Operations Report (Golder, 2011b), Decommissioning Plan Report (Golder, 2011c), and Project Description Report (Golder, 2011d). A description of the Site Plan design is provided in the Design and Operations Report. As it is broadly applicable to all of the REA Reports, and to avoid redundancy, the Site Plan diagram has been provided as a stand-alone document (the Site Plan Report).

Technical studies associated with the REA Application requirements were initiated in 2007 and extended into 2011. Additional information about the Project and results of technical studies and assessments of potential negative environmental effects are available in the following reports:

- Wind Turbine Specifications Report (Golder, 2011e);
- Natural Heritage Assessment Report (Golder, 2011f);
- Stage 1 Archaeological Assessment Report (Golder, 2010a);
- Heritage Assessment Report (Golder, 2011j);
- Noise Study Report (this Report);
- Water Assessment Report (Golder, 2011g);
- Site Plan Report (Golder, 2011h); and
- Consultation Report (Golder, 2011i).

Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports are not required as part of the REA Application for this Project (Ministry of Energy and Infrastructure, 2010) and are typically not publically available documents due to the confidential nature of the content. Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports will however be made available to the Ministry of Tourism and Culture (MTC) for review and their issuance of a Comment Letter in advance of construction and hard copies of this information will be provided to Aboriginal communities with an interest in the Project, as identified by the Director, and as agreed to by individual Aboriginal communities.

1.1 Project Summary

The Project consists of the site preparation, construction, operation, and decommissioning of 58 wind turbine generators with a total installed nameplate capacity of 128.82 MW. The Project will be owned and operated by NextEra Energy Canada, ULC (NextEra Energy Canada) and will be located in the vicinity of Nanticoke, Haldimand County, Ontario (Figure 1, end of Report). The Project lifespan from obtaining the REA Approval to the end of Decommissioning is estimated to be 27 years.

Turbine towers will be constructed on a concrete foundation. Underground and overhead cables will interconnect individual turbines and eventually connect to the substation (see Site Plan Report). The operation of the wind turbines will be monitored remotely from a Project operations building located near the substation. Once tested and commissioned, the turbines will require scheduled visits for maintenance during the Operations Phase. Maintenance will include complete inspection of the turbine's components and the tower, functionality testing, replacement of worn parts, bolt tightening and lubrication of moving parts. Routine preventative maintenance activities will be completed as per manufacturer requirements.

The Project Area (Figure 1) encompasses approximately 22,583 ha of privately owned land parcels. Land use is predominantly cash-crop agriculture (i.e., farming for corn, soybeans, wheat), although some areas are pasture (predominantly for cattle) and several wooded areas are present. Selkirk Provincial Park and Haldimand Conservation Area are located along the shore of Lake Erie south of the Project Area. The Grand River runs northeast of the Project Area and Imperial Oil is directly southwest.

The location of the Project was predicated by interest expressed by local landowners. Haldimand County is also attractive for wind development due to its proximity to Lake Erie, which results in favourable wind conditions for wind power production.

The Project will consist of fifty-eight (58) Siemens SWT-2.221-101 wind turbine generators (WTGs) that will be in full operation year-round, 24-hours per day when winds are sufficient. These noise sources will be situated within the property boundary as shown in Figures 2a through 2g (end of the Report). Table 1 summarizes the wind turbine locations. The WTGs will each have a nameplate capacity of 2.221 MW. The manufacturer's specifications are outlined below in Table 2.

The substation will be fenced and secured based on standard utility practices and will include an oil containment system to prevent soil contamination in the event of a leak. The transformer location is provided in Table 3.

