Appendix G:

Noise Impact Assessment

Hillside Boularderie Wind Farm
Noise Impact Assessment Report
March 2013

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Report Information

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** The WindPRO v2.8, Decibel Module Calculation Results for the Enercon E-92 2.3 MW @ 98m Hub Height and the Enercon E-82 2.0 MW @ 98m Hub Height. To review General Specification for the Enercon E-92 2.3 MW and Enercon E-82 2.0 MW please contact:

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1. Introduction

Natural Forces Wind Inc. has undertaken a noise impact assessment for the proposed Hillside Boularderie Wind Farm site to assess the impact of the wind farm's sound emissions at the surrounding points of reception. Details outlining the project, noise receptors, prediction methodology and assumptions made for the assessment are included herein, with WindPRO results for the each specific turbine, supplied in the annexes. The Land Use By-law for the Cape Breton Regional Municipality does not state any restriction pertaining to sound pressure levels relating to wind turbines activities. Therefore, the Ontario *Noise Guidelines for Wind Farms* will be used during this assessment as a guideline regarding acceptable noise emission from the proposed Hillside Boularderie Wind Farm.

The noise analysis was conducted using the ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation model within the Decibel module of the software package, WindPRO version 2.8.

2. General Description of Project Site and Surrounds

The proposed Hillside Boularderie Wind Farm consists of a maximum of 2 wind turbine generators (WTGs) located in Cape Breton Regional Municipality, Nova Scotia. Currently, Enercon E-92 2.0 MW and Enercon E-82 2.0 MW WTG types are being considered for the project. For this initial assessment, Enercon E-92 2.3 MW and Enercon E-82 2.0 MW were used to calculate predicted sound pressure levels, however if the WTG type was to change a new noise assessment would be conducted. The project site is situated approximately 8 kilometres north west of North Sidney and adjacent to the Hillside Boularderie Road. Land around the proposed project area is zoned as a General Zone and so, will not require re-zoning. A map of the site and surrounding receptors is included in Annex A.

The predominant noise sources in the area are from road traffic along Hillside Boularderie Road, the Trans-Canada Highway and waves from Bras d'Or Lake.

3. Noise Guidelines for Wind Farm

3.1. Provincial and Municipal Noise Guidelines

As previously mentioned, the Land Use By-law for the Cape Breton Regional Municipality does not include any restrictions concerning acceptable sound pressure levels being emitted from wind turbines. A joint federal-provincial-territorial initiative to create national guidelines concerning wind turbine noise is underway. Although this initiative is only in draft format, Nova Scotia may choose to adopt these guidelines.

3.2. Ontario Provincial Noise Guidelines

For the proposed Hillside Boularderie Wind Farm, the Ontario *Noise Guidelines for Wind Farms* was used as a general guideline. The guidelines describe receptors in rural environments as Class 3. Table 1 demonstrates the sound level limits for wind turbines at different wind speeds.

Table 1 - Summary of sound level limits for wind turbines (Ministry of the Environment, 2008).

Wind Speed (m/s) at 10 m height	4	5	6	7	8	9	10
Wind Turbine Sound Level Limits Class 3 Area, dB(A)	40.0	40.0	40.0	43.0	45.0	49.0	51.0

To ensure a conservative assessment of the sound level limits emitted by the proposed Hillside Boularderie Wind Farm, a general limit of 40 dB(A) was used for wind speeds ranging between and including 4 and 12 m/s.

The noise assessment used the height above grade at the centre of the receptors of 4.5 m as proposed by the Ontario guideline for single and two story dwellings.

4. Description of Receptors

The 71 points of reception taken into consideration for this noise impact assessment are to represent residential buildings and/or seasonal homes located within 2,000 metres (m) of the nearest proposed WTG. Every dwelling within the 2.000 m buffer is represented by a receptor. It should be noted that there are no residential buildings and/or seasonal homes located within 1,000m of the turbines. Details of receptor locations and distances to nearest WTG are detailed in Table 2. Receptor IDs included in Table 2 correspond with the WindPRO generated map included in Annex B and Annex C for the Enercon E-92 2.3 and E-82 2.0 respectively.

Table 2 - Description of receptors.

No.	Easting	Northing	Distance from WTG 1	Distance from WTG 2
A	702,233	5,124,332	2,008	2,209
B	702,245	5,124,439	1,967	2,184
C	702,322	5,124,229	1,957	2,138
D	702,338	5,124,594	1,844	2,082
E	702,373	5,124,595	1,809	2,046
F	702,401	5,124,196	1,895	2,068
G	702,413	5,124,325	1,838	2,031
H	702,415	5,124,204	1,879	2,053
I	702,442	5,124,309	1,817	2,006
J	702,450	5,124,392	1,782	1,985
K	702,483	5,124,244	1,801	1,977
L	702,487	5,124,266	1,789	1,969
M	702,501	5,124,373	1,740	1,938
N	702,519	5,124,262	1,761	1,939
O	702,605	5,124,401	1,632	1,831
P	702,611	5,124,315	1,656	1,839
Q	702,639	5,124,305	1,634	1,813
R	702,649	5,124,422	1,584	1,784
S	702,668	5,124,603	1,518	1,751
T	702,677	5,124,540	1,524	1,746
U	702,708	5,124,552	1,491	1,713
V	702,749	5,124,554	1,451	1,673
W	702,749	5,124,416	1,491	1,686
X	702,763	5,124,463	1,463	1,666
Y	702,779	5,124,440	1,454	1,652
Z	702,800	5,124,224	1,520	1,673
AA	702,829	5,124,411	1,418	1,607
AB	702,921	5,124,318	1,371	1,534

No.	Easting	Northing	Distance from WTG 1	Distance from WTG 2
AC	703,203	5,124,469	1,051	1,229
AD	703,223	5,124,201	1,174	1,276
AE	703,273	5,124,261	1,099	1,209
AF	703,321	5,124,255	1,064	1,166
AG	703,543	5,123,998	1,104	1,090
AH	703,586	5,124,088	1,005	1,003
AI	703,623	5,123,909	1,140	1,085
AJ	703,893	5,123,660	1,285	1,118
AK	703,970	5,123,685	1,247	1,061
AL	703,972	5,123,489	1,441	1,241
AM	703,982	5,123,364	1,563	1,354
AN	703,993	5,123,326	1,600	1,387
AO	704,013	5,123,289	1,635	1,417
AP	704,016	5,123,593	1,332	1,127
AQ	704,028	5,123,386	1,537	1,319
AR	704,038	5,123,276	1,646	1,422
AS	704,045	5,123,584	1,338	1,126
AT	704,062	5,123,279	1,641	1,412
AU	704,066	5,123,581	1,340	1,122
AV	704,075	5,123,344	1,576	1,347
AW	704,135	5,123,490	1,428	1,190
AX	704,191	5,123,479	1,439	1,189
AY	704,251	5,123,479	1,442	1,179
AZ	704,269	5,123,386	1,537	1,269
BA	704,368	5,123,374	1,559	1,273
BB	704,462	5,123,310	1,638	1,337
BC	704,688	5,123,259	1,743	1,413
BD	704,712	5,126,656	1,826	2,031
BE	704,735	5,123,166	1846	1514
BF	704,788	5,123,217	1816	1476
BG	704,911	5,123,205	1873	1523
BH	705,007	5,123,161	1954	1597
BI	705,062	5,123,136	2001	1641
BJ	705,365	5,123,038	2237	1866
BK	705,461	5,123,291	2087	1709
BL	705,468	5,123,354	2043	1664
BM	705,480	5,123,239	2140	1763
BN	705,517	5,123,121	2256	1879

No.	Easting	Northing	Distance from WTG 1	Distance from WTG 2
BO	705,536	5,123,330	2106	1726
BP	705,549	5,123,264	2164	1785
BQ	705,713	5,123,690	1985	1609
BR	705,867	5,123,593	2167	1791
BS	705,894	5,123,646	2156	1782

5. Description of Sources

5.1. Turbine Locations

A map of the project area with the proposed WTG layout is illustrated in Annex A. There is only one proposed wind farm project within 10 kilometres the project, in Point Aconi. The project is located approximately 9 km away, thus there is no need to include cumulative noise impacts as per the Ontario guidelines. UTM coordinates of the WTGs are given below in Table 3. WTG ID numbers included in Table 3 correspond with the labels to the WindPRO generated map included Annex B.

Table 3 - Coordinates of proposed turbine locations.

WTG ID Number	Proposed WTG Location (UTM Zone 20, NAD 83)	
	Easting	Northing
1	704,153	5,124,918
2	704,419	5,124,646

5.2. Turbine Types

The WTG models being considered for the proposed wind farm are the Enercon E-82 2.0 MW and the Enercon E-92 2.0 MW. The Enercon E-92 2.3MW turbine is being used to represent the Enercon E-92 2.0 MW as the power curve and sound data is not currently available for the 2.0 MW WTG. This is deemed an acceptable representation because the 2.3 MW WTG and 2.0 MW WTG are very similar as the only mechanical difference would be one less power conversion cabinet. By using the E-92 2.3 MW WTG in the model, the calculations represent a conservative result. Both turbine models utilize horizontal axis, 3-blade design and a microprocessor pitch control system. (Enercon Canada, 2012)

Table 4 and Table 5 below outline the WTGs main characteristics.

Table 4 - Enercon E-92 2.3 MW turbine characteristics (Enercon Canada, 2012).

WTG Type	Rotor Diameter (m)	Hub Height (m)	Rated Output (MW)
E-92 2.3	92.0	98	2.3

Table 5 - Enercon E-82 2.0 MW turbine characteristics (Enercon Canada, 2012).

WTG Type	Rotor Diameter (m)	Hub Height (m)	Rated Output (MW)
E-82-2.0	82.0	98	2.0

5.3. Power Curve Data

The power curve for the Enercon E-92 2.3 MW WTG at Noise Mode 0 and with an air density of 1.225 kg/m³ is shown below in Figure 1.

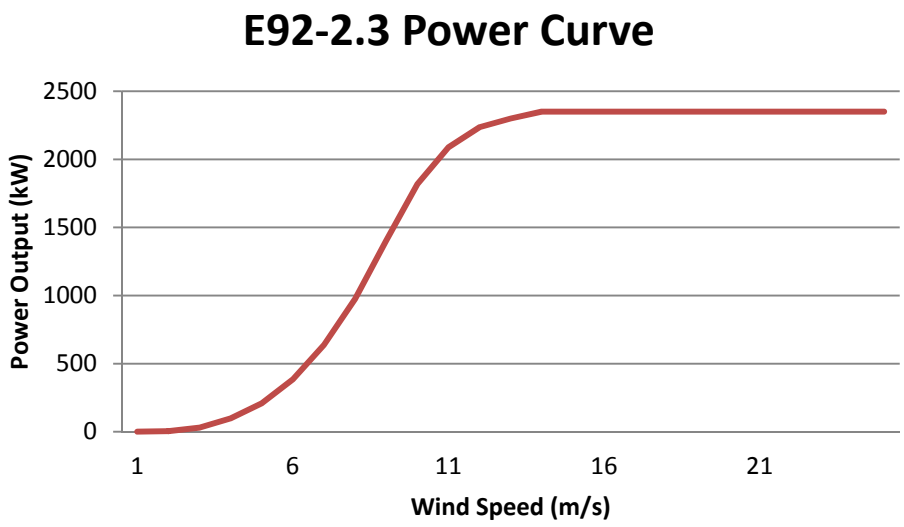


Figure 1 – Power curve for the Enercon E-92 2.3 (Enercon Canada, 2012).

The power curve for the Enercon E-82 2.0 MW WTG at Noise Mode 0 and with an air density of 1.225 kg/m³ is shown below in Figure 2.

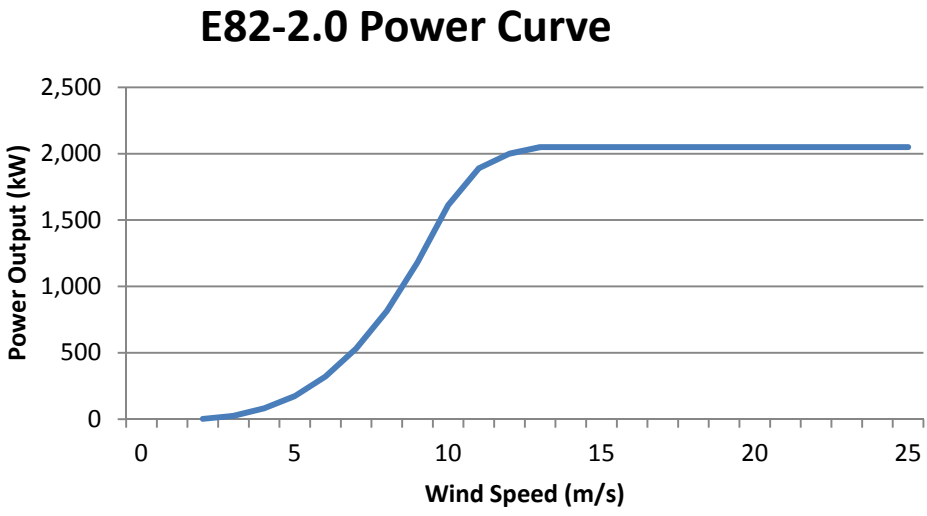


Figure 2 – Power curve for the Enercon E-82 2.0 (Enercon Canada, 2012).

6. Wind Turbine Noise Emission Rating

The noise emission data for the Enercon E-92 2.3 WTG, shown in Table 6, and Enercon E-82 2.0 WTG, shown in Table 7 was provided by Enercon Canada (2012). The sound pressure levels were measured to IEC 61400-11 standards, which stipulate measurements at a height of 10 m above ground level with an air density of 1.225 kg/m^{3}that is taken to be representative of the project area. Where data is shown as 'N/A', WindPRO has extrapolated octave band data to generate appropriate sound pressure level values in order to complete the calculation. These source noise levels are incorporated in the prediction calculations referenced in Section 7.

6.1. Enercon E-92 2.3 Noise Emission

Table 6 - Enercon E-92 2.3 MW noise emission data for 98 m hub height.

Wind speed at 10m a.g.l. (m/s)	SPL (LWA) (dB(A) re 10^{-12} Watts)	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
4	97.6	79.2	86.2	89.6	92.2	92.0	89.1	84.3	74.8
5	99.9	81.5	88.5	91.9	94.5	94.3	91.4	86.6	77.1
6	102.2	83.8	90.8	94.2	96.8	96.6	93.7	88.9	79.4
7	103.4	85.0	92.0	95.4	98.0	97.8	94.9	90.1	80.6
8	104.4	86.0	93.0	96.4	99.0	98.8	95.9	91.1	81.6
9	105.0	86.6	93.6	97.0	99.6	99.4	96.5	91.7	82.2
10	105.0	86.6	93.6	97.0	99.6	99.4	96.5	91.7	82.2
11	105.0	86.6	93.6	97.0	99.6	99.4	96.5	91.7	82.2
12	105.0	86.6	93.6	97.0	99.6	99.4	96.5	91.7	82.2

6.2. Enercon E-82 2.0 Noise Emission

Table 7 - Enercon E-82 2.0 MW noise emission data for 98 m hub height.

Wind speed at 10m a.g.l. (m/s)	SPL (LWA) (dB(A) re 10^{-12} Watts)	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
4	96.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	98.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	100.0	85.7	90.9	92.0	94.4	95.1	88.8	75.8	75.8
7	101.8	85.9	91.9	93.3	96.5	97.1	91.3	78.0	77.2
8	102.5	85.4	92.7	94.4	97.3	97.5	92.3	79.6	73.9
9	102.4	85.4	93.4	93.9	97.0	97.5	92.3	80.3	73.6
10	102.0	85.2	93.2	92.8	95.9	97.3	93.3	81.9	74.0
11	101.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	101.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7. Impact Assessment

7.1. Prediction Methodology

The SPL was calculated at each point of reception (listed in Table 2) using the Decibel module of WindPRO v.2.8 which uses the ISO 9613-2 model "Attenuation of sound during propagation outdoors, Part 2: A general method of calculation". The calculations were performed using the Enercon E-92 2.3 MW WTG and the Enercon E-82 2.0 MW WTG, both with a hub height of 98m. A global ground attenuation of zero was used; this is to represent a 'worst case scenario' that produces results that are unaffected by vegetation characteristics such as trees or grass etc. The WindPRO generated noise contour maps for the Enercon E-92 2.3 and Enercon E-82 2.0 MW, both with a 98m hub height, which can be found in Annex B and Annex C, respectively.

As another conservative measure, downwind propagation has been assumed to occur simultaneously in all directions and from all WTGs. Furthermore, no attenuation from topographical shielding (other buildings, barns, trees etc.) has been considered between the WTGs and receptors. In reality, noise propagation in an upwind direction would lead to a significant reduction of incident noise levels at receptors located in the upwind direction.

No correction for special audible characteristics such as clearly audible tones, impulses or modulation of sound levels has been made. These are not common characteristics of modern well designed WTGs. Furthermore, the absence of tonal noise is normally guaranteed by WTG manufacturers and impulses and modulation of sound levels from the wind farm under normal conditions would not be of a level to necessitate the application of any penalty.

A full list of parameters assumed for the predictions is provided in Annex B and Annex C for the Enercon E-92 2.3 and E-82 2.0 respectively.

7.2. Results of Noise Predictions

The results of the noise prediction model at each point of reception, as summarized in Table 8, prove compliance with the Ontario *Noise Guidelines for Wind Farms* and the 40 dB(A) conservative SPL emission limit. As the guideline requirements have been exceeded, it was deemed unnecessary to conduct noise monitoring to establish background noise levels.

The receptor with the highest perceived noise was receptor H for both the Enercon E-92 2.3 and Enercon E-82 2.0 MW, which received a maximum of 37.0 dB(A) and 35.1 dB(A) respectively.

The modelled noise results for a wind speed of 8 m/s, approximately the 'noisiest' operational speed of a WTG, in the form of a noise area plot is mapped in Annex B and Annex C for the Enercon E-92 2.3 and E-82 2.0 respectively. The receptor ID labels on the contour plot correspond with the WindPRO ID listed in Table 2.

Table 8 - Wind turbine noise impact assessment summary.

Receptor	Distance from WTG 1	Distance from WTG 2	Max Sound Pressure Level dB(A)	Max Sound Pressure Level dB(A)
A	2,008	2,209	28.7	27.8
B	1,967	2,184	28.9	28.0
C	1,957	2,138	29.1	28.1
D	1,844	2,082	29.6	28.6
E	1,809	2,046	29.8	28.8
F	1,895	2,068	29.5	28.5
G	1,838	2,031	29.8	28.8
H	1,879	2,053	29.6	28.6
I	1,817	2,006	29.9	28.9
J	1,782	1,985	30.1	29.1
K	1,801	1,977	30.0	29.0
L	1,789	1,969	30.1	29.1
M	1,740	1,938	30.4	29.4
N	1,761	1,939	30.3	29.3
O	1,632	1,831	31.1	30.1
P	1,656	1,839	31.0	30.0
Q	1,634	1,813	31.1	30.1
R	1,584	1,784	31.4	30.4
S	1,518	1,751	31.8	30.8
T	1,524	1,746	31.8	30.8
U	1,491	1,713	32.0	31.0
V	1,451	1,673	32.3	31.3
W	1,491	1,686	32.1	31.1
X	1,463	1,666	32.3	31.3
Y	1,454	1,652	32.3	31.3
Z	1,520	1,673	32.0	31.0
AA	1,418	1,607	32.6	31.6
AB	1,371	1,534	33.1	32.1
AC	1,051	1,229	35.8	34.8
AD	1,174	1,276	34.9	33.9
AE	1,099	1,209	35.6	34.6
AF	1,064	1,166	35.9	34.9
AG	1,104	1,090	36.1	35.1
AH	1,005	1,003	37.0	36.0
AI	1,140	1,085	35.9	34.9

Receptor	Distance from WTG 1	Distance from WTG 2	Max Sound Pressure Level dB(A)	Max Sound Pressure Level dB(A)
AJ	1,285	1,118	35.2	34.2
AK	1,247	1,061	35.7	34.7
AL	1,441	1,241	34.0	33.0
AM	1,563	1,354	33.0	32.0
AN	1,600	1,387	32.8	31.8
AO	1,635	1,417	32.5	31.5
AP	1,332	1,127	35.0	34.0
AQ	1,537	1,319	33.3	32.3
AR	1,646	1,422	32.5	31.5
AS	1,338	1,126	34.9	33.9
AT	1,641	1,412	32.5	31.5
AU	1,340	1,122	35.0	34.0
AV	1,576	1,347	33.0	32.0
AW	1,428	1,190	34.3	33.3
AX	1,439	1,189	34.3	33.3
AY	1,442	1,179	34.3	33.3
AZ	1,537	1,269	33.5	32.5
BA	1,559	1,273	33.5	32.5
BB	1,638	1,337	32.9	31.9
BC	1,743	1,413	32.3	31.3
BD	1,826	2,031	29.8	28.8
BE	1846	1514	31.5	30.5
BF	1816	1476	31.8	30.8
BG	1873	1523	31.4	30.5
BH	1954	1597	30.9	29.9
BI	2001	1641	30.6	29.6
BJ	2237	1866	29.2	28.2
BK	2087	1709	30.1	29.1
BL	2043	1664	30.4	29.4
BM	2140	1763	29.8	28.8
BN	2256	1879	29.1	28.1
BO	2106	1726	30.0	29.0
BP	2164	1785	29.7	28.7
BQ	1985	1609	30.8	29.8
BR	2167	1791	29.6	28.6
BS	2156	1782	29.7	28.7

8. Conclusions and Recommendations

Natural Forces Wind Inc. has completed a thorough assessment to evaluate the noise impact of the proposed Hillside Boularderie Wind Farm at receptors representing residential locations within 2,000 m of the proposed wind turbine generators. Based on the parameters used to run the WindPRO noise prediction model, it has been shown that the predicted sound pressure levels emitted by any of the proposed wind turbine generators are less than 40 dB(A) at the receptors, thus demonstrating compliance with the Ontario *Noise Guidelines for Wind Farms*. As a result of this study, no noise mitigation strategies are recommended.

9. References

Cape Breton Regional Municipality (2009). Land Use By-Law of the Cape Breton Regional Municipality. CBRM.

