

Appendix L – Aboriginal Engagement Documentation



Trent MacDonald <tmacdonald@eonwind.com>

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## Wind Energy Developments - EON WindElectric

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**Trent MacDonald** <tmacdonald@eonwind.com>

Wed, Jun 4, 2014 at 3:48 PM

To: twilagaudet@mikmaqrights.com

Hi Twila,

My name is Trent MacDonald and I am part of EON WindElectric as an Environmental/Project Engineer. I received your contact information from my colleague Andrew Arbuckle of whom you may have spoken to at a previous date.

I am writing to inform you of our development ideas for four proposed wind energy facilities in Nova Scotia in the following communities: Porters Lake, Harrietsfield, Liverpool and Bayswater.

On behalf on EON WindElectric I would like to set up a meeting with you for the near future to discuss these projects.

Please feel free to contact me at your convenience, by email or by phone. I look forward to hearing from you.

Kind regards,

Trent

Trent MacDonald

EON WindElectric

P: [1-902-863-9508](tel:1-902-863-9508)



Watts Wind Energy  
300 Prince Albert Road  
Suite 200  
Dartmouth, Nova Scotia B2Y 4J2

August 22, 2014

Bear River First Nation  
130 Reservation Road  
P.O. Box 210  
Bear River, Nova Scotia B0S 1B0

Chief Carol Thompson,

Watts Wind Energy is a Nova Scotia based company dedicated to developing community based and owned wind energy projects. Please see the attached GIS map showing our proposed wind energy development located outside of Liverpool in the Region of Queens Municipality. We would like to ensure this project does not negatively impact First Nation interests and would be pleased to meet with you to discuss in greater detail.

If you require further information, or would like to arrange a time and location for a meeting, please do not hesitate to contact me at 902-482-8687, or [smason@seafortheng.ca](mailto:smason@seafortheng.ca).

Sincerely,

A handwritten signature in black ink, appearing to be "SM", followed by a period.

Stan Mason  
President, Watts Wind Energy



Trent MacDonald <tmacdonald@eonwind.com>

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## Wind Energy COMFIT Projects - Watts Wind

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**Trent MacDonald** <tmacdonald@eonwind.com>

Wed, Sep 10, 2014 at 11:31 AM

To: twilagaudet@mikmaqrights.com

Hi Twila,

I hope all is well. On behalf of Watts Wind Energy (Proponent), EON WindElectric is managing environmental planning and studies, permitting and consultation to meet COMFIT needs.

As a follow-up to my email on June 4th, I wanted to update you further on the projects. Three projects are greater than 2MW in production rating:

- Porters Lake, a 3.2MW 2 WTG installation, closest First Nation is Indian Brook (~40km)
- Harrietsfield, a 4.8MW 3 WTG installation, closest First Nation is Indian Brook (~60km)
- Liverpool, a 3.2MW 2 WTG installation, closest First Nation is Bear River (~90km)

A fourth project is also proposed in Bayswater; a 1.68MW 1 WTG installation, closest First Nation is Glooscap (>50km). This Project, being less than 2MW, does not trigger a Provincial EA.

We believe we have designed the environmental planning and programs to meet the unique aspects of each project and to exceed EA expectations. If all studies and discussions go smoothly, it is proposed to have the 3 EA's registered for their respected projects by the end of 2014.

Please know we would welcome a meeting to discuss these projects in further detail. If you have any concerns, do not hesitate to contact me by email or phone at your convenience.

Best regards,

Trent

Trent MacDonald, EIT  
EON WindElectric  
P: (902) 863-9508



Watts Wind Energy  
4 MacDonald Avenue  
Dartmouth, NS B3B 1C5

March 6, 2015

Chief Deborah Robinson  
Acadia First Nation  
10526 Highway 3  
Yarmouth, NS B5A 5J7

Dear Chief Robinson,

Watts Wind Energy is a Nova Scotia based company dedicated to developing community based wind energy projects. Watts is proposing a two turbine, 3.6 MW Project near Liverpool and is currently completing environmental studies for the submission of a Provincial Environmental Assessment. The registration of the Environmental Assessment document is anticipated to occur in April, 2015.