Table 1: Wind Turbine Locations

Project Name: NextEra Energy Canada., Summerhaven Wind Energy Centre					
Type of Coordinates: UTM 17 NAD 83					
Equipment Make & Model: Siemens 2.221, 80m hub height					
Identifier[1]	Location Coordinates		Identifier	Location Coordinates	
	X (Easting)	Y (Northing)		X (Easting)	Y (Northing)
WTG-001	576124	4749873	WTG-032	590737	4746531
WTG-003	574742	4748226	WTG-033	594906	4747489
WTG-004	575685	4748309	WTG-034	588348	4744337
WTG-005	576990	4748661	WTG-035	588779	4744087
WTG-006	578518	4748834	WTG-036	589271	4744225
WTG-007	579869	4749156	WTG-037	589975	4744279
WTG-008	580947	4749341	WTG-038	591475	4744600
WTG-009	586015	4749711	WTG-039	591880	4745113
WTG-010	586837	4749912	WTG-040	592721	4744952
WTG-011	587326	4751141	WTG-041	593224	4745318
WTG-012	572316	4746292	WTG-042	593522	4745702
WTG-013	572920	4746475	WTG-043	594899	4745794
WTG-014	574224	4746586	WTG-044	596210	4746279
WTG-015	576150	4746799	WTG-045	596181	4745775
WTG-016	577821	4747047	WTG-046	597119	4745943
WTG-017	582468	4747896	WTG-047	597181	4746416
WTG-018	588422	4748589	WTG-048	590280	4742517
WTG-019	590644	4749342	WTG-049	590293	4742174
WTG-020	573903	4745199	WTG-050	590314	4741857
WTG-021	577726	4746477	WTG-051	592008	4742791
WTG-022	579685	4746426	WTG-052	593087	4743349
WTG-023	580952	4746798	WTG-053	593930	4743637
WTG-024	582973	4747085	WTG-054	595213	4744131
WTG-025	583914	4747307	WTG-055	596817	4743995
WTG-026	584940	4747269	WTG-056	597076	4743766
WTG-027	586761	4746915	WTG-057	579024	4749020
WTG-028	591259	4748123	WTG-058	584373	4748649
WTG-030	587383	4745469	WTG-059	577118	4747104
WTG-031	589357	4746128	WTG-061	577924	4745876

[1] Turbines number 2, 29, and 60 do not exist.

Table 2: Siemens SWT-2.221-101 Turbine Technical Specifications

Component	Specification
Rated capacity	2.221 MW
Cut-in wind speed	4m/s
Cut-out wind speed	25 m/s
Rated wind speed	12-13 m/s
Number of blades	3-bladed, horizontal axis
Rotor Diameter	101 m
Swept area	8,000 m^2
Tower (hub) height	80m

Source: Modified from Siemens, 2010a

Table 3: Substation Transformer Location

Identifier	Location Coordinates	
	X (Easting)	Y (Northing)
Substation	582616	4747537

2.0 DESCRIPTION OF TECHNICAL TERMS

To help understand the analysis and recommendations made in this report, the following is a brief discussion of technical noise terms.

Sound pressure level is expressed on a logarithmic scale in units of decibels (dB). Since the scale is logarithmic, a sound that is twice the sound pressure level as another will be three decibels (3 dB) higher.

The noise data and analysis in this report have been given in terms of frequency distribution. The levels are grouped into octave bands. Typically, the centre frequencies for each octave band are 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hertz (Hz.). The human ear responds to the pressure variations in the atmosphere that reach the ear drum. These pressure variations are composed of different frequencies that give each sound we hear its unique character.

It is common practice to sum sound levels over the entire audible spectrum (i.e., 20 Hz to 20 kHz) to give an overall sound level. However, to approximate the hearing response of humans, each octave band measured has a weighting applied to it. The resulting “A-weighted” sound level is often used as a criterion to indicate a maximum allowable sound level. In general, low frequencies are weighted higher, as human hearing is less sensitive to low frequency sound.

Environmental noise levels vary over time, and are described using an overall sound level known as the L_{eq}, or energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure L_{eq} sound levels in order to obtain a representative average sound level. The L_{90} is defined as the sound level exceeded for 90% of the time and is used as an indicator of the “ambient” noise level.

3.0 CRITERIA AND GUIDELINES

The Project site location can be best defined as Class 3 (Rural), as per MOE Publications NPC-232 (MOE, 1995). The performance limits for Class 3 areas are listed in MOE publication NPC-232 (MOE, 1995). The noise level limits are also provided in reference to wind induced background sound level in MOE publications PIBS 4709e "Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities" (MOE, 2008).

The sound level limit for the residential receptors in a Class 3 area can be described as follows:

- For wind speeds at or below 6 m/s.

  The sound level limit at a Point of Reception, expressed in terms of the hourly equivalent energy sound level (L_{eq}) is 40.0 dBA or the minimum hourly background sound level established in accordance with requirements in Publication NPC-232, whichever is higher.