Enercon Canada (2012). *Enercon E-92 2.3 MW Wind Turbine Generator data sheet.*

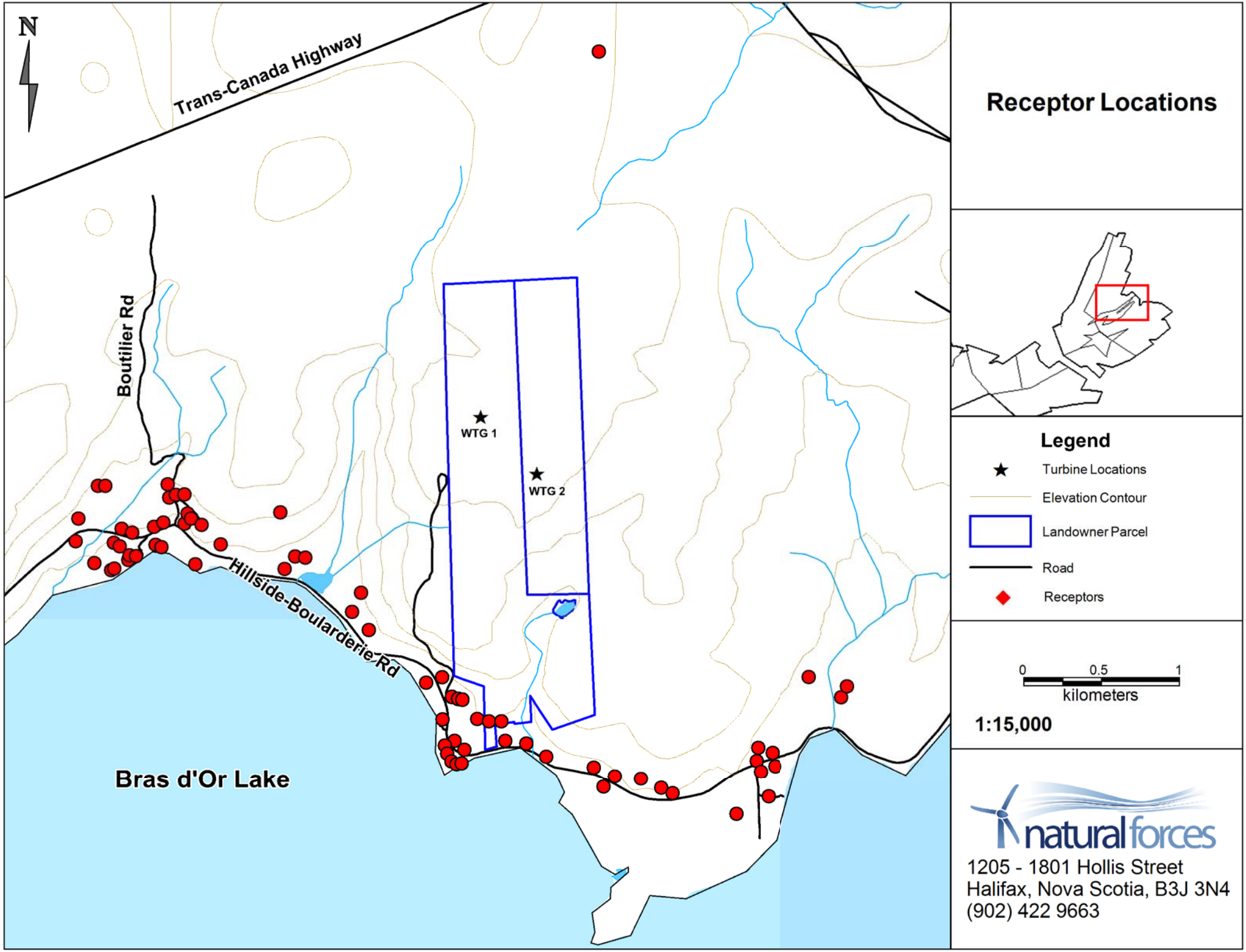
Enercon Canada (2012). *Enercon E-92 2.3 MW Wind Turbine Generator data sheet.*

International Organization for Standardization (1996). *ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*. WindPRO.

Ministry of the Environment (2008). *Noise guidelines for wind farms*. Ontario.

ANNEX A

Site Layout Map


N
Trans-Canada Highway
Boutilier Rd
WTG 1
WTG 2
Hillside-Boularderie Rd
Bras d'Or Lake
Receptor Locations
Legend
Turbine Locations
Elevation Contour
Landowner Parcel
Road
Receptors
0
0.5
1
kilometers
1:15,000
natural forces
1205 - 1801 Hollis Street
Halifax, Nova Scotia, B3J 3N4
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ANNEX B

WindPRO v2.8, Decibel Module Calculation Results

Enercon E-92 2.3 MW @ 98m Hub Height

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

Printed/Page
26/03/2013 10:54 AM / 1

Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

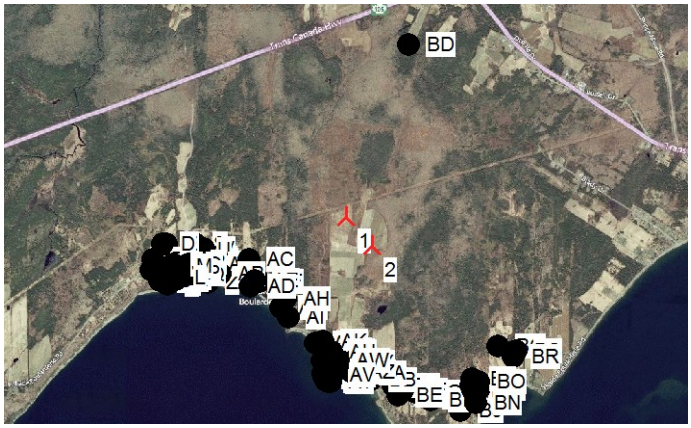
Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 10:51 AM/2.8.579

DECIBEL - Main Result

Calculation: Hillside_E92_receptors within 2km

Noise calculation model:
ISO 9613-2 General
Wind speed:
4.0 m/s - 12.0 m/s, step 1.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
4.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:75,000
New WTG
Noise sensitive area

WTGs

	UTM (north)-NAD83 (US+CA) Zone: 20 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]	
1	704,153	5,124,918	84.3	ENERCON E-92 2,3 MW 2300 ...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	EMD	Level 0 - calculated - Op.Mode I - 03/2012	4.0	97.6	12.0	105.0	0 dB g
2	704,419	5,124,646	90.6	ENERCON E-92 2,3 MW 2300 ...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	EMD	Level 0 - calculated - Op.Mode I - 03/2012	4.0	97.6	12.0	105.0	0 dB g

h) Generic octave distribution used
g) Data calculated from data for other wind speed (uncertain)

Calculation Results

Sound Level

Noise sensitive area No.	Name	UTM (north)-NAD83 (US+CA) Zone: 20 East	North	Z	Imission height	Demands Max Noise	Distance	Sound Level Max From WTGs	Demands fulfilled ? Noise	Distance	All
				[m]	[m]	[dB(A)]	[m]	[dB(A)]			
A	Noise sensitive point: User defined (43)	702,233	5,124,332	28.5	4.5	40.0	1000	28.7	Yes	Yes	Yes
B	Noise sensitive point: User defined (44)	702,245	5,124,439	35.4	4.5	40.0	1000	28.9	Yes	Yes	Yes
C	Noise sensitive point: User defined (45)	702,322	5,124,229	23.5	4.5	40.0	1000	29.1	Yes	Yes	Yes
D	Noise sensitive point: User defined (46)	702,338	5,124,594	41.8	4.5	40.0	1000	29.6	Yes	Yes	Yes
E	Noise sensitive point: User defined (47)	702,373	5,124,595	37.4	4.5	40.0	1000	29.8	Yes	Yes	Yes
F	Noise sensitive point: User defined (48)	702,401	5,124,196	13.7	4.5	40.0	1000	29.5	Yes	Yes	Yes
G	Noise sensitive point: User defined (49)	702,413	5,124,325	25.0	4.5	40.0	1000	29.8	Yes	Yes	Yes
H	Noise sensitive point: User defined (50)	702,415	5,124,204	13.5	4.5	40.0	1000	29.6	Yes	Yes	Yes
I	Noise sensitive point: User defined (51)	702,442	5,124,309	23.3	4.5	40.0	1000	29.9	Yes	Yes	Yes
J	Noise sensitive point: User defined (52)	702,450	5,124,392	25.3	4.5	40.0	1000	30.1	Yes	Yes	Yes
K	Noise sensitive point: User defined (53)	702,483	5,124,244	13.2	4.5	40.0	1000	30.0	Yes	Yes	Yes
L	Noise sensitive point: User defined (54)	702,487	5,124,266	17.0	4.5	40.0	1000	30.1	Yes	Yes	Yes
M	Noise sensitive point: User defined (55)	702,501	5,124,373	24.3	4.5	40.0	1000	30.4	Yes	Yes	Yes
N	Noise sensitive point: User defined (56)	702,519	5,124,262	13.8	4.5	40.0	1000	30.3	Yes	Yes	Yes
O	Noise sensitive point: User defined (57)	702,605	5,124,401	22.9	4.5	40.0	1000	31.1	Yes	Yes	Yes
P	Noise sensitive point: User defined (58)	702,611	5,124,315	12.6	4.5	40.0	1000	31.0	Yes	Yes	Yes
Q	Noise sensitive point: User defined (59)	702,639	5,124,305	10.3	4.5	40.0	1000	31.1	Yes	Yes	Yes
R	Noise sensitive point: User defined (60)	702,649	5,124,422	22.9	4.5	40.0	1000	31.4	Yes	Yes	Yes
S	Noise sensitive point: User defined (61)	702,668	5,124,603	34.0	4.5	40.0	1000	31.8	Yes	Yes	Yes
T	Noise sensitive point: User defined (62)	702,677	5,124,540	33.2	4.5	40.0	1000	31.8	Yes	Yes	Yes
U	Noise sensitive point: User defined (63)	702,708	5,124,552	33.8	4.5	40.0	1000	32.0	Yes	Yes	Yes
V	Noise sensitive point: User defined (64)	702,749	5,124,554	33.7	4.5	40.0	1000	32.3	Yes	Yes	Yes

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

Printed/Page
26/03/2013 10:54 AM / 2
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca
Calculated:
26/03/2013 10:51 AM/2.8.579

DECIBEL - Main Result

Calculation: Hillside_E92_receptors within 2km

...continued from previous page

Noise sensitive area		UTM (north)-NAD83 (US+CA) Zone: 20				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z	Imission height	Max Noise	Distance	Max From WTGs	Noise	Distance	All
				[m]	[m]	[dB(A)]	[m]	[dB(A)]			
W	Noise sensitive point: User defined (65)	702,749	5,124,416	23.4	4.5	40.0	1000	32.1	Yes	Yes	Yes
X	Noise sensitive point: User defined (66)	702,763	5,124,463	29.1	4.5	40.0	1000	32.3	Yes	Yes	Yes
Y	Noise sensitive point: User defined (67)	702,779	5,124,440	28.9	4.5	40.0	1000	32.3	Yes	Yes	Yes
Z	Noise sensitive point: User defined (68)	702,800	5,124,224	8.7	4.5	40.0	1000	32.0	Yes	Yes	Yes
AA	Noise sensitive point: User defined (69)	702,829	5,124,411	31.3	4.5	40.0	1000	32.6	Yes	Yes	Yes
AB	Noise sensitive point: User defined (70)	702,921	5,124,318	25.1	4.5	40.0	1000	33.1	Yes	Yes	Yes
AC	Noise sensitive point: User defined (71)	703,203	5,124,469	42.5	4.5	40.0	1000	35.8	Yes	Yes	Yes
AD	Noise sensitive point: User defined (72)	703,223	5,124,201	7.1	4.5	40.0	1000	34.9	Yes	Yes	Yes
AE	Noise sensitive point: User defined (73)	703,273	5,124,261	10.8	4.5	40.0	1000	35.6	Yes	Yes	Yes
AF	Noise sensitive point: User defined (74)	703,321	5,124,255	9.8	4.5	40.0	1000	35.9	Yes	Yes	Yes
AG	Noise sensitive point: User defined (75)	703,543	5,123,998	12.8	4.5	40.0	1000	36.1	Yes	Yes	Yes
AH	Noise sensitive point: User defined (76)	703,586	5,124,088	24.7	4.5	40.0	1000	37.0	Yes	Yes	Yes
AI	Noise sensitive point: User defined (77)	703,623	5,123,909	16.9	4.5	40.0	1000	35.9	Yes	Yes	Yes
AJ	Noise sensitive point: User defined (78)	703,893	5,123,660	9.1	4.5	40.0	1000	35.2	Yes	Yes	Yes
AK	Noise sensitive point: User defined (79)	703,970	5,123,685	26.2	4.5	40.0	1000	35.7	Yes	Yes	Yes
AL	Noise sensitive point: User defined (80)	703,972	5,123,489	5.1	4.5	40.0	1000	34.0	Yes	Yes	Yes
AM	Noise sensitive point: User defined (81)	703,982	5,123,364	4.2	4.5	40.0	1000	33.0	Yes	Yes	Yes
AN	Noise sensitive point: User defined (82)	703,993	5,123,326	3.3	4.5	40.0	1000	32.8	Yes	Yes	Yes
AO	Noise sensitive point: User defined (83)	704,013	5,123,289	2.3	4.5	40.0	1000	32.5	Yes	Yes	Yes
AP	Noise sensitive point: User defined (84)	704,016	5,123,593	17.0	4.5	40.0	1000	35.0	Yes	Yes	Yes
AQ	Noise sensitive point: User defined (85)	704,028	5,123,386	7.2	4.5	40.0	1000	33.3	Yes	Yes	Yes
AR	Noise sensitive point: User defined (86)	704,038	5,123,276	2.0	4.5	40.0	1000	32.5	Yes	Yes	Yes
AS	Noise sensitive point: (87)	704,045	5,123,584	2.0	4.5	40.0	1000	34.9	Yes	Yes	Yes
AT	Noise sensitive point: User defined (88)	704,062	5,123,279	2.0	4.5	40.0	1000	32.5	Yes	Yes	Yes
AU	Noise sensitive point: User defined (89)	704,066	5,123,581	21.3	4.5	40.0	1000	35.0	Yes	Yes	Yes
AV	Noise sensitive point: User defined (90)	704,075	5,123,344	4.9	4.5	40.0	1000	33.0	Yes	Yes	Yes
AW	Noise sensitive point: User defined (91)	704,135	5,123,490	15.8	4.5	40.0	1000	34.3	Yes	Yes	Yes
AX	Noise sensitive point: User defined (92)	704,191	5,123,479	15.7	4.5	40.0	1000	34.3	Yes	Yes	Yes
AY	Noise sensitive point: User defined (93)	704,251	5,123,479	16.6	4.5	40.0	1000	34.3	Yes	Yes	Yes
AZ	Noise sensitive point: User defined (94)	704,269	5,123,386	5.7	4.5	40.0	1000	33.5	Yes	Yes	Yes
BA	Noise sensitive point: User defined (95)	704,368	5,123,374	7.7	4.5	40.0	1000	33.5	Yes	Yes	Yes
BB	Noise sensitive point: User defined (96)	704,462	5,123,310	12.5	4.5	40.0	1000	32.9	Yes	Yes	Yes
BC	Noise sensitive point: User defined (97)	704,688	5,123,259	20.9	4.5	40.0	1000	32.3	Yes	Yes	Yes
BD	Noise sensitive point: User defined (98)	704,712	5,126,656	76.1	4.5	40.0	1000	29.8	Yes	Yes	Yes
BE	Noise sensitive point: User defined (99)	704,735	5,123,166	13.9	4.5	40.0	1000	31.5	Yes	Yes	Yes
BF	Noise sensitive point: User defined (100)	704,788	5,123,217	21.7	4.5	40.0	1000	31.8	Yes	Yes	Yes
BG	Noise sensitive point: User defined (101)	704,911	5,123,205	28.4	4.5	40.0	1000	31.4	Yes	Yes	Yes
BH	Noise sensitive point: User defined (102)	705,007	5,123,161	25.9	4.5	40.0	1000	30.9	Yes	Yes	Yes
BI	Noise sensitive point: User defined (103)	705,062	5,123,136	22.3	4.5	40.0	1000	30.6	Yes	Yes	Yes
BJ	Noise sensitive point: User defined (104)	705,365	5,123,038	12.2	4.5	40.0	1000	29.2	Yes	Yes	Yes
BK	Noise sensitive point: User defined (105)	705,461	5,123,291	14.7	4.5	40.0	1000	30.1	Yes	Yes	Yes
BL	Noise sensitive point: User defined (106)	705,468	5,123,354	19.4	4.5	40.0	1000	30.4	Yes	Yes	Yes
BM	Noise sensitive point: User defined (107)	705,480	5,123,239	11.5	4.5	40.0	1000	29.8	Yes	Yes	Yes
BN	Noise sensitive point: User defined (108)	705,517	5,123,121	6.5	4.5	40.0	1000	29.1	Yes	Yes	Yes
BO	Noise sensitive point: User defined (109)	705,536	5,123,330	11.3	4.5	40.0	1000	30.0	Yes	Yes	Yes
BP	Noise sensitive point: User defined (110)	705,549	5,123,264	7.6	4.5	40.0	1000	29.7	Yes	Yes	Yes
BQ	Noise sensitive point: User defined (111)	705,713	5,123,690	18.4	4.5	40.0	1000	30.8	Yes	Yes	Yes
BR	Noise sensitive point: User defined (112)	705,867	5,123,593	11.3	4.5	40.0	1000	29.6	Yes	Yes	Yes
BS	Noise sensitive point: User defined (113)	705,894	5,123,646	13.8	4.5	40.0	1000	29.7	Yes	Yes	Yes

ANNEX C

WindPRO v2.8, Decibel Module Calculation Results

Enercon E-82 2.0 MW @ 98m Hub Height

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

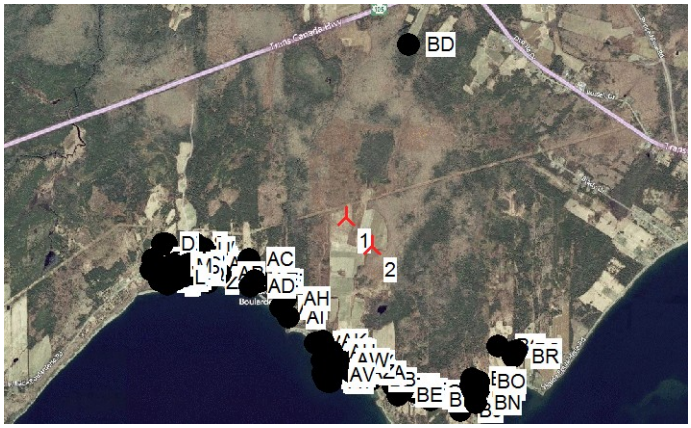
Printed/Page
26/03/2013 11:09 AM / 1
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca
Calculated:
26/03/2013 11:08 AM/2.8.579

DECIBEL - Main Result

Calculation: Hillside_E82_receptors within 2km

Noise calculation model:
ISO 9613-2 General
Wind speed:
4.0 m/s - 12.0 m/s, step 1.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
4.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:75,000
New WTG
Noise sensitive area

WTGs

	UTM (north)-NAD83 (US+CA) Zone: 20				WTG type						Noise data							
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones	
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]		
1	704,153	5,124,918	84.3	ENERCON E-82 2000 82.0 !O! ...	Yes	ENERCON	E-82-2,000	2,000	82.0	98.3	EMD	Level 0 - guaranteed - OM I/ Rev. 2.1 - 04/2006	4.0	97.6	12.0	104.0	0 dB	g
2	704,419	5,124,646	90.6	ENERCON E-82 2000 82.0 !O! ...	Yes	ENERCON	E-82-2,000	2,000	82.0	98.3	EMD	Level 0 - guaranteed - OM I/ Rev. 2.1 - 04/2006	4.0	97.6	12.0	104.0	0 dB	g

h) Generic octave distribution used
g) Data calculated from data for other wind speed (uncertain)

Calculation Results

Sound Level

Noise sensitive area		UTM (north)-NAD83 (US+CA) Zone: 20			Demands			Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z	Imission height	Max Noise	Distance	Max From WTGs	Noise	Distance	All
				[m]	[m]	[dB(A)]	[m]	[dB(A)]			
A	Noise sensitive point: User defined (43)	702,233	5,124,332	28.5	4.5	40.0	1000	27.8	Yes	Yes	Yes
B	Noise sensitive point: User defined (44)	702,245	5,124,439	35.4	4.5	40.0	1000	28.0	Yes	Yes	Yes
C	Noise sensitive point: User defined (45)	702,322	5,124,229	23.5	4.5	40.0	1000	28.1	Yes	Yes	Yes
D	Noise sensitive point: User defined (46)	702,338	5,124,594	41.8	4.5	40.0	1000	28.6	Yes	Yes	Yes
E	Noise sensitive point: User defined (47)	702,373	5,124,595	37.4	4.5	40.0	1000	28.8	Yes	Yes	Yes
F	Noise sensitive point: User defined (48)	702,401	5,124,196	13.7	4.5	40.0	1000	28.5	Yes	Yes	Yes
G	Noise sensitive point: User defined (49)	702,413	5,124,325	25.0	4.5	40.0	1000	28.8	Yes	Yes	Yes
H	Noise sensitive point: User defined (50)	702,415	5,124,204	13.5	4.5	40.0	1000	28.6	Yes	Yes	Yes
I	Noise sensitive point: User defined (51)	702,442	5,124,309	23.3	4.5	40.0	1000	28.9	Yes	Yes	Yes
J	Noise sensitive point: User defined (52)	702,450	5,124,392	25.3	4.5	40.0	1000	29.1	Yes	Yes	Yes
K	Noise sensitive point: User defined (53)	702,483	5,124,244	13.2	4.5	40.0	1000	29.0	Yes	Yes	Yes
L	Noise sensitive point: User defined (54)	702,487	5,124,266	17.0	4.5	40.0	1000	29.1	Yes	Yes	Yes
M	Noise sensitive point: User defined (55)	702,501	5,124,373	24.3	4.5	40.0	1000	29.4	Yes	Yes	Yes
N	Noise sensitive point: User defined (56)	702,519	5,124,262	13.8	4.5	40.0	1000	29.3	Yes	Yes	Yes
O	Noise sensitive point: User defined (57)	702,605	5,124,401	22.9	4.5	40.0	1000	30.1	Yes	Yes	Yes
P	Noise sensitive point: User defined (58)	702,611	5,124,315	12.6	4.5	40.0	1000	30.0	Yes	Yes	Yes
Q	Noise sensitive point: User defined (59)	702,639	5,124,305	10.3	4.5	40.0	1000	30.1	Yes	Yes	Yes
R	Noise sensitive point: User defined (60)	702,649	5,124,422	22.9	4.5	40.0	1000	30.4	Yes	Yes	Yes
S	Noise sensitive point: User defined (61)	702,668	5,124,603	34.0	4.5	40.0	1000	30.8	Yes	Yes	Yes
T	Noise sensitive point: User defined (62)	702,677	5,124,540	33.2	4.5	40.0	1000	30.8	Yes	Yes	Yes
U	Noise sensitive point: User defined (63)	702,708	5,124,552	33.8	4.5	40.0	1000	31.0	Yes	Yes	Yes
V	Noise sensitive point: User defined (64)	702,749	5,124,554	33.7	4.5	40.0	1000	31.3	Yes	Yes	Yes