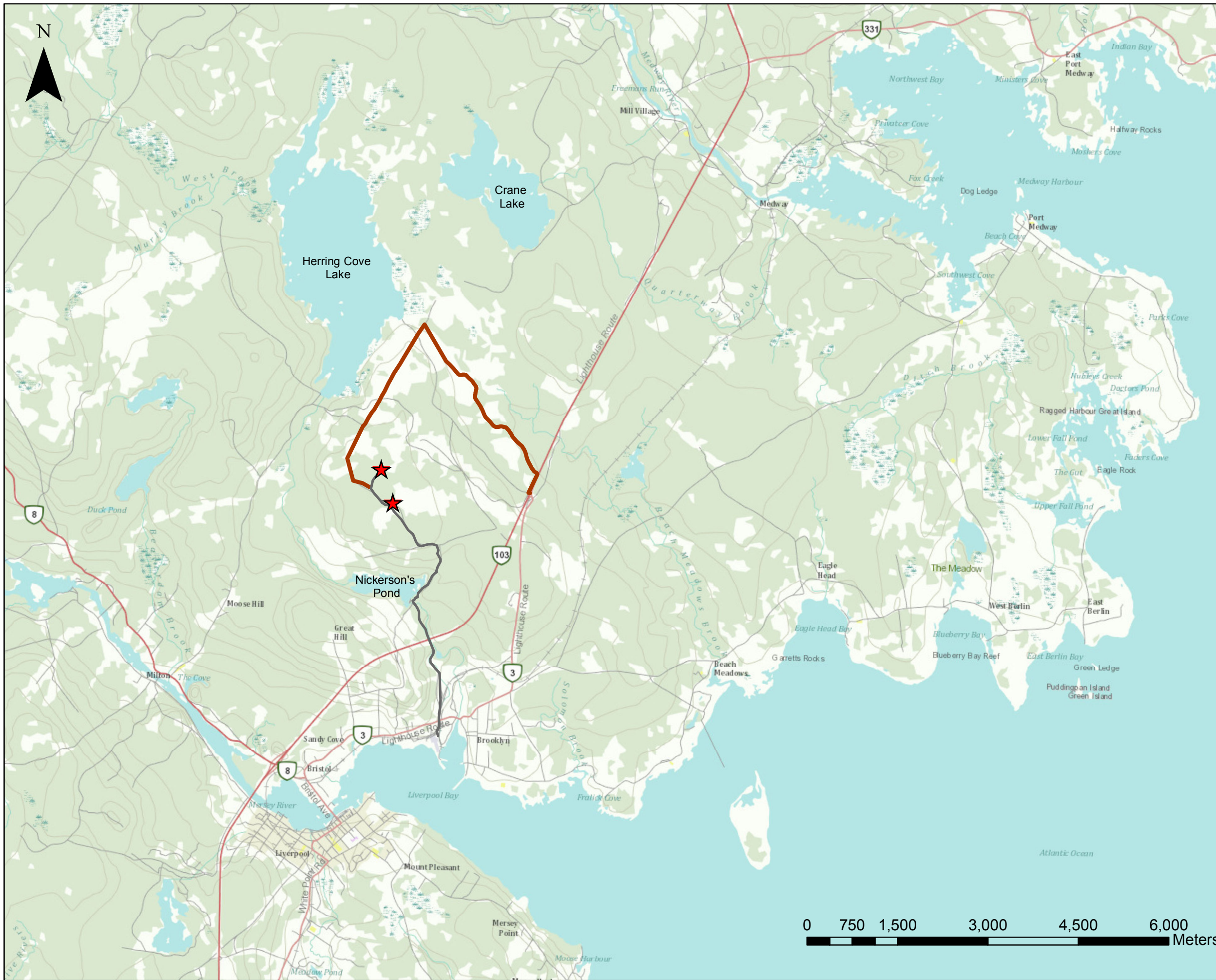
Please see the attached GIS map showing our proposed site. IR11 Medway River is located approximately 10kms from the proposed Project location. Accordingly, we would like to ensure our Project does not negatively impact First Nation interests and would be pleased to meet with you to discuss in greater detail.