- For wind speeds above 6m/s.

  The sound level limit at a Point of Reception in a Class 3 Area (Rural), under conditions of average wind speed above 6 m/s respectively, expressed in terms of the hourly equivalent energy sound level (Leq), is the wind induced background sound level, expressed in terms of ninetieth percentile sound level (L90) plus 7 dB, or the minimum hourly background sound level established in accordance with requirements in Publications NPC-232, whichever is higher.

These limits are summarized in Table 4.

Table 4: Noise Level Limits Based on Average Wind Speed at 10 m Height

Wind Speed (m/s)	≤ 6	7	8	9	10
Class 3 Criteria (dBA)	40.0	43.0	45.0	49.0	51.0

The Project is a Class 4 wind facility, as per O. Reg. 359/09 under the Environmental Protection Act. As per REA requirements, the turbines have been located at a minimum of 550m from any point of reception (POR).

4.0 RECEPTORS

4.1 Points of Reception

Two Thousand three hundred and thirty six (2336) receptors have been identified as being the most sensitive Point(s) of Reception (POR(s)) in the vicinity of the Project as shown on the site location plan in Figure 1. Figure 2a through 2g illustrate PORs within 2 km of the proposed turbines or transformers, and in accordance with MOE guidance, modelling was completed for all PORs within 1.5 km of any infrastructure associated with the Project. Accordingly, these PORs were assigned a specific ID. These receptors have been modelled at a height of 4.5 m or higher, if the actual top storey is higher as established through field programs, and located at the centre of the dwelling. One hundred twenty nine (129) vacant lots have also been modelled with vacant lot PORs (VPORs) located within a 1 hectare building envelope typical to the area. More specifically, in keeping with a conservative approach, the VPORs have been placed in each corner of the building envelope for modelling purposes. This study provides results for the corner that would result in the maximum noise level. These receptors have also been modelled at a height of 4.5 m above grade. Table 5 summarizes these locations.

Table 5: Points of Reception Location Summary

Receptor ID	Description	Location Coordinates	
		X (Easting)	Y (Northing)
POR0001	Refer to attached CD for Table 5.		
POR0002			
POR0003			

4.2 Participating Receptor Locations

In accordance with MOE guidelines, a receptor is a Participating Receptor (PR) and is not considered as a POR if the property of the receptor is associated with the Project. Therefore, the sound level limits stated in Section 3 of this report do not apply.

Eighty three (83) receptors have been identified as PRs in accordance with MOE guidelines. These receptors have been modelled at a height of 4.5 m and located at the centre of the dwelling. In addition, fifty two (52) signed vacant lots have also been modelled as vacant lot PRs (VPRs) located within a building envelope typical to the area. These PRs have been placed at the corner of the building envelope resulting in the highest noise levels. These receptors have also been modelled at a height of 4.5m above grade. PR locations are summarized in Table 6. A zoning map is included in Appendix A.

Table 6: Participating Receptor Locations Summary

Receptor ID	Description	Location Coordinates	
		X (Easting)	Y (Northing)
PR0001	Refer to attached CD for Table 6.		
PR0002			
PR0003			

5.0 METHODOLOGY

5.1 Predicted Noise Impact Assessment

A predictive analysis was performed using the commercially available software package Cadna/A. Geometrical spreading, attenuation from barriers, ground effect and atmospheric absorption were included in the analysis as determined from ISO 9613 (part 2), which is the current standard used for outdoor sound propagation predictions. It should be noted that this standard makes provisions to include a correction to address for downwind or ground based temperature inversion conditions. Noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MOE.

5.2 Atmospheric Absorption

As required by the MOE, the attenuation due to atmospheric absorption is based on the atmospheric attenuation coefficients for a temperature of 10ºC and a relative humidity of 70%. Table 7 summarizes the atmospheric attenuation coefficients used in this assessment.

Table 7: Summary of Atmospheric Absorption Coefficients

Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000	8000
Atmospheric Absorption Coefficients (dB/km)	0.1	0.4	1.0	1.9	3.7	9.7	32.8	117.0

5.3 Ground Effect

In accordance with MOE procedures, ground effect at the source(s), receiver(s) and all areas between can be set to one of the following two options:

- Variable ground effect (G(source) = 1, G(receiver) = 0.5, G(middle) = 0.8).
- Uniform ground effect (G=0.7 everywhere).