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

Printed/Page
26/03/2013 11:09 AM / 2
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca
Calculated:
26/03/2013 11:08 AM/2.8.579

DECIBEL - Main Result

Calculation: Hillside_E82_receptors within 2km

...continued from previous page

Noise sensitive area		UTM (north)-NAD83 (US+CA) Zone: 20				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z	Imission height	Max Noise	Distance	Max From WTGs	Noise	Distance	All
				[m]	[m]	[dB(A)]	[m]	[dB(A)]			
W	Noise sensitive point: User defined (65)	702,749	5,124,416	23.4	4.5	40.0	1000	31.1	Yes	Yes	Yes
X	Noise sensitive point: User defined (66)	702,763	5,124,463	29.1	4.5	40.0	1000	31.3	Yes	Yes	Yes
Y	Noise sensitive point: User defined (67)	702,779	5,124,440	28.9	4.5	40.0	1000	31.3	Yes	Yes	Yes
Z	Noise sensitive point: User defined (68)	702,800	5,124,224	8.7	4.5	40.0	1000	31.0	Yes	Yes	Yes
AA	Noise sensitive point: User defined (69)	702,829	5,124,411	31.3	4.5	40.0	1000	31.6	Yes	Yes	Yes
AB	Noise sensitive point: User defined (70)	702,921	5,124,318	25.1	4.5	40.0	1000	32.1	Yes	Yes	Yes
AC	Noise sensitive point: User defined (71)	703,203	5,124,469	42.5	4.5	40.0	1000	34.8	Yes	Yes	Yes
AD	Noise sensitive point: User defined (72)	703,223	5,124,201	7.1	4.5	40.0	1000	33.9	Yes	Yes	Yes
AE	Noise sensitive point: User defined (73)	703,273	5,124,261	10.8	4.5	40.0	1000	34.6	Yes	Yes	Yes
AF	Noise sensitive point: User defined (74)	703,321	5,124,255	9.8	4.5	40.0	1000	34.9	Yes	Yes	Yes
AG	Noise sensitive point: User defined (75)	703,543	5,123,998	12.8	4.5	40.0	1000	35.1	Yes	Yes	Yes
AH	Noise sensitive point: User defined (76)	703,586	5,124,088	24.7	4.5	40.0	1000	36.0	Yes	Yes	Yes
AI	Noise sensitive point: User defined (77)	703,623	5,123,909	16.9	4.5	40.0	1000	34.9	Yes	Yes	Yes
AJ	Noise sensitive point: User defined (78)	703,893	5,123,660	9.1	4.5	40.0	1000	34.2	Yes	Yes	Yes
AK	Noise sensitive point: User defined (79)	703,970	5,123,685	26.2	4.5	40.0	1000	34.7	Yes	Yes	Yes
AL	Noise sensitive point: User defined (80)	703,972	5,123,489	5.1	4.5	40.0	1000	33.0	Yes	Yes	Yes
AM	Noise sensitive point: User defined (81)	703,982	5,123,364	4.2	4.5	40.0	1000	32.0	Yes	Yes	Yes
AN	Noise sensitive point: User defined (82)	703,993	5,123,326	3.3	4.5	40.0	1000	31.8	Yes	Yes	Yes
AO	Noise sensitive point: User defined (83)	704,013	5,123,289	2.3	4.5	40.0	1000	31.5	Yes	Yes	Yes
AP	Noise sensitive point: User defined (84)	704,016	5,123,593	17.0	4.5	40.0	1000	34.0	Yes	Yes	Yes
AQ	Noise sensitive point: User defined (85)	704,028	5,123,386	7.2	4.5	40.0	1000	32.3	Yes	Yes	Yes
AR	Noise sensitive point: User defined (86)	704,038	5,123,276	2.0	4.5	40.0	1000	31.5	Yes	Yes	Yes
AS	Noise sensitive point: (87)	704,045	5,123,584	2.0	4.5	40.0	1000	33.9	Yes	Yes	Yes
AT	Noise sensitive point: User defined (88)	704,062	5,123,279	2.0	4.5	40.0	1000	31.5	Yes	Yes	Yes
AU	Noise sensitive point: User defined (89)	704,066	5,123,581	21.3	4.5	40.0	1000	34.0	Yes	Yes	Yes
AV	Noise sensitive point: User defined (90)	704,075	5,123,344	4.9	4.5	40.0	1000	32.0	Yes	Yes	Yes
AW	Noise sensitive point: User defined (91)	704,135	5,123,490	15.8	4.5	40.0	1000	33.3	Yes	Yes	Yes
AX	Noise sensitive point: User defined (92)	704,191	5,123,479	15.7	4.5	40.0	1000	33.3	Yes	Yes	Yes
AY	Noise sensitive point: User defined (93)	704,251	5,123,479	16.6	4.5	40.0	1000	33.3	Yes	Yes	Yes
AZ	Noise sensitive point: User defined (94)	704,269	5,123,386	5.7	4.5	40.0	1000	32.5	Yes	Yes	Yes
BA	Noise sensitive point: User defined (95)	704,368	5,123,374	7.7	4.5	40.0	1000	32.5	Yes	Yes	Yes
BB	Noise sensitive point: User defined (96)	704,462	5,123,310	12.5	4.5	40.0	1000	31.9	Yes	Yes	Yes
BC	Noise sensitive point: User defined (97)	704,688	5,123,259	20.9	4.5	40.0	1000	31.3	Yes	Yes	Yes
BD	Noise sensitive point: User defined (98)	704,712	5,126,656	76.1	4.5	40.0	1000	28.8	Yes	Yes	Yes
BE	Noise sensitive point: User defined (99)	704,735	5,123,166	13.9	4.5	40.0	1000	30.5	Yes	Yes	Yes
BF	Noise sensitive point: User defined (100)	704,788	5,123,217	21.7	4.5	40.0	1000	30.8	Yes	Yes	Yes
BG	Noise sensitive point: User defined (101)	704,911	5,123,205	28.4	4.5	40.0	1000	30.5	Yes	Yes	Yes
BH	Noise sensitive point: User defined (102)	705,007	5,123,161	25.9	4.5	40.0	1000	29.9	Yes	Yes	Yes
BI	Noise sensitive point: User defined (103)	705,062	5,123,136	22.3	4.5	40.0	1000	29.6	Yes	Yes	Yes
BJ	Noise sensitive point: User defined (104)	705,365	5,123,038	12.2	4.5	40.0	1000	28.2	Yes	Yes	Yes
BK	Noise sensitive point: User defined (105)	705,461	5,123,291	14.7	4.5	40.0	1000	29.1	Yes	Yes	Yes
BL	Noise sensitive point: User defined (106)	705,468	5,123,354	19.4	4.5	40.0	1000	29.4	Yes	Yes	Yes
BM	Noise sensitive point: User defined (107)	705,480	5,123,239	11.5	4.5	40.0	1000	28.8	Yes	Yes	Yes
BN	Noise sensitive point: User defined (108)	705,517	5,123,121	6.5	4.5	40.0	1000	28.1	Yes	Yes	Yes
BO	Noise sensitive point: User defined (109)	705,536	5,123,330	11.3	4.5	40.0	1000	29.0	Yes	Yes	Yes
BP	Noise sensitive point: User defined (110)	705,549	5,123,264	7.6	4.5	40.0	1000	28.7	Yes	Yes	Yes
BQ	Noise sensitive point: User defined (111)	705,713	5,123,690	18.4	4.5	40.0	1000	29.8	Yes	Yes	Yes
BR	Noise sensitive point: User defined (112)	705,867	5,123,593	11.3	4.5	40.0	1000	28.6	Yes	Yes	Yes
BS	Noise sensitive point: User defined (113)	705,894	5,123,646	13.8	4.5	40.0	1000	28.7	Yes	Yes	Yes

Appendix H:

Shadow Flicker Assessment

Hillside Boularderie Wind Farm
Shadow Flicker Assessment Report
March 2013

Natural Forces Wind Inc.
1801 Hollis Street Suite 1205
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Report Information

Client	Natural Forces Wind Inc.
Client Contact	Chris Veinot
Report Name	HIL_shadow flicker assessment
Created By	Chris Veinot
Signature	

** The WindPRO v2.8, Decibel Module Calculation Results for the Enercon E-92 2.3 MW and Enercon E-82 2.0 MW @ 98m Hub Height. To review General Specification for the Enercon E-92 2.3 MW and E-82 2.0 MW please contact:

Chris Veinot, Development Officer
Natural Forces Wind Inc.
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Halifax Nova Scotia B3J 3L1
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Fax: 902 422 9780
Contact email: cveinot@naturalforces.ca

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1. Introduction

Natural Forces Wind Inc. has undertaken a shadow flicker impact assessment for the proposed Hillside Boularderie Wind Farm to assess the potential impact of shadow flicker on the surrounding shadow receptors. Details outlining the shadow receptors, prediction methodology and assumptions made for the assessment are included herein, with complete WindPRO results supplied in the annexes. This report also provides background information on shadow flicker.

As there are very few federal, provincial or municipal guidelines or policies for governing or quantifying what is an acceptable amount of shadow flicker at this time, the German standards, *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergianlagen*, have been adopted for this study. Often, careful site design in the first instance is recommended, followed by industry accepted mitigation strategies thereafter. This assessment will be used as supporting documentation to demonstrate compliance with these standards. The shadow flicker analysis was conducted using the Shadow module of the software package, WindPRO version 2.8.

2. Background

Flicker is caused by incident light rays on a moving object which then casts an intermittent shadow on a receptor. This intermittent shadow, perceived as a change in light intensity to an observer, as it pertains to wind turbines, is referred to as shadow flicker. Shadow flicker is caused by incident sun rays on the rotor blades as they turn.

For shadow flicker to occur, the following criteria must be met:

1. The sun must be shining and not obscured by any cloud cover.
2. The wind turbine must be between the sun and the shadow receptor.
3. The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, buildings, awnings etc., will prevent shadow flicker from occurring at the receptor.
4. The shadow receptor has to be close enough to the turbine to be in the shadow.

3. Policy and Guidelines

As previously stated, there are very few federal, provincial or municipal guidelines or policies for governing or quantifying what is an acceptable amount of shadow flicker. As a result, the German standards have been adopted for this study. The German shadow flicker guidelines provide a means of quantifying acceptable levels of shadow flicker exposure based on the astronomic worst case. Acceptable levels at shadow receptors are:

- no more than 30 hours per year of astronomical maximum shadow (worst case), and
- no more than 30 minutes on the worst day of astronomical maximum shadow (worst case).

The guidelines also stipulate two factors that limit the shadow flicker effect, due to optic conditions in the atmosphere:

1) the angle of the sun over the horizon, which must be at least 3 degrees, and
2) the blade of the WTG must cover at least 20 % of the sun.

Receptors not exposed to more than 30 minutes per day on the worst affected day or a total of 30 hours per year from all surrounding wind turbines are considered unlikely to require technical mitigation.

4. General Description of Project Site and Surrounds

The proposed Hillside Boularderie Wind Farm consists of two wind turbine generators (WTGs) located in the Cape Breton Regional Municipality, Nova Scotia. Currently, Enercon E-92 2.0 MW and Enercon E-82 2.0MW WTG types are being considered for the project. The project site is approximately 8 kilometers (km) North West of North Sydney and adjacent to the Hillside Boularderie Road. Land around the proposed project area is zoned as a General Zone and so, will not require re-zoning. A map of the site and receptors is included in Annex A.

5. Description of Receptors

The 71 points of reception taken into consideration for this noise impact assessment are residential buildings and/or seasonal homes located within 2,000 metres (m) of the nearest proposed WTG. Every dwelling within the 2,000 m buffer is represented by a receptor. It should be noted that there are no residential buildings and/or seasonal homes located within 1,000m of the turbines. Details of receptor locations and distances to nearest WTG are detailed in Table 1. Receptor IDs included in Table 1correspond with the WindPRO generated maps included in Annex B and Annex C.

Table 1: Description of receptors.

No.	Easting	Northing	Distance from WTG 1	Distance from WTG 2
A	702,233	5,124,332	2,008	2,209
B	702,245	5,124,439	1,967	2,184
C	702,322	5,124,229	1,957	2,138
D	702,338	5,124,594	1,844	2,082
E	702,373	5,124,595	1,809	2,046
F	702,401	5,124,196	1,895	2,068
G	702,413	5,124,325	1,838	2,031
H	702,415	5,124,204	1,879	2,053
I	702,442	5,124,309	1,817	2,006
J	702,450	5,124,392	1,782	1,985
K	702,483	5,124,244	1,801	1,977
L	702,487	5,124,266	1,789	1,969
M	702,501	5,124,373	1,740	1,938
N	702,519	5,124,262	1,761	1,939
O	702,605	5,124,401	1,632	1,831
P	702,611	5,124,315	1,656	1,839
Q	702,639	5,124,305	1,634	1,813
R	702,649	5,124,422	1,584	1,784
S	702,668	5,124,603	1,518	1,751
T	702,677	5,124,540	1,524	1,746
U	702,708	5,124,552	1,491	1,713
V	702,749	5,124,554	1,451	1,673
W	702,749	5,124,416	1,491	1,686
X	702,763	5,124,463	1,463	1,666
Y	702,779	5,124,440	1,454	1,652
Z	702,800	5,124,224	1,520	1,673
AA	702,829	5,124,411	1,418	1,607
AB	702,921	5,124,318	1,371	1,534
AC	703,203	5,124,469	1,051	1,229
AD	703,223	5,124,201	1,174	1,276

AE	703,273	5,124,261	1,099	1,209
AF	703,321	5,124,255	1,064	1,166
AG	703,543	5,123,998	1,104	1,090
AH	703,586	5,124,088	1,005	1,003
AI	703,623	5,123,909	1,140	1,085
AJ	703,893	5,123,660	1,285	1,118
AK	703,970	5,123,685	1,247	1,061
AL	703,972	5,123,489	1,441	1,241
AM	703,982	5,123,364	1,563	1,354
AN	703,993	5,123,326	1,600	1,387
AO	704,013	5,123,289	1,635	1,417
AP	704,016	5,123,593	1,332	1,127
AQ	704,028	5,123,386	1,537	1,319
AR	704,038	5,123,276	1,646	1,422
AS	704,045	5,123,584	1,338	1,126
AT	704,062	5,123,279	1,641	1,412
AU	704,066	5,123,581	1,340	1,122
AV	704,075	5,123,344	1,576	1,347
AW	704,135	5,123,490	1,428	1,190
AX	704,191	5,123,479	1,439	1,189
AY	704,251	5,123,479	1,442	1,179
AZ	704,269	5,123,386	1,537	1,269
BA	704,368	5,123,374	1,559	1,273
BB	704,462	5,123,310	1,638	1,337
BC	704,688	5,123,259	1,743	1,413
BD	704,712	5,126,656	1,826	2,031
BE	704,735	5,123,166	1846	1514
BF	704,788	5,123,217	1816	1476
BG	704,911	5,123,205	1873	1523
BH	705,007	5,123,161	1954	1597
BI	705,062	5,123,136	2001	1641
BJ	705,365	5,123,038	2237	1866
BK	705,461	5,123,291	2087	1709
BL	705,468	5,123,354	2043	1664
BM	705,480	5,123,239	2140	1763
BN	705,517	5,123,121	2256	1879
BO	705,536	5,123,330	2106	1726
BP	705,549	5,123,264	2164	1785
BQ	705,713	5,123,690	1985	1609
BR	705,867	5,123,593	2167	1791
BS	705,894	5,123,646	2156	1782

6. Description of Sources

6.1. Turbine Locations

A map of the project area with the proposed WTG layout is illustrated in Annex A. There one proposed wind farm project within 10 kilometers the project, in Point Aconi. The project is located approximately 9 km away, thus there is no need to include cumulative shadow flicker impact. UTM coordinates of the wind turbines are given below in Table 2. Turbine ID numbers included in Table 2 correspond with the labels on the map in Annex A as well as with the WindPRO generated figures included Annex B and Annex C.

Table 2: Coordinates of proposed turbine locations.

Wind Turbine ID Number	Proposed Turbine Location (UTM Zone 20, NAD 83)	
	Easting	Northing
1	704,153	5,124,918
2	704,419	5,124,646

6.2. Turbine Types

The models of WTGs being considered for the proposed wind farm are the Enercon E-92 2.0 MW and Enercon E-82 2.0 WM. The Enercon E-92 2.3 MW is being used to represent the Enercon E-92 2.0 MW in this assessment for modelling purposes as data for the E-92 2.0 MW is not currently available. This is acceptable because the 2.3 MW turbines and 2.0 MW turbines are very similar as the only mechanical difference would be one less power conversion cabinet, which would not affect the WTGs capacity to produce shadows. By using the E-92 2.3 MW WTG in the model the calculations are represent a conservative result. (Enercon Canada, 2012)

This model utilizes horizontal axis, 3-bladed design and a microprocessor pitch control system (Enercon Canada, 2012). Table 3 and Table 4 below outline the WTGs' main characteristics.

Table 3: E-92 2.3 MW turbine characteristics (Enercon Canada, 2012).

WTG Type	Rotor Diameter (m)	Hub Height (m)	Rated Output (MW)	Swept Area (m^2)
E-92 2.0	92.0	98.0	2.0 or 2.3	6,648

Table 4: E-92 2.0 MW turbine characteristics (Enercon Canada, 2012).

WTG Type	Rotor Diameter (m)	Hub Height (m)	Rated Output (MW)	Swept Area (m^2)
E-82-2.0	82.0	98.0	2.0	5,281

7. Impact Assessment

7.1. Prediction Methodology

The shadow flicker impact was calculated at each receptor using the Shadow module of the software package, WindPRO version 2.8. The model simulates the Earth's orbit and rotation, to provide the astronomical maximum shadow, also known as the astronomical worst-case scenario. The astronomical maximum shadow calculation assumes that for every day of the year:

1. The sky is cloudless between sunrise and sunset,
2. The turbines are always in operation, and
3. The wind direction changes throughout the day such that the rotor plane is perpendicular to the incident sun rays at all times.

The position of the sun relative to the wind turbine rotor plane and the resulting shadow is calculated in steps of one minute intervals throughout a complete year. If the rotor plane, assumed to be a solid disk equivalent in size to the swept area shown in Table 3 and Table 4 casts a shadow on a receptor window during one of these intervals, it is registered as one minute of potential shadow impact.

As previously noted, following the German guidelines, the impact of shadow flicker on surrounding receptors is limited by two factors. The first being that the angle of the sun over the horizon must be greater than 3 degrees, due to optic conditions in the atmosphere which cause the shadow to dissipate before it could potentially reach a receptor. The second is that the blade of the wind turbine must cover at least 20% of the incident solar rays in order to have a noticeable effect. Distances from WTGs to receptors are shown in Table 1, where it can be seen that the closest residence to a WTG is 1,003m.

Each receptor was treated as a 'greenhouse' with 3m high windows for 360° of the building. Furthermore, no topographical shielding (other buildings, barns, trees etc.) has been considered between the wind turbines and receptors. This is a worst-case assumption and results in a conservative prediction of the potential shadow flicker impacts.

Table 5 provides results of the analysis for shadow flicker at each of the 71 receptors used in this assessment.

7.2. Results of Shadow Flicker Predictions

The results of the shadow flicker prediction model at each receptor, as summarized Table 5, prove compliance with the German standards of no more than 30 hours per year of astronomical maximum shadow (worst case), and no more than 30 minutes on the worst day of astronomical maximum shadow (worst case). Furthermore, some receptors within 2,000 km of the closest WTGs will not encounter any shadow flicker impacts.

While all receptors are subject to less than 30hrs/year or 30mins/day, the worst affected receptors are E, F and G on Hillside Boularderie Road. Tabulated results for the Enercon E-92 2.3 MW can be found in Table 5, while modelled results representing shadow flicker hours per year and WindPRO generated shadow flicker calendars are mapped in Annex B and C for both the E-92 2.3 MW and E-82 2.0 MW WTGs respectively.

Table 5: Predicted shadown flicker for E-92 2.3 MW @ 98 m hub height.

Receptor	Shadow		
	hr/year	days/year	hours/day
A	0:00	0	0:00
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	0:00	0	0:00
F	0:00	0	0:00
G	0:00	0	0:00
H	0:00	0	0:00
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	0:00	0	0:00
M	0:00	0	0:00
N	0:00	0	0:00
O	0:00	23	0:14
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	24	0:14
S	3:15	20	0:15
T	3:20	22	0:15
U	3:29	23	0:16
V	3:39	24	0:16
W	0:00	0	0:00
X	4:06	25	0:16
Y	4:19	27	0:16
Z	10:25	63	0:16
AA	0:00	20	0:14
AB	12:13	74	0:17
AC	23:14	98	0:23
AD	6:40	36	0:18
AE	6:46	35	0:19
AF	7:57	39	0:20
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00
AK	0:00	0	0:00

Receptor	Shadow		
	hr/year	days/year	hours/day
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00
BQ	0:00	0	0:00
BR	0:00	0	0:00
BS	0:00	0	0:00

8. Conclusions and Recommendations

Natural Forces Wind Inc. has completed a thorough assessment to evaluate the astronomical worst case shadow flicker impact of the proposed Hillside Boularderie Wind Farm at receptor locations within 2,000 m of a proposed wind turbine generator. Based on the parameters used to run the shadow flicker prediction model via WindPRO, it has been shown that the predicted duration of shadow flicker emitted by the wind turbine generators at all points of reception is significantly less than the German guidelines, adopted for this assessment. As a result of this study, no mitigation strategies are recommended.

9. References

Enercon Canada (2012). *Enercon E-92 2.3 MW Wind Turbine Generator data sheet.*

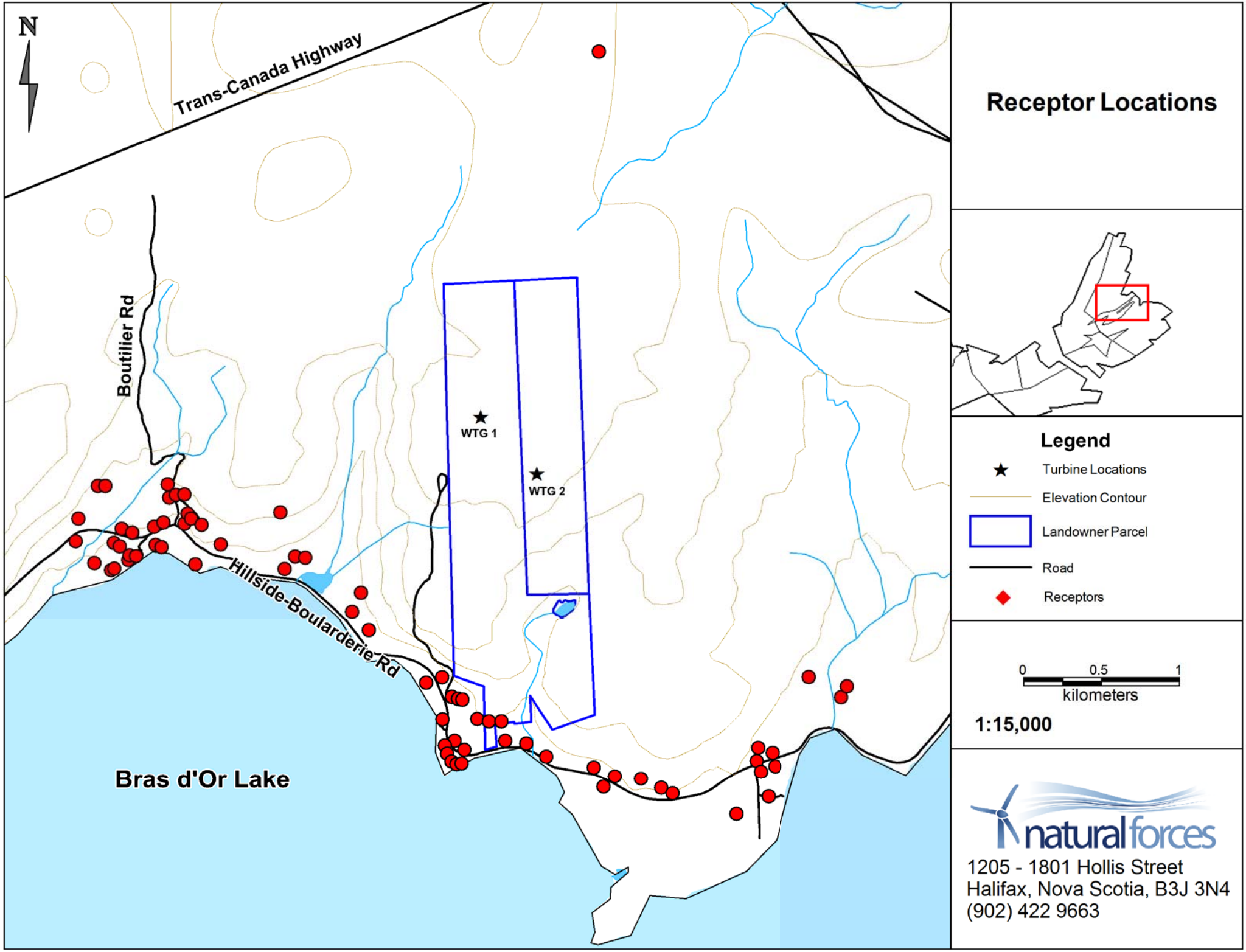
Enercon Canada (2012). *Enercon E-82 2.0 MW Wind Turbine Generator data sheet.*

Nielson, P. (2012). *Windpro 2.8 user guide*. (1st ed.). Denmark: EMD International A/S.

WEA-Schattenwurf-Hinweise (2002). *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergianlagen (Notes on the identification and assessment of the optical pollutions of Wind Turbines).* WindPRO

ANNEX A

Site Layout Map


N
Trans-Canada Highway
Boutilier Rd
WTG 1
WTG 2
Hillside-Boularderie Rd
Bras d'Or Lake
Receptor Locations
Legend
Turbine Locations
Elevation Contour
Landowner Parcel
Road
Receptors
0
0.5
1
kilometers
1:15,000
natural forces
1205 - 1801 Hollis Street
Halifax, Nova Scotia, B3J 3N4
(902) 422 9663

ANNEX B

WindPRO v2.8, Shadow Module Calculation Results

E92-2.3 MW @ 98m Hub Height

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

Printed/Page
26/03/2013 2:10 PM / 1
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca
Calculated:
26/03/2013 2:10 PM/2.8.579

SHADOW - Main Result

Calculation: Shadow_E92_witnin 2km

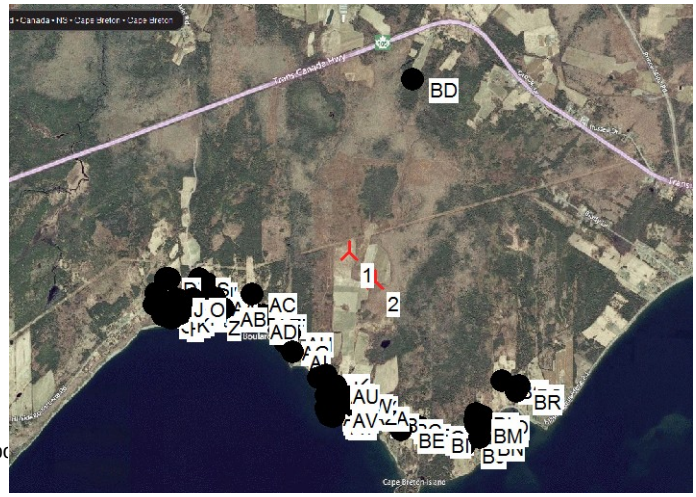
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: HIL_noise assessment_terrain data.wpc
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10.0 m



Scale 1:75,000
New WTG Shadow receptor

WTGs

	UTM (north)-NAD83 (US+CA) Zone: 20				WTG type						Shadow data	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	704,153	5,124,918	84.3	ENERCON E-92 2,3 MW 2300 92...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	1,639	16.0
2	704,419	5,124,646	90.6	ENERCON E-92 2,3 MW 2300 92...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	1,639	16.0

Shadow receptor-Input

	UTM (north)-NAD83 (US+CA) Zone: 20								
No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	702,233	5,124,332	28.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
B	702,245	5,124,439	35.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
C	702,322	5,124,229	23.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
D	702,338	5,124,594	41.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
E	702,373	5,124,595	37.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
F	702,401	5,124,196	13.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
G	702,413	5,124,325	25.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
H	702,415	5,124,204	13.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
I	702,442	5,124,309	23.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
J	702,450	5,124,392	25.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
K	702,483	5,124,244	13.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
L	702,487	5,124,266	17.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
M	702,501	5,124,373	24.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
N	702,519	5,124,262	13.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
O	702,605	5,124,401	22.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
P	702,611	5,124,315	12.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Q	702,639	5,124,305	10.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
R	702,649	5,124,422	22.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
S	702,668	5,124,603	34.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
T	702,677	5,124,540	33.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
U	702,708	5,124,552	33.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

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26/03/2013 2:10 PM / 2
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca
Calculated:
26/03/2013 2:10 PM/2.8.579

SHADOW - Main Result

Calculation: Shadow_E92_witnin 2km

...continued from previous page

UTM (north)-NAD83 (US+CA) Zone: 20

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
V	702,749	5,124,554	33.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
W	702,749	5,124,416	23.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
X	702,763	5,124,463	29.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Y	702,779	5,124,440	28.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Z	702,800	5,124,224	8.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AA	702,829	5,124,411	31.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AB	702,921	5,124,318	25.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AC	703,203	5,124,469	42.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AD	703,223	5,124,201	7.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AE	703,273	5,124,261	10.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AF	703,321	5,124,255	9.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AG	703,543	5,123,998	12.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AH	703,586	5,124,088	24.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AI	703,623	5,123,909	16.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AJ	703,893	5,123,660	9.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AK	703,970	5,123,685	26.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AL	703,972	5,123,489	5.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AM	703,982	5,123,364	4.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AN	703,993	5,123,326	3.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AO	704,013	5,123,289	2.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AP	704,016	5,123,593	17.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AQ	704,028	5,123,386	7.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AR	704,038	5,123,276	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AS	704,045	5,123,584	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AT	704,062	5,123,279	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AU	704,066	5,123,581	21.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AV	704,075	5,123,344	4.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AW	704,135	5,123,490	15.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AX	704,191	5,123,479	15.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AY	704,251	5,123,479	16.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AZ	704,269	5,123,386	5.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BA	704,368	5,123,374	7.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BB	704,462	5,123,310	12.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BC	704,688	5,123,259	20.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BD	704,712	5,126,656	76.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BE	704,735	5,123,166	13.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BF	704,788	5,123,217	21.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BG	704,911	5,123,205	28.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BH	705,007	5,123,161	25.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BI	705,062	5,123,136	22.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BJ	705,365	5,123,038	12.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BK	705,461	5,123,291	14.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BL	705,468	5,123,354	19.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BM	705,480	5,123,239	11.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BN	705,517	5,123,121	6.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BO	705,536	5,123,330	11.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BP	705,549	5,123,264	7.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BQ	705,713	5,123,690	18.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BR	705,867	5,123,593	11.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BS	705,894	5,123,646	13.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

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Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 2:10 PM/2.8.579

SHADOW - Main Result

Calculation: Shadow_E92_witnin 2km

Calculation Results

Shadow receptor

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	0:00	0	0:00
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	0:00	0	0:00
F	0:00	0	0:00
G	0:00	0	0:00
H	0:00	0	0:00
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	0:00	0	0:00
M	0:00	0	0:00
N	0:00	0	0:00
O	4:06	23	0:14
P	0:00	0	0:00
Q	0:00	0	0:00
R	4:20	24	0:14
S	3:59	20	0:15
T	4:07	22	0:15
U	4:20	23	0:16
V	4:41	24	0:16
W	0:00	0	0:00
X	5:09	25	0:16
Y	5:25	27	0:16
Z	12:41	63	0:16
AA	3:21	20	0:14
AB	15:26	74	0:17
AC	27:56	98	0:23
AD	8:22	36	0:18
AE	8:28	35	0:19
AF	9:54	39	0:20
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

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Licensed user:
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Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 2:10 PM/2.8.579

SHADOW - Main Result

Calculation: Shadow_E92_witnin 2km

...continued from previous page

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00
BQ	0:00	0	0:00
BR	0:00	0	0:00
BS	0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)	43:28	
2	ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (4)	24:11	

ANNEX C

WindPRO v2.8, Shadow Module Calculation Results

Enercon E-82 2.0 MW @ 98m Hub Height

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

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CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 2:37 PM/2.8.579

SHADOW - Main Result

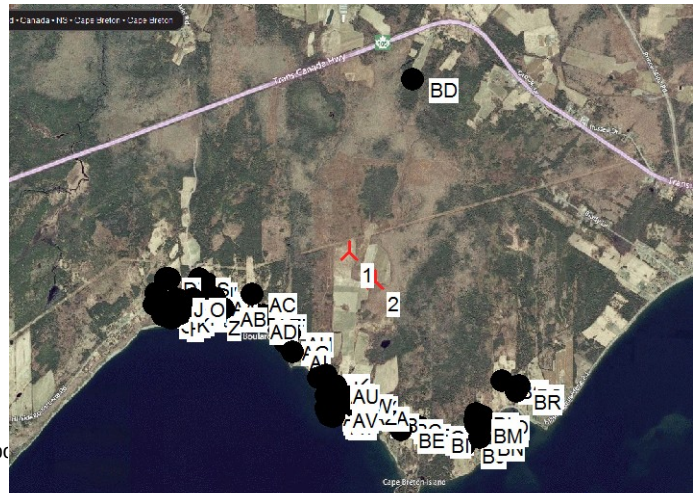
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: HIL_noise assessment_terrain data.wpc
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10.0 m



Scale 1:75,000

New WTG Shadow receptor

WTGs

	UTM (north)-NAD83 (US+CA) Zone: 20				WTG type						Shadow data	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	704,153	5,124,918	84.3	ENERCON E-82 2000 82.0 !O! hub: 9...	Yes	ENERCON	E-82-2,000	2,000	82.0	98.3	1,550	19.5
2	704,419	5,124,646	90.6	ENERCON E-82 2000 82.0 !O! hub: 9...	Yes	ENERCON	E-82-2,000	2,000	82.0	98.3	1,550	19.5

Shadow receptor-Input

	UTM (north)-NAD83 (US+CA) Zone: 20								
No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	702,233	5,124,332	28.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
B	702,245	5,124,439	35.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
C	702,322	5,124,229	23.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
D	702,338	5,124,594	41.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
E	702,373	5,124,595	37.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
F	702,401	5,124,196	13.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
G	702,413	5,124,325	25.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
H	702,415	5,124,204	13.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
I	702,442	5,124,309	23.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
J	702,450	5,124,392	25.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
K	702,483	5,124,244	13.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
L	702,487	5,124,266	17.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
M	702,501	5,124,373	24.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
N	702,519	5,124,262	13.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
O	702,605	5,124,401	22.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
P	702,611	5,124,315	12.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Q	702,639	5,124,305	10.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
R	702,649	5,124,422	22.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
S	702,668	5,124,603	34.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
T	702,677	5,124,540	33.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
U	702,708	5,124,552	33.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

Description:
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Calculated:
26/03/2013 2:37 PM/2.8.579

SHADOW - Main Result

...continued from previous page

UTM (north)-NAD83 (US+CA) Zone: 20

No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
V	702,749	5,124,554	33.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
W	702,749	5,124,416	23.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
X	702,763	5,124,463	29.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Y	702,779	5,124,440	28.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
Z	702,800	5,124,224	8.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AA	702,829	5,124,411	31.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AB	702,921	5,124,318	25.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AC	703,203	5,124,469	42.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AD	703,223	5,124,201	7.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AE	703,273	5,124,261	10.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AF	703,321	5,124,255	9.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AG	703,543	5,123,998	12.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AH	703,586	5,124,088	24.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AI	703,623	5,123,909	16.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AJ	703,893	5,123,660	9.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AK	703,970	5,123,685	26.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AL	703,972	5,123,489	5.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AM	703,982	5,123,364	4.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AN	703,993	5,123,326	3.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AO	704,013	5,123,289	2.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AP	704,016	5,123,593	17.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AQ	704,028	5,123,386	7.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AR	704,038	5,123,276	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AS	704,045	5,123,584	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AT	704,062	5,123,279	2.0	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AU	704,066	5,123,581	21.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AV	704,075	5,123,344	4.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AW	704,135	5,123,490	15.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AX	704,191	5,123,479	15.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AY	704,251	5,123,479	16.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
AZ	704,269	5,123,386	5.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BA	704,368	5,123,374	7.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BB	704,462	5,123,310	12.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BC	704,688	5,123,259	20.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BD	704,712	5,126,656	76.1	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BE	704,735	5,123,166	13.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BF	704,788	5,123,217	21.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BG	704,911	5,123,205	28.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BH	705,007	5,123,161	25.9	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BI	705,062	5,123,136	22.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BJ	705,365	5,123,038	12.2	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BK	705,461	5,123,291	14.7	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BL	705,468	5,123,354	19.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BM	705,480	5,123,239	11.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BN	705,517	5,123,121	6.5	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BO	705,536	5,123,330	11.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BP	705,549	5,123,264	7.6	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BQ	705,713	5,123,690	18.4	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BR	705,867	5,123,593	11.3	3.0	3.0	1.0	0.0	90.0	"Green house mode"
BS	705,894	5,123,646	13.8	3.0	3.0	1.0	0.0	90.0	"Green house mode"

Project:
HIL_noise assessment_2km receptors_130326

Description:
Hillside Boularderie Wind Farm
2 turbines with total max rated capacity 4.0 MW
Boularderie Island, Cape Breton, NS

Printed/Page
26/03/2013 2:38 PM / 3

Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 2:37 PM/2.8.579

SHADOW - Main Result

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	0:00	0	0:00
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	0:00	0	0:00
F	0:00	0	0:00
G	0:00	0	0:00
H	0:00	0	0:00
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	0:00	0	0:00
M	0:00	0	0:00
N	0:00	0	0:00
O	0:00	0	0:00
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	0	0:00
S	3:15	20	0:13
T	3:20	20	0:13
U	3:29	20	0:14
V	3:39	20	0:14
W	0:00	0	0:00
X	4:06	23	0:14
Y	4:19	24	0:14
Z	10:25	61	0:14
AA	0:00	0	0:00
AB	12:13	66	0:16
AC	23:14	94	0:20
AD	6:40	32	0:16
AE	6:46	31	0:17
AF	7:57	35	0:18
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00

To be continued on next page...

Project:
HIL_noise assessment_2km receptors_130326

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Amy / apellerin@naturalforces.ca

Calculated:
26/03/2013 2:37 PM/2.8.579

SHADOW - Main Result

...continued from previous page

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00
BQ	0:00	0	0:00
BR	0:00	0	0:00
BS	0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	ENERCON E-82 2000 82.0 !O! hub: 98.3 m (TOT: 139.3 m) (1)	37:30	
2	ENERCON E-82 2000 82.0 !O! hub: 98.3 m (TOT: 139.3 m) (2)	19:20	

Appendix I:

Community Engagement Plan

PREPARED FOR:

Natural Forces Wind Inc.

PROJECT:

Community Engagement Plan

Hillside Boularderie Community Wind Farm

March 5, 2013

PRESENTED BY:

Verterra Group

205-6454Quinpool Road, Halifax, NS B3L 1A9

verterra group
Environmental Strategies Ltd.

Table of Contents

1 INTRODUCTION

Natural Forces Wind Inc. (Natural Forces) is proposing to develop a two-turbine wind farm near the community of HillsideBoularderie in the Cape Breton Regional Municipality (CBRM). This 4MW wind energy project is being developed under the Nova Scotia Department of EnergyCommunity Feed in Tariff (ComFIT) program. A ComFIT contract was awarded to Wind4All Communities, a Community Economic DevelopmentCorporation, for this 4MW project in the spring of 2012; this project will be administered by Natural Forces.

Natural Forces is an established, privately owned wind energy developer based in Halifax Nova Scotia. Natural Forces developed and is part owner of the 150MW Kent Hills wind farm near MonctonNew Brunswick. The company also recently commissioned its first wind farm in Nova Scotia, the 4.6MWFairmont wind farm near the town of Antigonish. The Fairmont Wind Farm is majority owned by NaturalForces, and was equity financed through a Community Economic Development Investment Fund (CEDIF).

This Community Engagement Plan outlines the approach and general methods of engagement proposed by Natural Forces. Engagement of the community forms an integral part of the proposed Hillside Boularderie Community Wind Farm development.This planhas been prepared to guide the engagement activities of Natural Forces as it plans, designs, constructs and operates its two-turbine wind farm in the community of Hillside Boularderie. While specific engagement activities are presented, this plan also incorporates flexibility to allow Natural Forces to respond to the needs of the community as the project progresses. Natural Forcesis committed to addressing, to the best of their abilities, concerns pertaining to this proposeddevelopment raised by local residents and community members.

2 BACKGROUND

2.1 Project Overview

The proposed turbine locations are situated on privately-owned farmland approximately 18kmnorthwest of Sydney, 5km southwest of the Bras d'Or community and within the community of Hillside Boularderie. The site isadjacent to the Groves Point Provincial Picnic Park and in the Bras d'Or Lake Biosphere Reserve. Both turbines will be located at least 1 km away from all residential dwellings.

The turbines are approximately 85m to the hub with a blade length of approximately 40m. The project requires an access road to be constructed off of the Hillside Boularderie Road and laydown areas for assembly of the two turbines. A utility corridor is also required to connect the project to the local electrical distribution line. The total area of disturbance for the project is approximately 0.75ha. During operation of the wind turbines, lighting will be required as per aviation safety requirements. No buildings or other ancillary features are required.

Construction activities are currently expected to begin near the end of 2013 with project completion expected in early 2014.It typically takes approximately three years to develop and construct a wind farm. Public consultation began in late 2011 with an open house, a

presentation to CBRM Council, as well as several one-on-one meetingswith local residents. Since then, Natural Forces has held a second public information session, andnumerous meetings with local residents and community groups.

2.2 Purpose, Need and Alternatives

This proposed Hillside BoularderieCommunity Wind Farm will help meet the provincially mandated targets outlinedby the Nova Scotia Renewable Electricity Plan; this plan sets out clear legal requirements for renewable electricitysupply, that is, 25% renewable by 2015, and a further target of 40% renewable by 2020.As part of the ComFIT program, the proposed Hillside Boularderie Community Wind Farm, also enables local ownership and community economic development.

The CBRM has been a leader in embracing green energy. The recently published CBRM mayoral position paper, *Shaping Our Future in the Cape Breton Regional Municipality – A Reorganization Plan for Positive Change*, not only supports green energy development, but strongly advocates for community economic development initiatives. Many other local agenciesthroughout the CBRM support responsibly developed green energy projects, including the Cape BretonCounty Economic Development Authority, the Cape Breton Partnership, the Atlantic Coastal Action Program, and Cape Breton University to name a few.

The ComFIT program is part of Nova Scotia's RenewableElectricity Plan, which sets out a detailed path to move Nova Scotia away from carbon-based electricitytoward sources that are greener and closer to home.It is designed for locally-based renewable electricity projects that must be majority-owned by residents from communities throughout the province. Natural Forces is using a CEDIF to enable local investment and ownership in the proposedproject.

The CEDIF program, administered by the Nova Scotia Department of Economic and Rural Developmentempowers community members to invest and reap the financial benefits of local development projects. The CEDIF program also encourages support for local products and services, job creation, and stimulateseconomic growth. To date, almost $18 million dollars has been raised through CEDIF's located on Cape Breton Island.

As per the requirements of the ComFIT program, the project will provide renewable electricity to the distribution grid. This means that local Nova Scotia Power's customers will be, in part, drawing on the renewable electricity produced by the two-turbine wind farm. The4MW wind energy project is expected to produce enough energy on average to satisfy the energy needs of approximately 950 Nova Scotian homes.

The constraints for siting a wind energy project are technical, environmental, social, culturaland financial. To meet the requirements of ComFIT program, this includes available capacity within the electrical distribution system, but also environmental protection, Aboriginal engagement, and community support.

The location of the proposed Hillside Boularderie Community Wind Farm was selected after a thorough review of considerations such as proximity to the electricity grid, road access, ecology, archaeology and cultural significance, proximity to residential dwellings, and health

concerns.Natural Forces believes that the proposed site selected for this two-turbine project is the best alternative to provide renewable electricity to the local area.

2.3 Regulatory Requirements for Consultation

As the proponent of the proposed Hillside Boularderie Community Wind Farm, Natural Forces is required under the *Nova Scotia Environmental Assessment Act* to conduct a Class 1 Environmental Assessment(EA) for the project. When conducting a Class 1 EA, the proponent is required to consult with stakeholders who may be affected by the proposed development. Members of the public will have an opportunity to review and submit comments on the EA document, which will then be considered by the provincial Minister of Environment for a decision on whether to approve the development. The EA document will include a plan for environmental management, community engagement, and complaint resolution.

The ComFIT contract for the development of the Hillside Boularderie Community Wind Farm was awarded in May 2012. This approval has conditions that must be met; one of which requires the proponent to conduct community consultation in the form of at least two public information sessions prior to the construction of the project.