For the purpose of this assessment, uniform ground effect was applied.

5.4 Turbine Noise Emission Rating

Wind Shear

Sound power levels emitted by wind turbine generators are dependent on wind speeds at the hub. In contrast, the background noise levels specified by the MOE are based on wind speeds at receptor locations. Therefore, the site-specific wind shear has been used to account for the difference in wind speed between winds at 10 m versus wind speed at hub height (i.e., 80m). Table 8 summarizes the difference in wind speed for the Project based on a site-specific summer night time average wind shear value of 0.4184.

Table 8: Predicted Hub-height Wind Speed

Wind Speed (m/s) at 10m height	**≤ 6**	**7**	**8**	**9**	**10**
Wind Speed (m/s) at Hub height	≤ 14.32	16.71	18.77	21.48	23.87

Turbine Noise Emission Rating

As required by the MOE, the sound power data for the Siemens WTGs was acquired in accordance with IEC 61400-11 (IEC, 2002) procedures as identified in the manufacturer's noise data provided in Appendix B. The manufacturer's noise data demonstrates that the wind turbines are not tonal. This information is presented in Table 9.

Table 9: Noise Source Sound Power Level Summary Table for Siemens-SWT-101 turbines

	Octave Band Sound Power Level (dB)									
	Manufacturer's Emission Levels [1,2,3]					Adjusted Emission Levels				
Wind Speed (m/s) at 10m height	**≤ 6**	**7**	**8**	**9**	**10**	**≤ 6**	**7**	**8**	**9**	**10**
Frequency (Hz)										
63	108.8	N/A	108.6	N/A	N/A	108.8	108.7	108.6	108.6	108.6
125	109.9	N/A	109.1	N/A	N/A	109.9	109.5	109.1	109.1	109.1
250	105.6	N/A	104.6	N/A	N/A	105.5	105.0	104.6	104.6	104.6
500	102.7	N/A	103.0	N/A	N/A	102.7	102.9	103.0	103.0	103.0
1000	99.6	N/A	100.1	N/A	N/A	99.6	99.9	100.1	100.1	100.1
2000	95.9	N/A	95.3	N/A	N/A	95.9	95.6	95.3	95.3	95.3
4000	88.3	N/A	88.6	N/A	N/A	88.3	88.5	88.6	88.6	88.6
8000	86.0	N/A	86.8	N/A	N/A	86.0	86.4	86.8	86.8	86.8
A-Weighted	**105**	**105**	**105**	**105**	**105**	**105**	**105**	**105**	**105**	**105**

[1] Tested based on Measurement standard IEC 61400-11 ed. 2 2002.
[2] Octave band data for 7m/s was not provided and was interpolated between 6m/s and 8m/s
[3] Octave band data for 9m/s and 10m/s was not provided. It is understood that the 8m/s data represents maximum noise levels

5.5 Transformer Noise Emission Rating

The Project substation will include a step up power transformer. Table 10 provides the transformer noise specification that will be used to procure the substation transformer. The specification is based a sound pressure level of 63 dBA at a distance of 2 m from any surface on the transformer. A detailed description of the transformer can be found in the attached CD. This results in an overall sound power level of 88 dBA for the transformer. The transformer was modelled at a height of 7 m.

Table 10: Substation Transformer Sound Power Noise Specification

	Octave Band Centre Frequency (Hz)							
Source	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Transformer[1,2]	91.1	94.7	92.7	85.5	78.7	75.4	67.1	58.3

[1] Transformers will be designed in accordance with all applicable standards including CSA-C88-M90 and the above octave band sound power levels.

[2] A 5 dB penalty has been added to the transformers overall sound pressure levels at each POR in accordance with MOE requirements.

5.6 Cumulative Effects Assessment

In order to assess potential cumulative effects associated with the Project, all other planned projects within a 10 km buffer around the site were considered (Figure 3, end of the Report).