This Community Engagement Plan outlines how Natural Forces will consult and engage the relevant stakeholders throughout the EA process, and meet the relevant ComFIT approval conditions. The activities described in this Community Engagement Plan will not only meet prescribed regulatory requirements, but far exceed the regulatory requirements described above.

2.4 Objectives and Approach to Engagement

The local community of Hillside Boularderie has valid interests in this 4MW wind energy project. The proposed project has local benefits, such as investment opportunities, local construction contracts, increased tax base, long-term employment during operation, and distribution of renewable electricity. Yet there have been questions and concerns identified by some members of the community. These include, but are not limited to, visual impact, tourism, health, noise and enjoyment of property.

Natural Forces strongly believes that open, transparent and comprehensive community engagement is crucial to the success of any development. Accordingly, consultation began very early in this project planning (i.e., fall of 2011) and are still ongoing. Natural Forces is committed to maintaining consultation throughout the life of this project at a level appropriate to the community's level of interest.

The various engagement activities described in this Plan will provide an opportunity to facilitate meaningful dialogue between various stakeholders and Natural Forces. The project proponent intends to provide accurate information about the project and answer questions in an open and transparent fashion. As stakeholders have different interests and preferred modes of dialogue, many different activities are proposed to address these differences.

Natural Forces has begun a list of stakeholders who have expressed an interest in the project to date. This will be maintained throughout the project planning, construction and operation. The list of stakeholders ranges from individual local residents to local businesses to the Hillside Boularderie and Area Concerned Citizens Group. This list is maintained to facilitate

communication from Natural Forces. Perhaps more importantly, Natural Forces will maintain a clearly identified contact person such that community members know whom to contact at Natural Forces if a question or concern arises.

This Community Engagement Plan sets out the formal engagement activities Natural Forces will undertake throughout the development, construction, and operation of the wind farm. It also allows flexibility to allow Natural Forces to adapt to the needs of the community. This Plan does not address Natural Forces' engagement activities with the Mi'kmaq First Nations of Nova Scotia specifically, yet some of the same activities will occur. Engagement of the Mi'kmaq is very important, yet it is a distinct and separate activity. This plan focuses on engagement of the community near the Hillside Boularderie Community Wind Farm.

3 ENGAGEMENT ACTIVITIES

Six key tools of engagement are outlined below in terms their application for the Hillside Boularderie Community Wind Farm; a few other possible engagement mechanisms are also suggested.

Following this section, the proposed implementation plan is laid out. While the minimum engagement activities are outlined, it is important to maintain flexibility such that the engagement plan can respond to various stages of the project and level of interest of the community.

3.1 Media and Press Releases

Use of media (such as newspapers, radio, etc.) to inform the general public about aproposed development is one very broad way for a wind farm developer toshare general information about a proposal. To be effective, it must be used in concert with other tools of engagement.

To date, Natural Forces has used the media to advertise its engagement opportunities, and will continue to do so as identified in the next sectionon use of this engagement tool.

3.2 Newsletters

Newsletters allow the proponent to easily share factual information with the local community and other members of the public who have expressed an interest (i.e., on contact list). Also circulating newsletters with the proponent contact information allows a member of the community to easily contact the proponent if questions or concerns arise. Previous wind farms developed by Natural Forces included newsletters as a key engagement tool used to update and inform the local community on recent project activities.

To date, no new newsletters have been sent out. Natural Forces will circulate newsletters via email, our website, and through Canada Post to local residents throughout the 2013 and 2014 calendar year. See Section 4 for more information on use of this engagement tool.

3.3 Website, Email and Social Media

Project websites are a great tool to share information as they can be updated periodically and used to inform the general public about numerous aspects of the proposed development.

Natural Forces has used this tool on prior projects (e.g., Fairmont Wind Farm, http://www.fairmontwindfarm.ca). Website content and updates will include some or all of the below items:

- Notices for public information sessions;
- CLC meeting agendas and minutes;
- Photos of the project location and turbine types;
- Posting of technical reports such as the Environmental Assessment document;
- Investment seminar schedules;
- Construction activity notices; and
- Educational and media related material.

Recently, a project website was constructed (http://hillsideboularderiewindfarm.ca). This website has an online questionnaire and comment form to collect comments. From this source and other forms of engagement, an email list will be maintained. Email will be used comparable to the use of newsletters but as a digital approach.

A social media presence exists for Wind4All which is the Community Economic Development Corporation for this project; this includes a Facebook page (www.facebook.com/Wind4All) and an active Twitter account (https://twitter.com/Wind4AllNS). While these tools are primarily used by Wind4All to increase awareness of investment opportunities, they are a good vehicle for awareness of the proposed projects.

See Section 4 for more information on use of the website and social media as an engagement tool.

3.4 Open Houses

Open houses allow a project proponent to inform the general public about a proposed development. Open houses have been, and are still currently, one of the most effective ways for a wind farm developer to gauge community interest in a proposal.

In an open house, interested members of the public have the opportunity to view information and speak directly with representatives of the proponent. This allows one-on-one discussions to answer any questions of the visitor. For many members of the public, this can be a more comfortable form of communicating with the proponent than town hall type meetings.

The meetings can take many forms but usually involve information boards and displays showing the location of the proposed project in relation to nearby communities, fact and figures pertaining the wind energy generation, and an update of the general public on the status and progress of development activities, such as the EA and anticipated construction schedule.

To date, Natural Forces has held two public information sessions, and will hold more as identified in the next section on use of this engagement tool.

3.5 Community Liaison Committee

A Community Liaison Committee (CLC) acts as an advisory body to a project proponent by providing input on existing or potential concerns of the community with respect to a proposed

development. CLCs have been used successfully to facilitate communication between community representatives and aproject proponent, while providing a public and transparent forum to present true and accurate information pertaining to the project.

Natural Forces is in the process of forming a CLC for the Hillside Boularderie Community Wind Farm. It is anticipated that this CLC will form the core of the public consultation program throughout the development, construction, and operation phases of the project. The CLC will be comprised majorly of residents living near the proposed wind farm.

A draft Terms of Reference (ToR) has been prepared for the CLC (see Appendix A). The membership, operation of the CLC and the rules and responsibilities of parties involved are outlined in the ToR. This ToRwill remain in draft until membership is formed and it is accepted via majority vote. This ToR is in line with the *Guide for the Formation and Operation of a Community Liaison Committee* (Nova Scotia Environment, 2010).

To date, the draft ToR has been shared with some interested stakeholders and the opportunity for membership has been advertised (website, local paper, radio, etc.). Only two members of the community have expressed an interest (including a representative of the Hillside Boularderie and Area Concerned Citizens Group) as of the closing date on February 28, 2013. Natural Forces intends to re-advertise at its next open house to gather more nominations. See Section 4 for more information on use of this engagement tool.

3.6 Individual Follow Up

One-on-one dialogue can often resolve issues that other engagement techniques cannot. Where individuals or small groups of residents have specific concerns, Natural Forces welcomes the opportunity to engage with them. This allows Natural Forces to better understand and try to address the concerns, and it provides a better understanding of the issues of concern to the interested community members. There are many engagement tools; often it is the individual discussions that can most quickly and easily facilitate mutual learning and exchange of perspectives. Natural Forces will use this tool on an ad hoc basis when individual or small groups identified specific issues or concerns.

To date, Natural Forces has met with many members of the community individually and in small groups; this includes numerous discussions with members of the Hillside Boularderie and Area Concerned Citizens Group. See Section 4 for more information on use of this engagement tool.

3.7 Investment Seminars

In order to raise the required capital for the project, Natural Forces will run numerous investment seminars throughout the province. The main goal of the investment seminars is to introduce the project to potential investors and to present the details of the investment opportunity, including all associated risks and rewards. The investment seminars do not play a key role in the Community Engagement Plan, but will certainly aid in raising awareness of the benefits of renewable energy CEDIFs and ultimately the success of the Hillside Boularderie Community Wind Farm.

To date, several seminars were held for the current CEDIF offering of two projects, including two in the local community in February 2013. See Section 4 for more information on use of this engagement tool.

3.8 Signage

At the entry point(s) to many wind energy projects, signage is often posted to identify the presence of hazards, such as ice throw during certain weather conditions. Natural Forces will use this as an opportunity to provide some additional information about the Hillside Boularderie Community Wind Farm. This can include facts about construction schedule, electricity generation, and wind energy statistics. At a minimum, signage will include contact information for the proponent.

See Section 4 for more information on use of this engagement tool.

3.9 Other Engagement Tools

There are many other engagement tools that Natural Forces could implement to increase engagement of the local community. These include:

- *Participation in community events*: Local BBQs and other community events can allow an opportunity for Natural Forces to have an information table and share information on the project. This is a very broad level of increasing awareness and starting a dialogue.
- *Presentations to school and other community groups*: Information sessions held in local schools and for other community groups can be completed if interest by such groups. This is also a broad level of increasing awareness and starting a dialogue.
- *Organize visit to existing wind energy projects*: By allowing interested citizens to experience comparable developments, such as Fairmont Wind Farm near Antigonish, a better understanding of potential impacts can be developed.
- *Workshops*: Workshops can be facilitated in many different ways and for a number of different objectives; these include: education by using theoretical design exercises; empowerment by using a World Café format to decide on a project parameter; and joint fact finding on specific issues of interest or concern.
- Expert visits: If a key area of concern is identified, an expert can be integrated into the community engagement as opposed to working solely with the proponent. The expert can attend an open house, CLC meeting or community workshop as most appropriate to the level of interest and the issue of concern.

These should be used when a specific need or synergy exists, i.e., on an opportunistic basis or when a specific need is identified. The potential use of these other engagement tools are noted in see Section 4 as appropriate.

4 IMPLEMENTATION PLAN

For the phases over the stages of planning, development, construction, operation and maintenance and decommissioning of the Hillside Boularderie Community Wind Farm, the

approaches to community engagement are laid out below. These are presented in context of driving factors and benefits of the tools at each stage to maintain a nimble plan of engagement. Indeed the level of and tools for engagement is expected to be aligned with level and type of interest in the community; this is expected to change over time and hence, a flexible plan is required. To visualize the milestones associated with this project, the general schedule with is shown in Appendix B (http://hillsideboularderiewindfarm.ca/community-engagement.html).

4.1 Planning

During the planning phase, the key aspect is early notification of the general intent to construct a wind farm. It is important that the community be notified by Natural Forces directly rather than learn of the proposal from others. This allows Natural Forces to share accurate and true information with the community. It is important that the preliminary nature of the project planning stage be communicated to the community. Often early project plans change; while this may be a result of community input, it can cause some individuals to question the legitimacy of the project.

Engagement tools that are broad based and information sharing should be used primarily to introduce the project. Tools include media and press releases, newsletters, website, email, and social media. It is key that each tool clearly indicate the preliminary project stage and the contact information of Natural Forces.

During this planning stage, an introductory open house is often recommended to gauge community interest and facilitate one-on-one discussion. While information sharing is key at this stage, it is often quite beneficial to have a tool that allows more engagement. This enables concerns and questions of the community to be heard early in the project, allowing issues to be addressed early.

4.2 Development

Once the ComFIT approval is received and announced, the project moves to development stage (May 2012 for Hillside Boularderie Community Wind Farm). This stage is active involving much data collection and analysis (technical, social, cultural, environmental and financial), project design, and associated financing and permitting. This includes key public milestones such as raising money under the CEDIF and the Nova Scotian EA process; both of these have distinct aspect of community engagement.

This stage is the most important from the perspective of community engagement. If concerns develop in the community and are not adequately addressed in a timely manner, they can lead to low levels of community support for the project. Addressing concerns can consist of changes to the proposed project (e.g., turbine locations, etc.); however it can also simply be acknowledging the concerns and sharing information with the community.

Accordingly, engagement tools should range from the low end of the engagement scale, such as information sharing (e.g., media, newsletters, website, email and social media) to more engaged techniques (e.g., encouraging dialogue via the internet and open houses, etc.). One-on-one sessions should be used when specific groups or individuals express an interest. The use of engagement tools, such as site visits, workshops and use of experts, are more directed toward a specific issue or concern (e.g., noise, health, etc.). Ad hoc information booths and

presentations within the community are also good to raise awareness, but are only recommended should an opportunity present itself. Investment seminars are held at this time as part of the CEDIF; these are a tool to raise awareness of the project but need to be supported by other engagement tools.

The use of a CLC can be used as a foundational tool to engage the community in a meaningful way and direct use of other tools of engagement. For the Hillside Boularderie Community Wind Farm, a CLC is proposed to engage the community. It will provide a balanced and transparent forum for concerns that have been voiced be some members of the community, specifically the Hillside Boularderie and Area Concerned Citizens Group. For the CLC to be effective, a balanced and robust membership is required as laid out in the ToR (see Appendix A). It is recommended that a CLC only be formed if a membership of 5 or more be maintained (i.e., quorum as per the ToR). If nominations are not sufficient to provide five members, there may not be sufficient interest in the community to form a CLC.

As noted, the EA process occurs during project development. While there is a formal consultation process administered by Nova Scotia Environment after registration (i.e., a 30-day period to accept public comments), engagement of the community directly immediately before registration with Nova Scotia Environment allows the community more time to respond and to continue the dialogue with Natural Forces.

4.3 Construction

During construction, it is necessary to update the community on the activities involved which may have a direct effect, such as transportation of turbine sections, concrete truck traffic, use of heavy equipment on this site, and blasting if required for the Hillside Boularderie Community Wind Farm. Natural Forces is expected to have several conditions of approval from the NSE EA process. During this time, Natural Forces will be implementing many environmental protection measures.

It is important that engagement tools, like signage, media, newsletters, and the use of website, email and social media, be used to keep residents up-to-date on physical activities and compliance with the environmental protection measures, including specific regulatory conditions. The CLC and other tools will be used to address specific concerns that may arise. In particular, it is recommended that one newsletter be sent out at start of construction and one at its completion, i.e., commissioning.

It is also important – as with every stage but perhaps more so during construction – for community members to know how to contact Natural Forces if a complaint, question or suggestion arises. This includes specifying a specific employee with this role.

4.4 Operation and Maintenance

When the Hillside Boularderie Community Wind Farm is commissioned (expected in summer of 2014), a community event will celebrate this milestone and further facilitate the dialogue between the community and Natural Forces.

It is expected that the level of interest in the project will change over time after commissioning as uncertainty diminishes. The CLC will provide direction on the level of engagement that is appropriate.

As the ComFIT fixed price contract is a 20-year term, a 20-year operation and maintenance period is expected. During this time, information sharing with project updates via newsletters, website, email, etc. are expected. Frequency may decrease to annual over time; however, it is important to maintain an openness for dialogue and allow the community to share in the success of the two-turbines wind energy project. As always, website and signage should clearly indicate the up-to-date contact information for Natural Forces.

4.5 Decommissioning

Depending on the extension or decommissioning activities after a 20-year life span, the engagement tools used should respond to the type of concern and level of interest of the community at that time. Indeed the forms of engagement and community expectations will also be drivers for the engagement plan.

5 COMPLAINT RESOLUTION

Natural Forces will draft a Complaint Resolution Procedure document that will be included in the EA report. The protocol will identify who community members should contact should there be concerns about negative impacts affecting community members or the environment caused by the wind farm development. Some of the activities which may be scoped into the Complaint Resolution Protocol include:

- Commercial traffic and noise due to construction activities
- Noise from the operation of the wind farm
- Noise mitigation
- Shadow flicker annoyance
- Bird or bat mortality caused by the wind farm
- Any other annoyances which may result from the wind farm activities, e.g., lighting.

Natural Forces expects to cover some, if not all of the above mentioned activities, with the CLC.As previously mentioned, the CLC is proposed as the core engagement tool and will be actively involved in managing issues raised by community members in relation to the proposed development.

6 CLOSURE

This Community Engagement Plan outlines Natural Forces' approach to facilitating an open and transparent dialogue with the community near the proposed Hillside Boularderie Community Wind Farm. Tools of engagement and their proposed uses are outlined. Engagement is a spectrum ranging from information sharing (e.g., newsletters) to mutual learning and advice (e.g., a CLC). Common in all engagement tools is the need for respect of the opinions of community members.

Natural Forces has developed this flexible plan in an attempt to address the various preferred modes and levels of engagement. It is expected that the levels of interest of the community will change over time. Hence this engagement plan has been designed not to be prescriptive but as a guidance document. Natural Forces is committed to addressing, to the best of their abilities, concerns pertaining to this proposed development raised by members of the community.

Appendix J:

Public Complaint Procedure

Formal complaints procedure for Natural Forces Wind Inc. Hillside Boularderie Wind Farm

Natural Forces Wind Inc. is committed to addressing any public concerns regarding the Hillside Boularderie Wind Farm in Hillside Boularderie and bordering Groves Point, Cape Breton. The intention is that this policy can inform the public on the ways that they can communicate their concerns to Natural Forces Wind Inc., and how complaints will be addressed.

1.0 PURPOSE

The purpose of this policy is to ensure all public complaints are dealt with consistently and effectively. Natural Forces Wind Inc. aims to:

- Manage complaints openly, promptly and properly;
- Try to resolve complaints as soon as possible; and
- Learn from complaints and improve our services.

2.0 SCOPE

This policy will address any complaint; written or spoken expression of dissatisfaction.

3.0 PROCEDURE

All complaints of Hillside Boularderie Wind Farm will be directed to the Project Manager, Andy MacCallum:

Andy MacCallum | VP Developments
Natural Forces Wind Inc.
1801 Hollis Street | Suite 1205 | Halifax | NS | B3J 3N4
Tel: +1 902 422 9663 x 214
Fax: +1 902 425 7840
For more information please refer to Natural Forces Wind Inc. website
www.naturalforces.ca

Complainant will be notified upon receipt of the complaint. The Project Manager will investigate complaints within 20 days of receiving the complaint, upon which complainant will be notified of how the concern was or will be addressed.

3.1 Noise

Complaints dealing with noise will be assessed on whether noise monitoring is necessary.

If there are several complaints regarding noise from the Hillside Boularderie Wind Farm, then a noise monitoring program may be implemented.

Ways on reducing noise will be discussed with the wind farm operators.

Complainant(s) will be informed of noise mitigation strategies and will be contacted within a year of implemented noise reduction strategies on the success of the noise reduction strategy. This will help address any noise issues that may arise from the Hillside Boularderie Wind Farm.

3.2 Construction and Operation

Complaints regarding operation and construction activities will be discussed with workers or contractors involved.

Solutions to the complaints will be established with worker(s) and contractor(s). Complainant will be informed of how issue was addressed.

If complaints persist, then worker(s) and contractor(s) may be dismissed.

4.0 CLOSURE

If the complainant is not satisfied with the initial response, the complaint will be referred to a higher authority within the company to further resolve the issue.

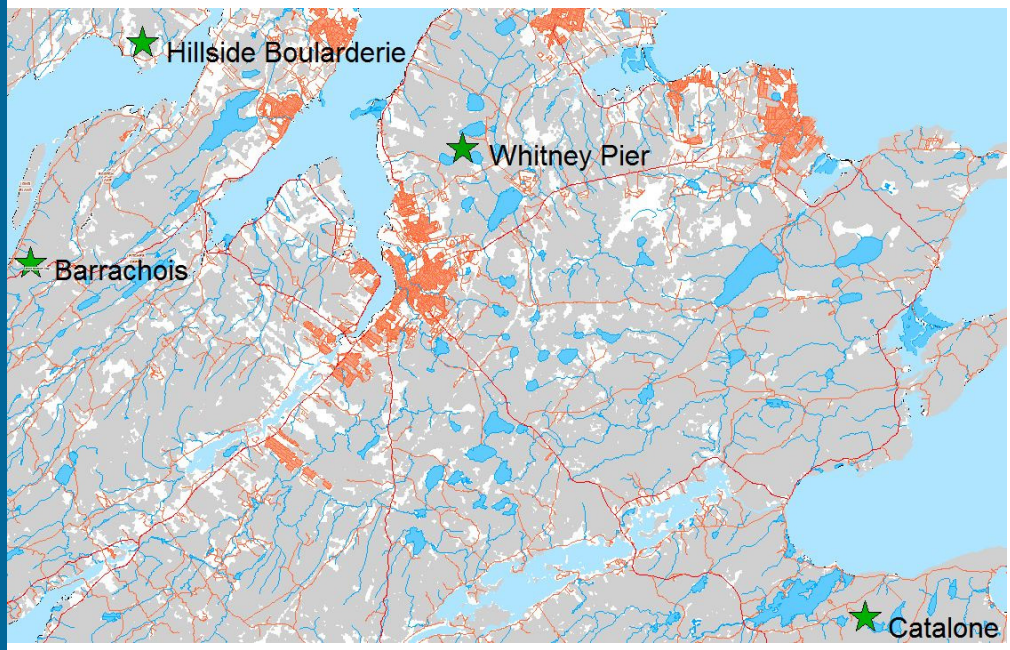
Appendix K:

Stakeholder Consultation

General Public

YOU'RE INVITED

Wind4All COMMUNITIES



Wind Prospect Inc is proposing to develop 4 wind energy projects around CBRM. Each project will consist of one or two commercial scale turbines. The proposed projects will be near the communities shown on the map above. The projects will be developed as part of the Nova Scotia Community Feed-in Tariff (COMFIT) program, and will be majority owned by the community.

We are pleased to invite you to a public information session on **November 9th, 2011** to introduce the proposed projects and gather your valuable input.

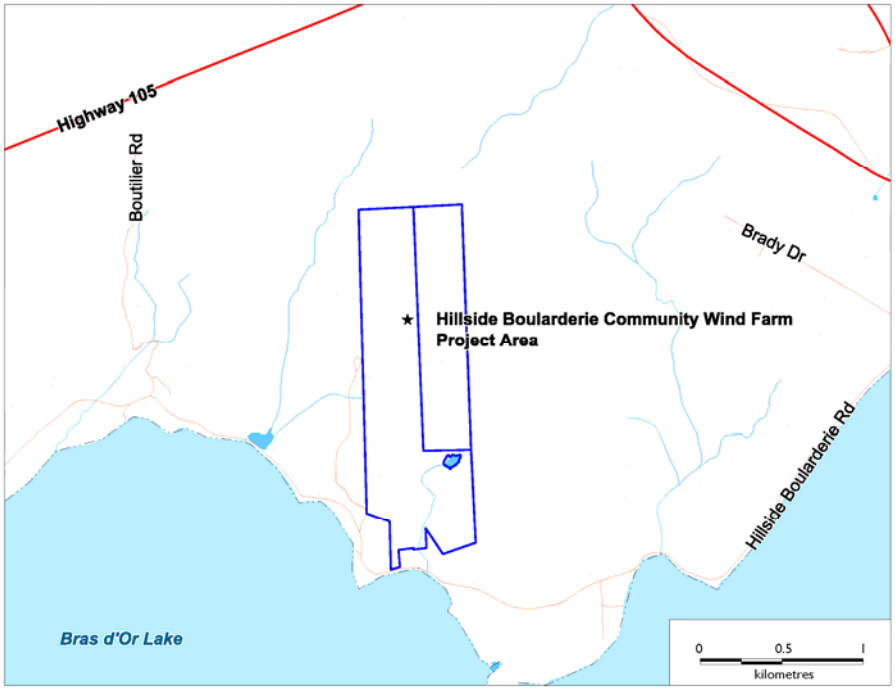
Time: 5:00pm-8:30pm
Location: Room Kluskap A, Membertou Convention Centre, 50 Maillard Street, Membertou NS.

Wind Prospect brings a wealth of experience in developing, constructing and operating wind farms in Canada and worldwide. We have developed over 2000 MW of wind energy worldwide since 1995 and have built over 100 wind farms. In addition to our work in Ontario, Wind Prospect Inc. is developing the Fairmont Wind Farm in Antigonish, Nova Scotia.

For further information, please contact our Halifax Office:
Andy MacCallum
Andy.maccallum@windprospect.com
902-422-9663 x 214
1030-1791 Barrington Street, Halifax

YOU'RE INVITED

Wind4All COMMUNITIES



Natural Forces, formally Wind Prospect Inc, is developing a wind energy project on behalf of Wind4All Communities in the Hillside Boularderie community, bordering the Groves Point community as shown on the map above. The project will consist of two or three commercial scale turbines and is being developed as part of the Nova Scotia Community Feed-in Tariff (COMFIT) program. As part of the COMFIT program, the project will be majority owned by the community.

We are pleased to invite you to a public information session on **Thursday September 6th, 2012** to introduce the project and gather your valuable input.

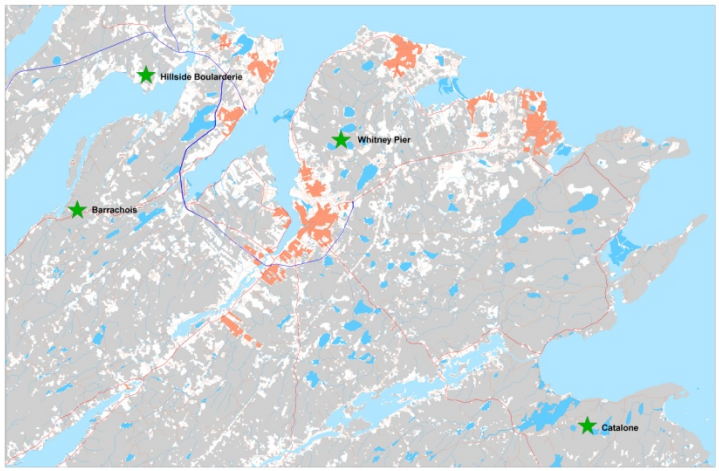
Time: 5:00pm-8:30pm
Location: Bras d'Or Community Hall, 24 Villa Drive, Little Bras d'Or, NS

Natural Forces has been active in the Maritimes since 2008. We have developed 154.6 MW of wind energy, including the Kent Hills Wind Farm in New Brunswick. In addition to this development work, Natural Forces is currently constructing its 4.6 MW Fairmont Wind Farm in Antigonish, Nova Scotia.

For further information, please contact:
Amy Pellerin
APellerin@naturalforces.ca
902-422-9663 x 211
1030-1791 Barrington Street, Halifax, B3J 3L1

naturalforces

Proposed CBRM Community Wind Farms



Overview

- The proposed community wind farms will be developed under the NS Community Feed-in Tariff (COMFIT) program. COMFIT applications for each site were submitted to the Department of Energy in Sept 2011, we are currently awaiting approval from the Department to proceed with the proposed developments.

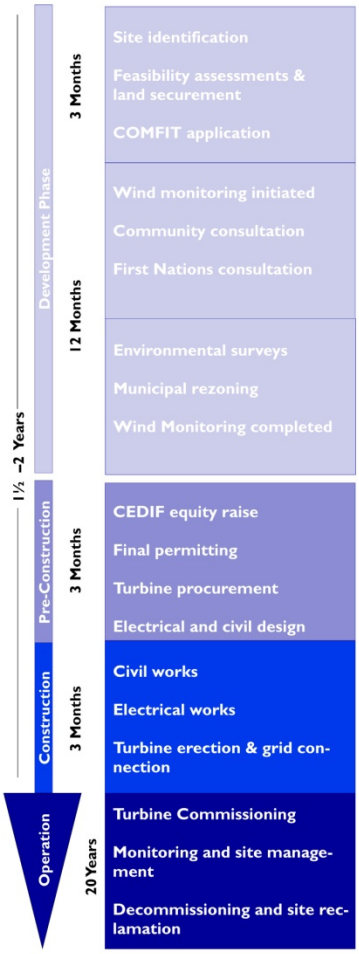
Wind Farm Facts & Figures

- Each proposed wind farm will have 1 - 2 commercial scale wind turbines with a nameplate capacity of approximately 2MW.
- Each turbine will have a hub height of approximately 80m and a rotor diameter of approximately 80m.
- Each turbine will be setback approximately 1km from all residential dwellings.

Benefits of the Proposed Community Wind Farms

- Each wind farm will be majority owned by Nova Scotia residents through the creation of a Community Economic Development Corporation (CDEC).
- Each turbine will provide clean, emission–free electricity to approximately 400 to 500 homes.
- Reduction of carbon dioxide emissions in Nova Scotia by relying less on coal plants to produce electricity in the province.
- Provide additional revenue to the Cape Breton Regional Municipality through the payment of property taxes.
- Job creation during the development, construction & operation of each wind farm by utilizing local suppliers and contractors.

Project Timeline



What is Shadow Flicker ?

Shadow flicker is the intermittent shadowing effect caused by a moving wind turbine rotor that casts shadows on the ground and stationary objects.

For Shadow flicker to occur, the following criteria must be met :

1. The sun must be shining and not obscured by any cloud cover.
2. The wind turbine must be in between the sun and the shadow receptor.
3. The wind turbine must be facing directly towards or away from the sun.
4. The line of sight between the turbine and the shadow receptor must be clear.
5. The shadow receptor has to be close enough to the turbine to be in the shadow.

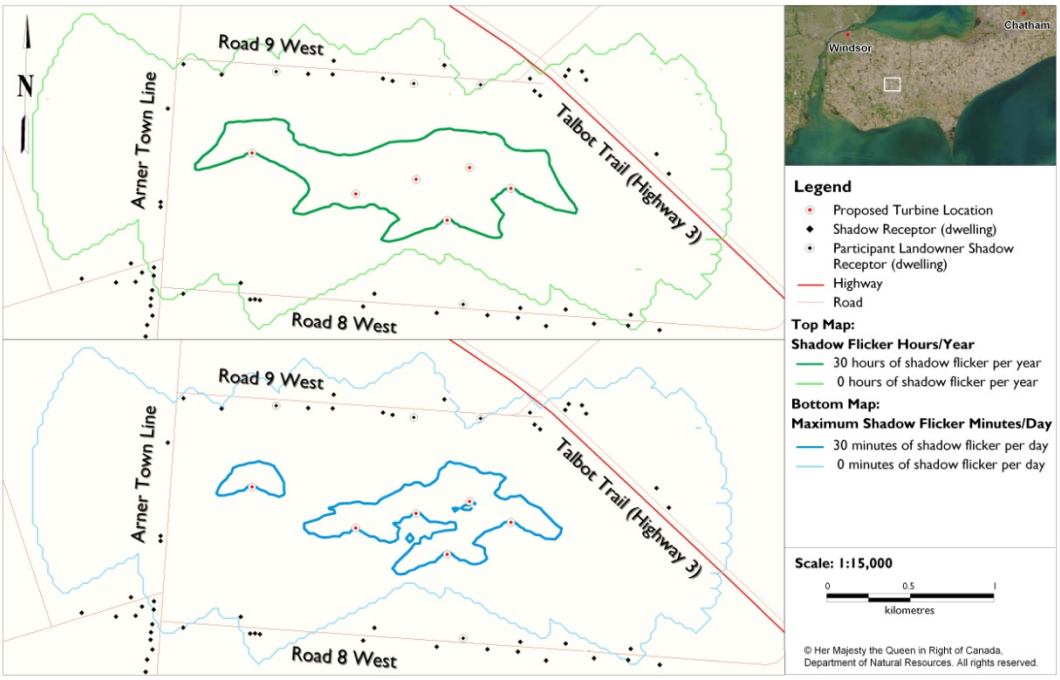
Shadow Flicker Guidelines

Industry standard shadow flicker guidelines (astronomical worst case) recommend:

- A maximum of 30 hours per year.
- A maximum of 30 minutes per day.

Shadow Flicker modelling

The software package WindPRO version 2.7 is used to model the anticipated shadow flicker caused by a proposed wind farm. The map below shows the anticipated astronomical worst case shadow flicker for a particular wind farm developed by Wind Prospect in south-western Ontario.



What is a CEDIF?

A Community Economic Development Investment Fund, or CEDIF, is a pool of capital raised through the sale of shares that is invested in a new or existing local businesses. A CEDIF gives residents of Nova Scotia the opportunity to invest in local wind energy projects.

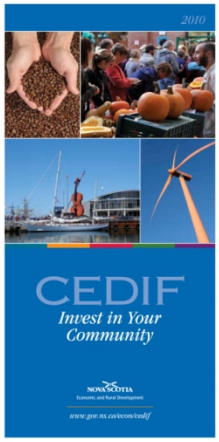
The program began in 1999-2000 and more than 3500 people have invested in CEDIFs. These funds, through a total of 120 offerings, raised and invested $40 million in local enterprises.

CEDIFs help keep investment dollars working in your community. They support locally produced products and services, create jobs, and stimulate economic growth.

As an investor, there are several benefits to buying shares in a CEDIF.

- You receive a 35% non-refundable provincial income tax credit on your investment
- your investment is RRSP eligible; this deduction is in addition to the Nova Scotia Tax Credit
- Shares must be held for a minimum of five years
- you have input into investment decisions made by the fund through the board of directors.

(Source: http://www.gov.ns.ca/econ/cedif/)



(Source: http://www.gov.ns.ca/econ/cedif/)

Wind4All COMMUNITIES

Wind Prospect Inc. is the sponsor of Wind4AllCommunities. We plan for Wind4AllCommunities to become a fully formed Community Economic Development Corporation (CEDC) in late 2012 or early 2013.

Assuming the projects proceed, there will be an opportunity for Nova Scotia residents to invest in Wind4AllCommunities through a CEDIF share offering*

Wind Prospect intends to develop the proposed wind farms and is seeking community input on these projects. We also intend to create a community fund which will be applied towards education programs and/or donations to local community organizations. We welcome further suggestions from community members on uses for the proposed community fund.

*Disclaimer: The CEDIF offering will be made through an offering document, which will be made available from an authorized sales agent or finder. Investors should read the offering document in its entirety before making an investment decision.

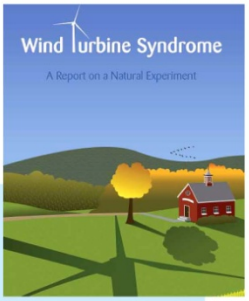
For more information on CEDIFs:
Please pick up a pamphlet or visit online at
http://www.gov.ns.ca/econ/cedif/

For more information please contact:
Andy MacCallum at andy.maccallum@windprospect.com
Follow us on twitter: @Wind4AllCom

Wind Turbines and Health Concerns

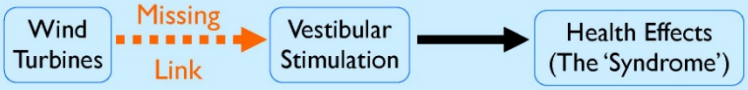
Uncovering the Real Story

Due in part to awareness of climate change and other environmental issues, the wind industry in Canada has enjoyed fast growth in the past decade, and media attention devoted to the industry has grown with it. Recently, concerns have been raised by various special interest groups that wind turbines may be causing unwanted health effects.



Nearly every concern that can be found on various anti-wind publications traces its roots to a book written by Nina Pierpont (Wind Turbine Syndrome, 2009) which attempts to create a link between turbines and a wide variety of symptoms.

The Missing Link in Pierpont's Research



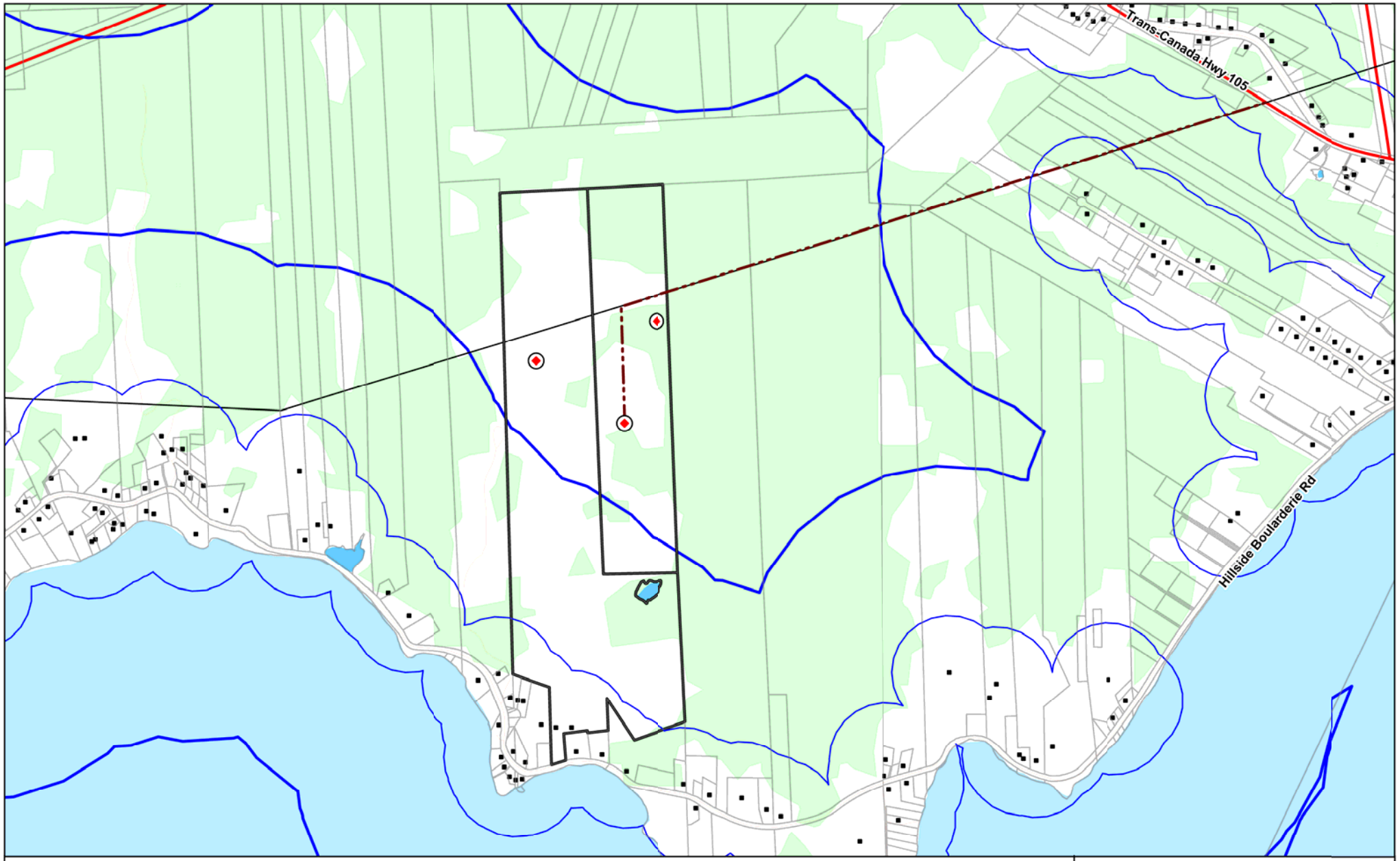
In short, Pierpont's research points to a link she sees between Wind Turbines and Vestibular Stimulation. There is **simply no evidence** on which to base this link. **Pierpont misunderstood and misquoted research** by Manchester University's Dr. Neil Todd when making this connection. Dr. Todd has since **repudiated her findings publicly** [Britain's 'The Independent', August 9, 2009] yet this reference remained in the book., as without this vital link, Pierpont has no theory.

It is not coincidental that **Pierpont hasn't been able to publish her findings in a single peer-reviewed medical or scientific journal**, despite numerous attempts to do so. The science simply isn't there.

Wind Turbines Are Part of the Climate Solution

The IPCC's (Intergovernmental Panel on Climate Change) 4th Assessment report has shown that if we are to stand a 50% chance of keeping global temperature increase below 2 degrees, industrialised countries must reduce their GHG emissions by at least 25-40% below 1990 levels by 2020.

40% of global CO_2 emissions (46% in Nova Scotia) are produced by the power sector. Nova Scotia's Climate Change Action Plan states that our short and medium term goals (2013 and 2020) for CO_2 reduction will need to be met in large part by new renewable energy. The NS Ministry of Energy has recently committed to supplying 25% of electricity from renewable resources by 2015.



LEGEND

- Site boundary
- Waterbody/Coast line
- Vegetation
- Highway
- Arterial & Minor roads
- Building buffer - 800 m
- CBRM by-law buffer - 220m
- Property parcels
- Transmission line
- Approximate connection route
- Buildings
- Indicative wind turbine locations

SCALE

0 0.375 0.75

kilometres

1: 20,000

Hillside Boularderie Wind Farm questionnaire responses for public meeting #1 and #2.

	Yes	No	Undecided
Do you support wind energy in general?	39 83%	3 6%	5 11%
Do you support wind energy in this community?	38 81%	4 9%	5 11%
Do you support the Hillside Boularderie Wind Farm?	30 64%	9 19%	8 17%

Hillside Boularderie Community Wind Farm Public Information Session
September 6th 2012
Visitor Questionnaire

Your feedback as a valued stakeholder is important to us.

We appreciate that you have taken the time to attend this open house and fill out this questionnaire. Thank You!

This information will help us plan future wind energy developments in Nova Scotia.

Contact Information:

Name: (*Please circle:* Mr. / Mrs. / Ms.) _____

Address: _____ Town: _____ Postal code: _____

Is this your primary residence? **Yes** ☐ **No** ☐

Telephone number: _____ E-mail: _____

Did you receive the notice regarding this meeting in the mail? **Yes** ☐ **No** ☐

Did you see the notice for this meeting in the newspaper? **Yes** ☐ **No** ☐

If neither of these, how did you hear about this meeting? _____

After attending this information session...

Do you have any questions about the Hillside Boularderie Community Wind Farm project?

_____

_____

_____

_____

Are there any issues that you feel should be addressed in the environmental assessment?

_____

_____

_____

_____

Has this information session answered your questions about the Hillside Boularderie Community Wind Farm project?

_____

_____

_____

_____

Please continue on reverse side…

Do you have any other comments about this information session or the project

_____

_____

_____

_____

Please check the most appropriate response:

	Yes	No	Undecided
Do you support wind energy in general?	☐	☐	☐
Do you support wind energy in this county?	☐	☐	☐
Do you support the Hillside Boularderie Wind Farm?	☐	☐	☐
Did you find this information session informative?	☐	☐	
Did you attend the information session on Nov 9th 2011?	☐	☐	
Did you take any of the provided educational brochures?	☐	☐	

Correspondence:

Would you like to be added to our **MAILING LIST** for future correspondence? **Yes** ☐ **No** ☐

How would you prefer to receive correspondence? **Regular Mail** ☐ **E-mail** ☐

(*Please ensure a full mailing address or e-mail address is clearly printed on the reverse side.*
Your phone number will only be used to clarify contact details in the event of an email or letter returned to sender)

Please tell us a little bit about yourself:

Occupation: _____

Age (check range): **Under 25** ☐ **25 – 34** ☐ **35 – 49** ☐ **50 – 64** ☐ **Over 65** ☐

Are you a member of any organizations in the area? **Yes** ☐ **No** ☐
If so, which one(s)? _____

Thank you for coming by the information session and filling out this questionnaire.
Please leave your completed questionnaire with a staff member or send it via fax or regular mail to:

Natural Forces
1791 Barrington Street
Suite 1030
Halifax, NS B3J 3L1

Telephone: +1-902-422-9663
Toll Free: 1-877-425-9663
Fax: 902-425-7840

Contact Details

Contact Amy Pellerin: apellerin@naturalforces.ca

Please feel free to contact us with any further questions or comments.