As per published MOE guidelines (MOE, 2008) NextEra Energy Canada completed research to identify any approved adjacent projects. One (1) planned Project within a 10 km radius of the Summerhaven Wind Energy Centre was identified, which was the Capital Power Corporation (CPC) Port Dover and Nanticoke (PDN) wind farm. For all other projects, information was limited to the various project Notices of Commencement. In order to address foreseeable and predicted cumulative noise impacts with the adjacent PDN wind farm and the Summerhaven Wind Energy Centre, CPC and NextEra Energy Canada worked together to develop layouts that would allow both projects to co-exist. In May 2010 a layout (crystallized) was presented to the MOE for both the PDN wind farm and the Summerhaven Wind Energy Centre. The MOE agreed to allow the two projects to proceed without consideration for other proposed projects in the area.

- **Capital Power Corporation Wind Project**– In late November 2009, CPC acquired the Port Dover and Nanticoke (PDN) wind farm from Tribute Resources Inc (TSX-V: TRB). The Project, proposed for Haldimand County and Norfolk County, would have the potential to generate approximately 105 megawatts (MW) of renewable energy and would be developed through the Ontario Power Authority's (OPA) recently launched Feed-in-Tariff (FIT) program. The CPC Wind Project consists of up to sixty-two (62) Vestas V90 wind turbines for a nameplate capacity of up to 111.6 MW.

6.0 RESULTS

6.1 Noise Impact Assessment

Using noise data provided by the WTG manufacturer and the noise specification for the substation transformer, Golder has carried out noise predictions for the operation of the Project. The manufacturer's test data was based on a surface roughness of 2.133m, the data was adjusted based on the site specific wind shear of 0.4184. The results of the predictions are summarized in Table 13 and Table 14. Figures 4a, 4b, and 4c (end of the Report) show the resulting noise level contours for 6, 7, and 8 m/s respectively. Noise contours for 9m/s and 10m/s are equivalent to 8m/s (maximum sound power is reached at 8m/s). Please refer to the attached CD for sample calculations. As required by the MOE, sample calculations include noise predictions for a single WTG at one receptor location and all WTGs at a single receptor location.

6.2 Cumulative Effects Assessment

6.2.1 Capital Power Port Dover and Nanticoke Wind Project

As discussed in Section 5.6 the cumulative effects assessment was completed by generating noise predictions due to both the Summerhaven Wind Energy Centre and the PDN wind farm.

CPC provided a layout of sixty-two (62) turbines and one substation location. Turbine coordinates and the substation location for the PDN wind farm is provided in Tables 11 and 12 respectively. A noise model was created based on this layout and Vestas V90 sound power levels from Golder's database. The sound power data for the Vestas V90 turbine are based on a surface roughness of 0.05m and therefore, based on a conservative site specific wind shear assumed, the highest sound power was applied at all wind speeds.

When modelling the PDN wind farm alone, three (3) receptors within the Summerhaven Wind Energy Centre Project area have noise levels above 40.0 dBA. The levels at VPR0050, VPR0015 and VPOR0052 are 52.8, 50.0, and 43.0 dBA respectively. VPR0050 is located at the base of PDN turbine T340 and VPR0015 is located on the same lot as PDN turbine T349. It is Golder's understanding that the PDN wind farm has been developed to meet the MOE's noise guideline requirements of 40.0 dBA at 6m/s. Therefore, these receptors were considered as participating receptors for the PDN wind farm.

Modelling both Projects together results in an additional three (3) receptors increasing to over 40.0 dBA. The receptors are PR0055, PR0053, and PR0012. Since these are participating receptors, the 40.0 dBA limit does not apply. The contribution to these receptors from the PDN wind farm is 28.2, 27.5, and 23.7 dBA respectively. The overall increases from levels with only the Summerhaven Wind Energy Centre are 0.3, 0.1, and 0.2 dB respectively.

The noise levels due to the NextEra Energy Canada Summerhaven Wind Energy Centre on receptors farther than 1.5 km from the Project are at 25 dBA or lower. This is significantly lower than the 40.0 dBA noise level limit and should not be a concern for receptors within the PDN project area.