Aboriginal

Date	Person Contacted	Band/Organization	Method of Communication	Content
September 15, 2011	Twila Gaudet, Consultation Liaison Officer	Kwilmu'kw Maw-Klusuaqn Negotiation Office	Letter	Initial engagement efforts with Mi'kmaq communities
August 29, 2012	Office Receptionist	Office of Aboriginal Affairs	Phone Call	Engagement effort with the Mi'Kmaq community
August 29, 2012	Executive Assistant	Membertou	Phone Call	Invitation to public meeting on September 6, 2012
January 3-10, 2013	Donna Foster, Secretary & Treasurer	Bras d'Or First Nation	Email	Seeking contact information for the Bras d'Or First Nation
March 5, 2013	Chief Terrance Paul	Membertou	Letter	Information update regarding CLC, EA and website
March 5, 2013	Chief Wilbert Joseph Marshall	Potlotek/ Chapel Island	Letter	Information update regarding CLC, EA and website
March 5, 2013	Chief Joseph Wayne Morley Googoo	Waycobah	Letter	Information update regarding CLC, EA and website
March 5, 2013	Chief Norman Francis Bernard	Wagmatcook	Letter	Information update regarding CLC, EA and website
March 5, 2013	Cheif Leyroy D.C. Denny	Eskasoni	Letter	Information update regarding CLC, EA and website
March 5, 20123	Twila Gaudet, Consultation Liaison	Kwilmu'kw Maw-klisuaqn	Letter	Information update regarding CLC, EA and website
March 5, 2013	Owen Fitzgerald	Unama'ki	Letter	Information update regarding CLC, EA and website

Federal, Provincial & Municipal Government

Date	Person Contacted	Department / Agency	Method of Communication	Content
Municipal				
March 25, 2011	Malcolm Gillis, Planner & Wayne MacDonald, Director of Engineering & Public Works	Cape Breton Regional Municipality	Meeting	Introduction of company and proposed HBWF project
May 25, 2011	Malcolm Gillis & Doug Foster, Planning Department	Cape Breton Regional Municipality	Meeting	Requirements for COMFIT and WTG land use bylaw update
August 30, 2011	Malcolm Gillis, Planner	Cape Breton Regional Municipality	Letter	Support from CRBM and land use/zoning verification
April 9, 2012	Mayor Cecil Clarke & MLA Keith Bayne	Cape Breton Regional Municipality	Phone Call	HBWF economic benefits to the Cape Breton Region
May 20, 2012	Gordie Goss, MLA	Cape Breton Regional Municipality	Phone Call	Invitation to public meeting
August 30,2012	Keith Bayne, MLA	Cape Breton Regional Municipality	Phone Call	Invitation to public meeting
August 23, 2012	Manning MacDonald, MLA	Cape Breton Regional Municipality	Phone Call	Invitation to public meeting
October 10, 2012	Keith Bayne, MLA	Cape Breton Regional Municipality	Phone Call	Update on public consultation
December 19, 2012	Deborah Campbell, Assistant Municipal Clerk	Cape Breton Regional Municipality	Letter	Request for Natural Forces to present to CBRM council
February 12, 2013	Malcolm Gillis, Planner	Cape Breton Regional Municipality	Phone Call	Inquired about Development Permit
March 11, 2013	Malcolm Gillis, Planner	Cape Breton Regional Municipality	Letter	General information update regarding CLC, EA and website

Date	Person Contacted	Department / Agency	Method of Communication	Content
March 11, 2013	12 Councillors	Cape Breton Regional Municipality	Letter	General information update regarding CLC, EA and website
March 11, 2013	Mayor Cecil Clarke	Cape Breton Regional Municipality	Letter	General information update regarding CLC, EA and website
February 26, 2013	Jim Folds, Planner	Cape Breton Regional Municipality	Email	Not interested in participating in CLC
		Provincial		
September 15, 2011	Bob Green, Aboriginal Liaison Officer	Nova Scotia Department of Energy	Letter	Initial engagement efforts with Mi'kmaq communities
September 15, 2011	Krystal Therien, COMFIT Administrator	Nova Scotia Department of Energy	Letter	Initial engagement efforts with Mi'kmaq communities
September 16, 2011	Laura Bennett, Coordinator, Special Places	Department of Tourism, Culture and Heritage	Email	Request for environmental screening
March 22, 2012	Charlie Parker, Minister	Nova Scotia Department of Energy	Letter	COMFIT Approval
March 27, 2012	Krystal Therien, COMFIT Administrator	Nova Scotia Department of Energy	Letter	COMFIT project guidance
August 7, 2012	Terry Power, Regional Wildlife Biologist	Nova Scotia Department of Natural Resources	Phone Call	Recommended studies to include in EA
September 11, 2012	Glen Hart	NS Transportation and Infrastructure Renewal	Letter	Work Within Highway Right of Way Permit
November 7, 2012	Steve Stanford, Environmental Assessment Officer	Nova Scotia Environment – Environmental Assessment Branch	Meeting	Consultation regarding EA process, CLC formation and EA scoping
November 27, 2012	Mark Elderkin, Species at Risk Biologist	Nova Scotia Department of Natural Resources	Meeting	Recommended studies to include in EA

Date	Person Contacted	Department / Agency	Method of Communication	Content
December 6, 2012	Steve Stanford, Environmental Assessment Officer	Nova Scotia Environment – Environmental Assessment Branch	Phone Call	General update on progress of EA
February 7, 2013	Steve Stanford, Environmental Assessment Officer	Nova Scotia Environment – Environmental Assessment Branch	Phone Call	Update on status of forming the Community Liaison Committee
April 5, 2013	Steve Stanford, Environmental Assessment Officer & Mark Elderkin, Species at Risk Biologist	Nova Scotia Environment – Environmental Assessment Branch & Nova Scotia Department of Natural Resources	Meeting	Discussion of EA requirements, past minister's decisions and future monitoring requirements
Federal				
September 18, 2012	Mario Lavoie, Spectrum Engineering Technician	Government of Canada, National Defense	Email	No interference with DND radio communication systems
September 19, 2012	Capt. Adin Switzer, AEC Liaison Officer	Government of Canada, National Defence	Email	No interference with DND radar and airport facilities
September 19, 2012	Carolyn Rennie, National Radar Program	Environment Canada, Meteorological Service of Canada	Email	No severe interference with meteorological radar systems
Other				
August 4, 2011	Eileen Oldford, CEO	Cape Breton County Economic Development Authority	Letter	Cape Breton County Economic Development Authority communicating support to the HBWF
November 8, 2012	Jim Folds, Planner	Cape Breton Regional Municipality	Phone Call	Introducing project to Chair of UNSECO Bras d'Or Biosphere Reserve

Date	Person Contacted	Department / Agency	Method of Communication	Content
December 13, 2012	Wayne Scott, Community Development Officer	Cape Breton County Economic Development Authority	Meeting	Discussion regarding CLC

Appendix L:

Community Liaison Committee

verterra group
Environmental Strategies Ltd.

205-6454 Quinpool Road, Halifax, NS B3L 1A9
T: (902) 431-1077 C: (902) 225-4436
F: (902) 453-4670 W: verterragroup.ca

Terms of Reference for Community Liaison Committee
Hillside Boularderie Wind Farm

Prepared for Natural Forces Wind Inc.
DRAFT pending finalization by CLC members (February 5, 2013)

Introduction

Natural Forces Wind Inc. (the Company) is proposing a 4MW wind farm near the community of Hillside Boularderie (the Project) in the Cape Breton Regional Municipality (CBRM) under the Community Feed in Tariff (ComFIT) program. The two turbine project is in the early stages of environmental planning and design. At present, construction is proposed to begin near the end of 2013 with commissioning expected in early 2014. Various desktop and field studies have been completed in 2012 and will continue as appropriate. The Project is intended to be registered in the provincial environmental assessment process in spring of 2013.

Open, transparent and comprehensive community engagement is a priority for the Company; it is understood as crucial to the success of any project. To date, land has been secured in the community which allows siting of turbines with a separation distance of 1km or greater from residential dwellings. In November 2011, an initial open house was held in Membertou. After the Company received ComFIT approval for the Project from Nova Scotia Department of Energy (DoE), a second open house was held in the community (September 2012).

Beyond this, the Company has held meetings with numerous individuals and groups in the community, including but not limited to the Hillside Boularderie and Area Concerned Citizens Group, other local residents, elected officials, representatives from the local Regional Development Agencies (RDAs), and CBRM planners. At this early stage of project planning and design, the Company intends to form a Community Liaison Committee (CLC). This is an integral part of its overall community engagement plan.

This document forms the Terms of Reference (ToR) for the CLC by outlining its purpose, mandate, membership, roles and responsibilities, and structure. It is intended that the ToR is finalized at the first meeting of the CLC. The last page of this ToR allows for signature of each individual CLC member confirming its acceptance.

verterra group

Purpose

A CLC acts as an advisory body to a project proponent by providing input on existing or potential concerns of the community with respect to the proposed development. There are three primary purposes of the CLC:

- Collaborate with community by two-way sharing information in a transparent forum;
- Obtain advice from existing community leaders and those with an interest in the project; and
- Provide a voice to those in the community who have concerns, suggestions or questions.

CLCs have been used successfully to facilitate communication between community stakeholders and a project proponent as they provide a public forum to present factual information about the development. CLCs are most effective if formed early in the planning process; this allows issues raised by the community to be addressed transparently in a timely and sensitive fashion.

Mandate

The CLC members will serve as an advisory board for the Company by providing a representative cross-section of community opinions, concerns and suggestions on the Hillside Boularderie Wind Farm as it progresses from the planning and design stage through to construction and operation. The CLC is not a decision making forum; yet the Company anticipates advice and insight into perceptions of the community and suggestions of potential mitigative measures for the Project. While there is collaboration between the CLC and the Company, the responsibility for all Project decisions is retained by Natural Forces.

At its heart, the CLC provides a conduit for dialogue; many residents may not be comfortable to hold discussions with developers, so the CLC should provide a more approachable mechanism. To facilitate this mandate, an atmosphere of respect must be maintained within the CLC to allow diverse views to be presented. Further, members of the CLC must be accountable to the community that is represented.

Membership

The CLC membership will be structured to provide a balance in terms of interests in the Project, location relative to the Project, and perspectives on the Project. To ensure balance but also the necessary transparency, members will be recruited for the CLC via the following open and impartial process:

- Advertise the upcoming formation of the CLC and opportunity for membership to request nominations of interested individuals from the host community via the following:
    - Local newspaper(s), i.e., Community Section of Cape Breton Post;
    - CBC Radio community announcements;
    - Project website (www.hillsideboularderiewindfarm.ca);
    - Notice posted on 110 Bras d'Or – Florence Rd, Bras d'Or (i.e., Post Office) and nearby businesses;
    - Mailout to residents within nearby communities, including but not limited to, Hillside Boularderie and Groves Point;
- Extend a direct invitation to specific groups who have an interest in the Project yet may not reside in the nearby communities;
- Allow a two week nomination period; and
- Receive nominations from interested individuals to be a member of the CLC.

A format of the advertisement is proposed in Attachment A; this is a base but will be edited as appropriate depending on the media used.

The criteria for selection will be based upon the Guide for the Formation and Operation of a Community Liaison Committee (Nova Scotia Environment, August 2010). This includes limiting the members of the CLC to ten in most cases. The balance shall be those members who reside in the geographic area of the Project.

Depending on level of interest, four to six representatives of the cross-section of nearby communities will be selected, specifically including representatives of the areas of Hillside Boularderie and Groves Point. If numerous nominations are received with equal interest and commitment conveyed, the Company may elect to randomly draw potential members to create a balanced representation of the potentially impacted geographical areas.

Beyond the community representatives, a representative will be sought from the following:

- First Nations community, e.g., Membertou First Nation, Bras d'Or First Nation, Unama'ki Institute of Natural Resources, etc.;
- Local economic development organizations, e.g., Cape Breton Partnership, the Cape Breton County Economic Development Agency, etc.;
- Local CBRM Councillor (Charlie Keagan, District 2);
- Hillside Boularderie and Area Concerned Citizens Group; and
- Bras d'Or Lake Biosphere Reserve Association.

Roles and Responsibilities

The responsibilities of other roles and additional responsibilities of the members and other participants are outlined below.

Chair / Facilitator

At the formation of the CLC, the interim chair will be appointed by the Company. This may be an independent facilitator, a representative of the Company, or a respected member of the community. After several meetings of the CLC, it is proposed that the Chair will be elected from the CLC members by a vote of CLC members during a regular CLC meeting. The Company may opt to use an external facilitator to support the role of the Chair.

The role and responsibilities of the Chair (as supported by a facilitator as appropriate):

- Ensuring that CLC members are provided with necessary information and technical support to assist them in their role;
- Facilitating discussion such that there is balance within members' perspectives and individual members are not unduly interrupted nor dominate discussion;
- Allowing for constructive and thorough discussion while ensuring that agreed upon agenda and schedule are followed; and,
- Maintaining the structure of the CLC as outlined in the ToR, including but not limited to, procedural voting aspects and annual review of the ToR.

CLC Members

The CLC is formed by individual members as defined in this ToR. As a representative of their community, group or organization, the members are responsible to share the perspectives with other members of the CLC and the Company, as well as convey factual information back to interested residents or the members of their group or organization.

It is the responsibility of each CLC member to openly participate in discussions, provide input and ideas from their perspective, and actively listen to other points of view. Only with this contribution from each CLC member can the mandate of the CLC be achieved.

Specifically, individual members are responsible for the following:

- Signing the CLC Member Acceptance of the ToR once it is finalized as agreed by majority vote of the CLC;
- Working to fulfill the purpose and mandate of the CLC as per this ToR, including conducting themselves with respect and accountability as a CLC member;
- Attending CLC meetings in a regular and timely manner as per the agreed upon schedule with understanding that resignation is required after two consecutive unexplained absences;
- Allowing name, email and telephone number to be published as a CLC member;
- Completing appropriate review of meeting minutes and Project information, including the environmental assessment, consultation approaches and construction and operation planning to the best of the individual's abilities;
- Listening to other members of the CLC and information presented by the Company during CLC meetings;
- Identifying Project related concerns of the community or group that the individual member represents;
- Providing constructive comments on the mitigative measures proposed by the Company; and
- Assisting the Company in informing the community and other organizations on items related to the Project that are of interest or concern to the stakeholders.

Company

There is a dual role and responsibility of the Company: that is, the Company will both support the CLC administratively, financially and technically and respectfully consider the perspectives and opinions shared by the CLC members. Specific responsibilities of the Company include:

- Attending the CLC meetings and listening carefully with due consideration of concerns and suggestions brought forward by the CLC members;
- Keeping the CLC members up-to-date on the Project, including sharing documentation in a timely manner to allow members to review prior to next meeting;

- Distributing the agreed upon agenda, ensuring that minutes are taken of the meetings, and posting approved agenda and minutes on the Project website;
- Supporting the CLC as appropriate with administrative, technical or financial requirements of the CLC as the Company deems appropriate; and
- Providing updates to the CLC on timely responses and/or actions subsequent to concerns brought forth by the CLC.

Structure

The processes of formation and conduct are important to a well-functioning CLC. While many items are typical of any advisory committee, the tone of the CLC and its interaction with the Company and the community are set by the TOR.

Below are specific items respecting the processes and procedures that form the structure of the CLC to ensure that fulfillment of the CLC's purpose and mandate.

Meeting Format and Frequency

The first agenda will be proposed by the Company and consists of introductions of the members and the Company, Project update and review and comment upon the draft ToR. The agenda for each subsequent meeting will be set by the CLC with the Chair asking each member in turn if they have specific items to include in the next agenda. In order to keep meetings to a reasonable length of two hours, the Chair may elect to move subsequent items to the next scheduled meeting.

Standard agenda items will include:

- Review and approval of past meeting minutes and addition of items to agenda;
- Project update by the Company;
- Discussion of CLC comments or concerns;
- Other agenda items as appropriate; and
- Determination of next meeting date and agenda for next meeting.

Meetings will be run in a roundtable format as led by the Chair who will start with review of past minutes and call for new items on proposed agenda.

Meeting frequency is proposed as quarterly; however, depending on items for discussion, meetings may be held more frequently. The date of next meeting will be proposed by the Chair at conclusion of each meeting.

While most input of the CLC is individual opinion and perspective for consideration of the Company, voting will be used for several procedural aspects. These include, but are not limited to: finalizing the ToR; determining timing of next meeting if more frequent than quarterly; and electing the Chair. With the exception of electing the chair, each member will vote with a show of hands as facilitated by the Chair or delegate. Private ballot voting will be used to elect the Chair; this will be facilitated by a third party.

Records

Records relating to the CLC include: the final ToR; the list of current CLC members; the meeting agendas and minutes; and Project specific information. Publishing these records for the community and other interested stakeholders to review is important for transparency. This facilitates information sharing back and forth between the community and Company; recording CLC meetings and sharing minutes as well as supporting documentation is an important part of fulfilling the CLC's mandate.

Modes of publishing will be determined by the Company; the CLC can provide advice on best modes of communication depending on the record. These can include any of the following: newspaper ads; posters; newsletters; use of local government; website; social media; and an email distribution list. Ideally a combination of modern and traditional publishing is used.

Role of Chair / Facilitator

As laid out within the ToR, the Chair (or designated facilitator) maintains structure and functionality of the CLC meetings. While (s)he is a member of the CLC, the Chair will only vote on procedural matters where a tie has formed. The Chair will limit discussion to items on the agenda and keep on schedule while ensuring that each member has contributed as appropriate. The Chair will liaise with the Company to ensure that appropriate support is provided to the CLC members.

It is proposed that the Chair be elected from within the CLC membership by ballot vote at the third CLC meeting. This process will be facilitated by an independent party. The term of the Chair is annual.

Support

Necessary technical, financial and administrative support to facilitate a functioning CLC will be provided by the Company at the discretion of the Company. Through the Chair, the CLC

members may request additional support of the Company as appropriate to facilitate the mandate of the CLC; this may include presentations by specialists to assist the CLC members in understanding technical documentation.

A maximum of two weeks after a meeting, the Company will distribute draft meeting minutes and the proposed agenda for the next meeting to CLC members. The Company will also distribute Project specific information in a timely fashion to allow suitable review of the material by CLC members before the next meeting.

Rules of Order

Where members of the CLC are not able to attend an upcoming meeting, (s)he will email, call or visit the Chair at least 24hours prior to the meeting time. Failure to do so for two consecutive meetings will result in automatic resignation from the CLC; the Chair will send a letter accordingly. Where another nomination exists for that geographical area or stakeholder group, a new member will be selected; otherwise, the position must be advertised.

Typically, the CLC meetings are limited to members who are nominated to represent the community. Observers may be allowed at the CLC meetings at the discretion of the Chair where a specific justification exists pertinent to the meeting agenda. In this case, the Chair will allow comments or questions from observers pertaining to an agenda item after the CLC comments or questions have been addressed.

Quorum will consist of five members of the CLC plus attendance of at least one Company representative. Quorum is required for voting matters only.

Each member of the CLC, the Company representatives, any invited third parties and observers must conduct themselves in a respectful manner. The Chair has the right to exclude any party who is disrupting the CLC meeting.

Review of Terms of Reference

As its first matter of business, the CLC will review the draft ToR and provide suggestions to finalize this document. The Company will note the proposed changes and attempt to address any voiced concerns via edits. It is the goal that at the subsequent meeting, the CLC will approve the agreed upon final version of the ToR via a majority vote. Accordingly, each member would sign and date the attached CLC Member Acceptance. Alternatively, subsequent amendments may be suggested if the majority does not support the revised

ToR; in this case, the Company will make a second round of edits based on voiced concerns and submit to members for review and vote at the subsequent meeting.

This ToR will be reviewed and amended by the CLC annually. This is important to ensure that the CLC is well supported to fulfill its purpose and mandate. It is expected that as the Project progresses through various stages that the ToR will be amended accordingly to ensure an effective CLC formation and structure.

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Attachment A
Proposed Advertisement of Opportunity for CLC Membership

Hillside Boularderie Wind Farm:
Requesting Nominations of Members for a Community Liaison Committee

Natural Forces Wind Inc. is proposing a 4MW wind farm near the community of Hillside Boularderie in the Cape Breton Regional Municipality (CBRM). We currently plan for construction to begin near the end of 2013 with commissioning expected in early 2014. The project is in the planning and design stage.

As community engagement is an important part of the project, we are establishing a Community Liaison Committee (CLC). A CLC will act as an advisory body to Natural Forces by providing input on perspectives of the community on the proposed Hillside Boularderie Wind Farm.

Nominations are being sought for membership. We are seeking a number of representatives from the areas of Hillside Boularderie, Groves Point and Millville Boularderie to participate in the CLC. Representatives will also be sought from local organizations.

A written submission to Andy MacCallum, VP Developments, Natural Forces Wind Inc via email at amaccallum@naturalforces.ca is requested to apply to participate in the CLC. All community nominations must be seconded by another member of the community. Selection criteria will be based on provincial guidelines and seek to develop a balanced mix of members representing a cross-section of the community.

Nominations will close on Feb. 28th, 2013. The first meeting is planned in mid-late January. The Terms of Reference for the CLC will be finalized at the first meeting of the CLC.

For further information, please contact Andy via email or phone at 902-422-9663 ext 214 or by visiting the project's website at www.hillsideboularderiewindfarm.ca.

_____

This content will be edited as appropriate depending on the media (e.g., mail out, email, newspaper, radio).

Attachment B
CLC Member Acceptance

I have read, understand and agree to the Terms of Reference for Community Liaison Committee of the Hillside Boularderie Wind Farm as noted in this document (DATE 2013).

_____
Name of CLC member (printed)

_____
Signature of CLC member

_____
Date

Appendix M:

Consultant CV

Christopher M. Milley, M.Sc., MMM

Senior Environmental Consultant, Dartmouth, NS

Years with AMEC: 3
Years Experience: >27

Education

Dalhousie University, 1995 (Masters of Marine Management)

Dalhousie University, 1983 (Master of Science (Oceanography))

Mount Allison University, 1979 (Bachelor of Science)

Training

Negotiation Skills, Conflict Management Group, Cambridge, MA

Meeting Facilitation, Saint Mary's University, 2002

Introduction to MapInfo Professional, Baseline Business Geographics, 1998

Middle Management Orientation Program, Public Service Commission, Ottawa, 1990

Project Management by Activity, Bureau of Management Consultants, Supply and Services Canada, Georgetown, Guyana, 1990

Resource Systems and Economic Development, Institute for Resource and Environmental Studies, Dalhousie University, 1985

Professional Summary

Chris Milley is a resource manager with over 25 years of experience working in cross cultural environments. Mr. Milley has managed resource and environmental management projects in the Caribbean, Central America and with the First Nations in Atlantic Canada. Mr. Milley has liaised actively with regional and national First Nations organizations, international agencies and organisations, such as the Assembly of First Nations, the UNPFII, UN FAO and UNESCO's Intergovernmental Oceanographic Commission, and co-ordinated co-operative support for international development assistance projects. He has been a delegate at the UN Economic and Social Council's Permanent Forum on Indigenous Issues

Mr. Milley specializes in working with Indigenous communities in the design, and implementation of species inventories and community-based resource management activities that promote sustainable social and economic development. Mr. Milley teaches Fisheries Management, and special courses on Indigenous Resource Management in the Faculty of Graduate Studies at Dalhousie University.

Relevant Experience

Environmental Project Management

Mr. Milley brings to this project an intimate familiarity of the local environmental issues of communities in Nova Scotia with a specific emphasis of the relationships between tradition, culture and local environment. Chris has a dept of knowledge and experience working with projects that have a potential impact on local and First Nation communities, particularly in identification of traditional resource use practices, harvesting areas and mapping traditional knowledge. Chris has worked with a number of resource development and management projects and organizations, including: the Eskasoni Fish and Wildlife Commission, the Mi'kmaq Fish and Wildlife Commission, where he served as Executive Director and the Atlantic Policy Congress as a fishery policy analyst, the Acadia Band in SW Nova Scotia as Director of their Fisheries Program, and with the Mi'kmaq Confederacy of PEI as Director of Integrated Resource Management.

Relevant Projects

Traditional Knowledge Study
Designed, implemented and managed a Traditional Ecological Knowledge Study for the Sable Offshore Energy Inc. Natural Gas Liquids (NGL) Pipeline Corridor (Goldboro to Point Tupper).

Fishermen and Scientist Research Society Conference
Coordinated the development and incorporation of the Fishermen and Scientist Research Society, a community-oriented research group involved in fishery research. Also organized an inaugural conference of the FSRS

Coastal Communities Network Workshop
Organized and facilitated a Coastal Communities Network workshop on Community-based Co-management. Also presented an overview of fisheries co-management concepts and principles to conference participants from municipal governments, fishery organization and ENGOs.

Research on traditional management systems
Collaborated in the design and managed First Nation inputs to a collaborative research project with St. FX. This project, Social Research for Sustainable Fisheries, involved inter-community research on customary decision-making systems.