Table 11: Capital Power Corporation Port Dover and Nanticoke Wind Project Wind Turbine Locations

Project Name: Capital Power Corporation Port Dover and Nanticoke Wind Project					
Type of Coordinates: UTM 17 NAD 83					
Equipment Make & Model: Vestas V90, 90m hub height					
Identifier	Location Coordinates		Identifier	Location Coordinates	
	X (Easting)	Y (Northing)		X (Easting)	Y (Northing)
T103	575307	4742745	T312	583493	4744367
T156	579533	4741665	T313	583993	4744142
T201	568555	4738173	T315	585310	4744511
T202	568981	4738058	T317	584910	4742959
T203	568909	4738489	T318	584199	4742941
T204	568579	4738661	T319	582759	4742476
T205	568697	4738990	T320	580924	4742063
T206	569595	4738138	T321	581714	4740972
T208	569371	4738865	T322	582020	4740794
T209	569814	4739619	T323	585933	4741375
T210	570307	4738245	T324	586076	4741064
T211	570109	4738532	T325	586174	4740775
T212	570059	4738865	T327	574985	4743809
T213	569430	4739242	T330	577281	4744266

Project Name: Capital Power Corporation Port Dover and Nanticoke Wind Project					
Type of Coordinates: UTM 17 NAD 83					
Equipment Make & Model: Vestas V90, 90m hub height					
Identifier	Location Coordinates		Identifier	Location Coordinates	
	X (Easting)	Y (Northing)		X (Easting)	Y (Northing)
T219	570347	4739860	T333	579437	4742091
T220	569995	4739250	T334	584273	4742681
T261	574726	4742606	T336	580845	4740070
T262	574874	4742030	T337	580404	4742207
T263	580204	4742499	T338	584734	4744277
T264	580473	4740590	T340	577352	4743805
T266	580533	4740325	T342	574772	4742341
T267	581259	4739957	T343	581857	4743740
T268	581225	4740767	T344	585895	4741901
T269	581148	4740414	T345	573708	4743768
T273	580065	4741835	T346	574387	4743875
T305	579512	4743796	T347	577109	4744591
T306	579627	4743550	T348	578653	4744610
T307	580078	4743331	T349	571450	4745125
T309	581699	4743973	T350	585637	4743103

Project Name: Capital Power Corporation Port Dover and Nanticoke Wind Project					
Type of Coordinates: UTM 17 NAD 83					
Equipment Make & Model: Vestas V90, 90m hub height					
Identifier	Location Coordinates		Identifier	Location Coordinates	
	X (Easting)	Y (Northing)		X (Easting)	Y (Northing)
T310	582206	4744219	T351	572609	4744773
T311	582857	4744112	T352	583804	4745802

Table 12: Capital Power Corporation Port Dover and Nanticoke Wind Project Substation Transformer Location

Identifier	Location Coordinates	
	X (Easting)	Y (Northing)
Transformer	576105	4746494

Table 13: Combined Noise Impact Assessment Summary - Points of Reception

Point of Reception ID	Distance to Nearest Wind Turbine (m)	Nearest Turbine ID	Calculated Overall SPL (dBA) at Receptor Locations at Selected Wind Speeds (m/s)					Sound Level Limit at Selected Wind Speeds (dBA)					Compliance with MOE Limits?
			≤ 6	7	8	9	10	≤ 6	7	8	9	10	
POR001	Refer to attached CD for Table 13.												
POR002													
POR003													

Table 14: Combined Noise Impact Assessment Summary - Participating Receptors

Participating Receptor ID	Distance to Nearest Wind Turbine (m)	Nearest Turbine ID	Calculated Sound Level at Selected Wind Speeds (dBA)				
			≤ 6	7	8	9	10
PR001	Refer to attached CD for Table 14.						
PR002							
PR003							

Table 15: Cumulative Effects

Receptor ID	Location Coordinates		Cumulative Effects at 6m/s (dBA)	Cumulative Effects at 7m/s (dBA)	Cumulative Effects at 8m/s (dBA)
	X (Easting)	Y (Northing)			
R1	Refer to attached CD for Table 15.				
R2					
R3					

7.0 CONCLUSION

Golder was retained by NextEra Energy Canada ULC., to prepare a Noise Study Report for the proposed 128.82 MW Project, located in Summerhaven, Ontario. Using manufacturer's noise specifications, Golder has predicted noise levels that are at or below the MOE noise level limits at specified wind speeds. Based on these results, the Project will operate within compliance limits as set out by the MOE.

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