Coastal Traditional Resources Mapping Program – Bras D'or Lakes, Eskasoni First Nation
Managed and implemented a community-based coastal mapping program with the Eskasoni First Nation for the Bras D'or Lakes region of Cape Breton. This project involved organizing field data collection activities, designing information presentations systems (including GIS), and conducting community workshops throughout the Bras D'or Lakes region.

First Nations Renewable Energy Development
Assisted the Mi'kmaq First Nations on Prince Edward Island in the review and development of an alternative energy strategy that build upon available wind technology and ethanol production.

Teaching materials and Course delivery - Integrated Coastal Zone Management: A community perspective
Prepared a text and teaching modules for a short course on Integrated Coastal Zone Management for community organizations in Spain and delivered the course during a spring semester of the University of Las Palmas de Gran Canaria, Spain

Training Needs Assessment
Managed a study to assess the training needs and job/task analysis of the Lennox Island and Abegweit First Nations' fisheries as part of an ongoing DFO funded initiative to determine the long-term and short term training needs that can be effectively addressed through an at-sea mentoring program.

Fisheries Management Program, Prince Edward Island First Nations
Designed and managed a Federal government funded program to enhance the institutional and administrative fisheries management capacity within the PEI First Nations

Study on Environmental Contaminants in the Food Fishery
Designed and managed a small project undertaken with the support of Health Canada to examine the presence of common environmental contaminants, including heavy metals, in the food fishery resources commonly consumed in First Nations Communities in PEI

Janet Blackadar, M.Sc.F., CCEP

Manager, Environmental Sciences – Maritime Provinces

Years with AMEC: 9
Years Experience: 20

Education

University of New Brunswick, M.Sc.F. (Forestry and Environmental Management), 2002

University of New Brunswick, B.Sc. (Biology), 1990

NB Certificate of Proficiency in French - Level Four (Superior), 2008

Training

AMEC Strategic Client Relationship Certification, 2006

AMEC Performance Leadership Program, 2007

AMEC Project Management Training, 2002

Professional Summary

Ms. Blackadar is Manager, Environmental Sciences for AMEC Earth & Environmental, a division of AMEC Americas Limited, based in Fredericton, NB. She is responsible for providing senior technical services in the environmental sciences sector. She is fluently trilingual and has worked professionally in the environmental field throughout Canada and internationally for 20 years. Her areas of specialization include project planning and management, permitting, project review, environmental impact assessment, meeting facilitation, client and regulatory liaison, and expert witness testimony.

Professional Associations

- Certified Canadian Environmental Practitioner, 2006 (Canadian Environmental Certification Approvals Board)
- Registered environmental consultant in Peru and El Salvador
- Memberships with the Canadian Society of Environmental Biologists, New Brunswick Environmental Industries Association, and International Association of Impact Assessment

Relevant Experience

Environmental Impact Assessment / Permitting

Ms. Blackadar has been has been extensively involved in some of the recent environmental impact assessments for major capital projects which have been undertaken in the Maritime Provinces of Canada. She has managed, coordinated, supervised, reviewed, conducted and/or reported a variety of EIAs related to linear corridor developments (e.g., natural gas pipelines, highways, electrical transmission lines). Her work has also included consultation with stakeholders, and preparation of reports. Ms. Blackadar is very familiar with the application and requirements of the Canadian Environmental Assessment Act (CEAA) (including the Projects Outside Canada Regulation), and a variety of provincial regulations related to Environmental Impact Assessment (e.g., the EIA Regulation of the New Brunswick Clean Environment Act).

Relevant Projects

2007-Present Project Reviewer for ACOA EIAs conducted on PEI – as part of a Public Works and Government Services Canada Standing Offer is responsible for al project review for all EIA screenings conducted on PEI for ACOA under this SOA. The range of projects includes manufacturing plant upgrades to walking trails to tourist attractions. All projects are funded by ACOA.

2006-2007 Comprehensive Study Report and Nova Scotia Provincial Class 2 Assessment (NS): Project Manager – as project manager for this 5 billion dollar development of an LNG and Petrochemical facility for Keltic Petrochemicals Inc., was responsible for conduct of a federal Comprehensive Study report and NS EA and provided expert witness testimony during hearings by the NSEA Board. The project received provincial approval in March 2007.

2007-2008 EIA and Energy and Utilities Board (EUB) Application (NB): Project Manager – Potash Corporation of Saskatchewan (Sussex Division): As project manager for a 1.7 billion dollar mine expansion and 30 km brine pipeline for the Potash Corporation of Saskatchewan (Sussex Division), was responsible for all aspects of permitting, regulatory liaison, submission of the EIA and EUB application, and public consultation.

2005-2007 Corridor Resources Inc. Environmental Assessment and Public Utilities Board (PUB) Application (NB): Project Manager – as project manager was responsible for all aspects of permitting, regulatory liaison, submission of the EIA and PUB application, and public consultation for a natural gas gathering

system, gas conditioning plant, and 54 km transmission pipeline on behalf of Corridor Resources Inc. First gas to the Maritimes & Northeast Pipeline occurred in June 2007.

2006 EIA for Sydney Tar Ponds Remediation Options (NS): Biophysical Team Lead – lead the biophysical assessment component (including terrestrial, aquatic and wetland components) for AMEC. This study is a project which involves extensive stakeholder consultation and interaction with the client. The goal of this study is to assess options available for remediation of the Sydney Tar Ponds, one of the most contaminated sites in Canada.

Maureen Cameron-MacMillan, M.Sc.

Environmental Scientist - Sydney, NS

Years with AMEC: 8
Years Experience: 10

Education

Memorial University of Newfoundland, M.Sc., Cognitive and Behavioural Ecology, 2003

Mount Allison University, Sackville, NB, B.Sc., Biopsychology (Honours), 2000

Screenings Under the Canadian Environmental Assessment Act Course, Halifax, NS, 2005

Backpack Electrofishing Certificate Course, 2007

Professional Summary

Ms. Maureen Cameron-MacMillan, M.Sc., is an environmental scientist with a wide variety of experience in the environmental field. She has over seven years of academic and consulting experience conducting terrestrial surveys, including bat surveys and breeding and migrating bird surveys, throughout eastern Canada. Ms. Cameron-MacMillan has worked on a number of environmental impact assessments and screenings under CEAA. She has several years of aquatic field experience in freshwater fish population surveys, stream and lake habitat assessments, and surface water sampling programs. As well, she is active in local nature societies and participates in volunteer-based survey programs including the Cape Breton Nocturnal Owl Survey, Maritimes Breeding Bird Atlas, Maritimes Butterfly Atlas, and Atlantic Canada Shorebird Survey.

Professional Associations

Member, Canadian Society of Environmental Biologists

Relevant Experience

Bird Surveys

Ms. Cameron-MacMillan has over 9 years of ornithological field work in consulting, academic, and volunteer settings, including five years' participation in the Maritimes Breeding Bird Atlas. She has conducted nest surveys for breeding birds, owl and early woodpecker surveys, and breeding and migrating bird surveys in Nova Scotia and elsewhere in eastern Canada.

Environmental Impact Assessment

Ms. Cameron-MacMillan has assisted in the preparation of EIAs since 2006, including conducting and assisting with various field surveys, collection of information on ecological components of proposed work sites and identification of mitigation measures. Ms. Cameron-MacMillan has also participated in the preparation of several screenings under the Canadian Environmental Assessment Act since 2005.

Relevant Projects

2011 Field Scientist, Biological Inventory, Effects Assessment, and Mitigation and Monitoring Recommendations for Reopening of a Tailings Pond: Desktop review and field surveys for terrestrial fauna, including targeted surveys for breeding birds, herpetiles and bats, in the proposed tailings area and adjacent land. Ms. Cameron-MacMillan was responsible for conducting bird surveys during early and late breeding season and assisted with bat and herpetile surveys; as well, she participated in preparation of a report summarizing desktop and field data and providing monitoring and mitigation recommendations for terrestrial fauna and habitat.

2010 Baseline Field Investigations for Fairmont Wind Farm Proposal Environmental Assessment: As part of the baseline data collection for an environmental assessment of a small (2 turbine) proposed wind farm, participated in baseline acoustic surveys for bats in the proposed wind farm footprint.

2009 – 2010 Project Manager and Field Scientist, Bird and Plant Species Inventory for Proposed Radar Array: Conducted bird surveys for a proposed Defence Construction Canada radar array throughout main breeding and migration periods, as well as surveys for wintering waterfowl. Field work included auditory and visual surveys (point counts and area searches) in the project area and along the proposed access route.

2010 Field Scientist, Terrestrial Fauna Surveys for Proposed Quarry: Conducted surveys of breeding birds and migrating passerines and shorebirds within the footprint of a proposed quarry, and assisted with odonate surveys. Point counts and area searches were conducted in the project area.

John W. Krilow, C.E.T.

Environmental Technician - Sydney, NS

Years with AMEC: 21
Years Experience: 22

Education
University College of Cape Breton, Diploma of Environmental Engineering Technology, 1990

University College of Cape Breton, Groundwater Hydrology (Credit Course), 1991

Professional Summary

Mr. Krilow is a senior environmental technologist for AMEC Environment & Infrastructure in Nova Scotia. Mr. Krilow has over 21 years of experience in the fields of environmental site assessment (ESA), remediation, hydrogeological studies, potable water well drilling, pumping tests, municipal water and sewer projects, hazardous material surveys and environmental auditing.

Relevant Experience

Field Surveys

Mr. Krilow has participated in terrestrial habitat surveys for federal properties throughout Cape Breton and elsewhere in the Atlantic Provinces. In addition, he has extensive experience conducting surface water and groundwater sampling, and freshwater fish surveys.

Relevant Projects

2010 - 2011 Field Technician, Field Work to Support Human Health Risk Assessment and Detailed Quantitative Ecological Risk Assessment, Various DFO Light Station Properties, NS: Participated an assessment of wildlife habitat on four light station properties in Cape Breton, and recorded observations and evidence of terrestrial fauna on the site. Collected soil samples for toxicity testing and assisted with preparation of habitat description for the ERA report.

2010 - 2012 Field Technician, Field Work for Environmental Monitoring Trend Analysis (EMTA) Program, Former Dominion #11, Lingan and Princess Colliery Sites, Cape Breton County, NS: Collected baseline data as part of a long term program designed to monitor expected improvements in surface water quality and aquatic habitats following site remediation. Conducted surface water, sediment and benthic invertebrate sampling for each of these sites.

2008 - 2009 Field Technician, Victoria Junction Coal Preparation Plant Phase 2 Aquatic Environmental Effects Monitoring Program (AEEMP): Conducted quarterly surface water and effluent quality monitoring events for a former coal wash plant in Sydney, NS.

2006 - 2008. Field Technician, Victoria Junction Coal Preparation Plant Phase 1 AEEMP. Collected surface water and benthic invertebrate samples, and conducted a detailed habitat assessment for a former coal wash plant in Sydney, NS. Assisted with qualitative fish population studies as well as quantitative fish population and growth studies on Northwest Brook and nearby reference streams.

Field Technician, Environmental Site Assessment (Phase II), Former Landfill Sites, Louisbourg, NS: Participated in all aspects of the field programs for the Phase II ESA of three former landfill sites in Louisbourg, NS. Investigations included the excavation of 14 test pits; drilling of 8 boreholes (with monitoring wells installed at all locations); soil, groundwater, sediment and surface water sampling.

Field Technician, Potable Water Quality Sampling and Analyses, Various Sites, NS: Conducted and provided project management, coordination and supervision of quarterly groundwater sampling programs for chemical and microbiological parameters at various sites as per the Nova Scotia Guidelines for Monitoring Public Drinking Water Supplies.

Field Technician, Quarterly Surface Water Sampling, Several Former Mine Sites in Industrial Cape Breton, NS: Conducted quarterly surface water, seep and groundwater sampling programs, including stream flow measurements at potential Acid Rock Drainage (ARD)-generating sites.

Davis MacIntyre & Associates

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Company Details
Davis MacIntyre & Associates Limited was established in 2009 and previously operated as Davis Archaeological Consultants Limited. We are leaders in the cultural resource management discipline in the Atlantic Region. Our staff has over 50 years of combined experience in the field of archaeology. We provide comprehensive professional services in undertaking archaeological and historical cultural resource assessments for government, public, and private industry. We are committed to excellence and pride ourselves on offering our clients value-added services to meet modern environmental and development standards.
(Source: http://www.davismacintyre.com/)

Dillon Consulting

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www.dillon.ca

Company Details

The global needs for technical services related to infrastructure, environmental management, community development and buildings/facilities is enormous. From basic needs for clean water and shelter, to advanced technologies for hazardous waste management, to the policies and know-how to advance sustainable development, communities and businesses beyond North America are part of the Dillon marketplace.

But while all of our skills and services can be applied in meeting client needs in the international marketplace, our focus is on:

- infrastructure (water, wastewater, solid waste, transport)
- environmental management (water resources, waste management, land and coastal resource management, pollution control)
- energy (renewable technologies, transmission, generation)
- community development (redevelopment, new settlements, tourism, community planning)
- institutional strengthening (capacity building, organizational development, training)

Geographically, we have experience in Asia, South America, Africa, Europe and Central America/Caribbean. Our people have diverse language skills and with many, strong connections to the global community through family ties and their upbringing.

Our projects are delivered under a number of models: in-country teams assigned for extended periods, program management as executing agency for extended capacity building programs, short-term technical assistance projects, and collaborative arrangements with local consultancies.

Of particular benefit to our private sector clients is our expertise in the environmental assessment and approvals requirements of lending institutions such as the IFC.

(Source: http://www.dillon.ca/html/int_intro.html)

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Janis Rod, ALM, P.Eng.

SUMMARY

As an environmental consultant for fifteen years, Janis Rod has broad experience spanning project management, environmental management and permitting, policy development and review, stakeholder consultation, sustainability planning, and environmental impact assessments. She has foundational experience as an environmental engineer, direct experience in a wide range of industries and levels of government, and varied experiences engaging with stakeholders; this allows her to assess strategy issues holistically from social, cultural, economic and environmental perspectives.

Janis' experience in the private sector spans several industries, including renewable energy, natural gas distribution, food and beverage processing, metal and mineral mining, petroleum product storage, petrochemical manufacturing, and commercial land development. Her work for the public sector has included environmental training, stakeholder consultation, and studies for all levels of government. Through this broad base of experience, she has a solid understanding of environmental policy and regulatory tools from varied perspectives.

EDUCATION

2008 - 2011	Master of Liberal Arts (Sustainability and Environmental Management), Harvard University; Thesis – Social Consent for Large Onshore Wind Energy Projects
1993 - 1997	Bachelor of Science (Environmental Engineering), University of Guelph
1991 - 1993	Diploma of Engineering, Dalhousie University

EMPLOYMENT

2005 - present	Part-time Academic as Instructor, Dalhousie University, Nova Scotia
2002 – present	Independent Environmental Consultant, Sole proprietorship, Nova Scotia
2000 - 2002	Environmental Engineer, Vaughan Engineering Limited, Nova Scotia
1997 - 2000	Environmental Engineer-in-Training, Dillon Consulting Limited, Nova Scotia

PROFESSIONAL AFFILIATIONS / APPOINTMENTS

1997– present	Member – Association of Professional Engineers of Nova Scotia
2003 – 2006	Appointment – Halifax Regional Watershed Advisory Board
2002 – 2004	Appointment – Shubenacadie Canal Commission

PROFILE OF PROFESSIONAL PROJECT EXPERIENCE

Environmental Assessments and Associated Approvals

- Preparation of workshops and development of guiding practices for a wind energy development company in terms of their proposed project environmental assessments and stakeholder engagement.
- Review of proposed sites from an environmental constraint and permitting perspective for a tidal infrastructure supporting facility in Nova Scotia as part of a feasibility study.
- Preparation of follow up and monitoring for a wind energy project for permitting from Ontario Ministry of Natural Resources near Kingston, Ontario, including bird and bat monitoring.
- Scoping of environmental approvals and leading environmental planning for a natural gas pipeline proposed in Pictou County.
- Strategic advice to a wind energy development company on environmental and social risks, necessary permits, scoping of the environmental assessments, engagement planning, and recommendations of mitigative measures for their proposed community wind energy projects in Nova Scotia, including those near McLellans Brook and Barrington.
- Project management and lead assessor of a federal environmental assessment for a wind energy project for the eastern shore of Nova Scotia.
- Peer review of and advice on an environmental assessment registration document for a proposed wind energy project on the northern shore of mainland Nova Scotia for a consulting firm.
- Instruction of a fourth year course, ENVS 4001 / ENVE 4772, Environmental Assessment and Management, at Dalhousie University to sixty environmental science and engineering students.
- Environmental assessor of the exploration stage for a coal mine in Donkin, Cape Breton, including consultation with regulators, preparing the project description and developing mitigative measures in partnership with the client.
- Coordination of environmental planning and federal-provincial environmental impact assessment for a proposed large wind farm in Cumberland County, Nova Scotia.
- Advising on key issues on environmental assessment of a wind farm, such as impact on radar, in Point Tupper, Nova Scotia.
- Provision of advice on both provincial and federal level environmental impact assessments and associated follow up for a petrochemical facility in eastern Nova Scotia.
- Management of environmental permitting and stakeholder consultation associated with a proposed wharf expansion project within the Strait of Canso.
- Review and recommendations on draft Strategic Environmental Assessment of management options in Rustico Harbour / Bay, Prince Edward Island.
- Regulator liaison and coordination of environmental operating approvals for a lead and zinc mine in central Nova Scotia.
- Preparation of project description, including valued ecological components identification, for the future environmental impact assessment of a proposed gypsum quarry expansion.
- Preparation of project description and analysis of environmental impacts as part of an environmental impact assessment of a wastewater treatment plant in Saint John, New Brunswick.
- Update of an environmental assessment of seismic activity in Sydney Bight, Nova Scotia with a team of environmental scientists.

- Amendment an environmental assessment for drilling activity, including assessing project against Species at Risk Act and reviewing other changes since review by Canada Nova Scotia Offshore Petroleum Board.
- Coordination of an environmental impact assessment, including stakeholder consultation, for a surface coal mine extension in Stellarton, Nova Scotia.
- Coordination of the environmental impact assessment of the taxiway extension and associated development at the Halifax International Airport.
- Project team member working with Sempra Atlantic Gas team in preparation of award of the provincial natural gas distribution franchise and subsequent environmental analysis and impact assessment.

Environmental Management

- Advisor for environmental management associated with a bridge redecking project in Halifax, Nova Scotia.
- Analysis of health and safety risks from large-scale wind turbines in the Municipality of the County of Kings in partnership with a professor of environmental health from Boston University.
- Design of best practices for municipalities to plan for wind energy projects in their communities for the Union of Nova Scotia Municipalities including associated research and review of two pilot projects and consultation with identified municipalities.
- Development of a toolkit to build capacity for Nova Scotia Department of Energy's Community Feed-in-Tariff (COMFIT) program, including liaison with stakeholders and presentations in five communities around Nova Scotia as a pilot of the toolkit.
- Development of an environmental protection plan and a post-construction community consultation plan for a wind energy project on the eastern shore of Nova Scotia.
- Management of post-construction commitments of a wind energy project on the northern shore of Nova Scotia, including bird and bat studies, moose studies, and other regulatory commitments.
- Analysis of four renewable energy development scenarios from an environmental perspective as part of the Stakeholder Consultation Process for: A New Renewable Strategy for Nova Scotia that was conducted by Dr. David Wheeler and the Faculty of Management, Dalhousie University for Nova Scotia Department of Energy.
- Advice and support to Nova Scotia Environment in the preparation of the Nova Scotia Water Resource Strategy, including review and analysis of public comments, member of facilitation team for the provincial regulator workshop, and preparation of documentation to assist in next steps.
- Developing a corporate plan for sustainability including greenhouse gas accounting and management relating to development of natural gas distribution lines in Nova Scotia.
- Provision of direction and advice on environmental issues associated with development of natural gas distribution lines in Nova Scotia, including existing policies/specifications, field inspections, and advice regarding environmental liabilities and permitting requirements.
- Development of an Integrated Sustainability Plan for the Town of Middleton including preparing a visioning statement, public consultation and development of a detailed action plan.
- Team member for preparing a visioning statement and a public consultation program for the Municipality of the County of Kings' Integrated Community Sustainability Plan.
- Creation and instruction of a new undergraduate course under the Environmental Science Program at Dalhousie University, Enterprise Sustainability, ENVS 3301.

- Team member for pollution prevention assessments and workshops for the winery and brewery industry in Nova Scotia.
- Development of key issues paper with specialists in the fields of public consultation, oceanography and fisheries for potential offshore drilling near Cape Breton, Nova Scotia.
- Facilitation and management of public and private sector partners in the development of an environmental effects monitoring project using underwater vehicle and sensor technology.
- Environmental team member in a study assessing best management practices for small-scale marine projects for Environment Canada.
- Environmental team member in the policy assessment for environmental impact assessments for air quality for highway projects.
- Environmental consultant for a pollution prevention assessment of poultry processing / packaging plants in Kentville, Nova Scotia.
- Environmental planning for the golf community development in Nova Scotia, including environmental permitting and approvals and environmental planning.
- Project team member in the facility siting of the Cobequid Multi-Service Centre including review of environmental sensitivities, socio-economic issues, and site development options.
- Engineer for a water supply study to evaluate options for a water supply for a First Nations Reserve, including conceptual design of options, costing estimates and recommendation.
- Team member assisting in the preparation of air quality impact assessment to the environmental impact assessment for a proposed natural gas transmission pipeline.
- Engineer responsible for the calculation of the environmental impact of replacement of traditional fossil fuels with natural gas as part of the economic analysis of a proposed natural gas pipeline.

Contaminated Sites Management

- Review and recommendations for Transportation Infrastructure Renewal's highway base and garage site management program.
- Review of Phase I and II Environmental Site Assessments on behalf of a client reviewing properties for purchase and subsequent recommendations.
- Project manager for the development of a compliance promotion training package to be used by Environment Canada staff for proposed regulations on petroleum products handling and storage.
- Instruction of third year undergraduate course on contaminated sites management for four years at Dalhousie University, ENVS 3300.
- Environmental review of contaminated site management process completed by other consultants for Defence Construction Canada at various sites in the Atlantic Region.
- Project manager of a hazardous material assessment of a building in Willow Park to identify the presence and quantity of hazardous materials.
- Project manager of a contaminated sites audit of various sites owned by the Department of National Defence to verify compliance with federal Contaminated Sites Remediation Framework.
- Project manager of a long term monitoring program at a hazardous waste facility in Nova Scotia.
- Coordinator of historical review and field survey and qualitative risk assessment at Wright's Cove for the Department of National Defence.
- Project engineer for Statia Terminals' Waste Disposal Area Remedial Action Plan which included excavation, transport and treatment of various contaminants.