If you require further information such as a Project Description, or could suggest a time and location for a meeting, please do not hesitate to contact me at 902-482-8687, or [ppynn@eonwind.com](mailto:ppynn@eonwind.com).




Sincerely,

A handwritten signature in blue ink, appearing to read "Paul Pynn", with a long horizontal line extending to the right.

Paul Pynn  
Vice President, Watts Wind Energy



### Legend

-  Turbine Location
-  Utility Routing
-  Access Road

### Liverpool Wind Energy Storage Project - Draft

Drawn by: TAM

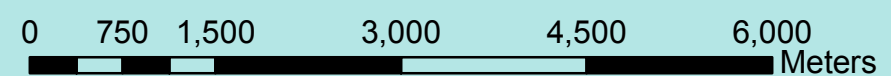
Date: 1/21/2015

Project #: 122

Scale 1:60000



Coord. System: NAD83 CSRS UTM Z20N  
 Projection: Transverse Mercator  
 Units: Meters





Trent MacDonald <tmacdonald@eonwind.com>

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## Liverpool Wind Energy Storage Project - Watts Wind Energy

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**Trent MacDonald** <tmacdonald@eonwind.com>

Fri, Mar 6, 2015 at 10:09 AM

To: [frontdesk@acadiaband.com](mailto:frontdesk@acadiaband.com)

Dear Chief Deborah Robinson,

Please find attached a letter from Watts Wind Energy regarding a proposed 3-turbine wind energy facility in Harrietsfield, NS.

If you have any questions, please contact me at your convenience.

Best regards,

Trent

Trent MacDonald, EIT  
EON WindElectric  
P: [\(902\) 482-8687](tel:(902)482-8687)



**20150306 Acadia First Nation.pdf**

1898K



Trent MacDonald <tmacdonald@eonwind.com>

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## Liverpool Wind Farm - Watts Wind Energy

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**Trent MacDonald** <tmacdonald@eonwind.com>

Tue, May 19, 2015 at 9:58 AM

To: twilagaudet@mikmaqrights.com

Dear Twila,

Watts Wind Energy Inc., under the Limited Partnership Liverpool Wind Energy Storage Project Inc., is proposing a two-turbine wind facility north of Liverpool, approximately one kilometer north of Nickerson's Pond. The wind project is part of the NS ComFIT program and will be connected to an energy storage system, capable of storing wind when demand is low and supply is high.

The Proponent has begun initial wind data collection on the site with the installation of a meteorological tower.

Over the past calendar year, the Proponent has completed studies to assess the environmental factors on site and will be compiled into an Environmental Assessment document and submitted to Nova Scotia Environment for their formal review process.

The Proponent would like to request a meeting to sit down and discuss the Project in detail. Please contact myself at your convenience to decide on a time and to discuss the Project further.

Best Regards,

Trent MacDonald, EIT

**EON WindElectric Inc.**  
4 MacDonald Avenue  
Dartmouth, NS B3B 1C5

Office: (902) 482-8687

Cell: (902) 863-9508

[www.eonwind.com](http://www.eonwind.com)





Trent MacDonald <tmacdonald@eonwind.com>

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## Liverpool Wind Farm - Watts Wind Energy Inc.

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Trent MacDonald <tmacdonald@eonwind.com>

Tue, May 19, 2015 at 9:57 AM

To: frontdesk@acadiaband.com

Dear Sir/Madam,

Watts Wind Energy Inc., under the Limited Partnership Liverpool Wind Energy Storage Project Inc., is proposing a two-turbine wind facility north of Liverpool, approximately one kilometer north of Nickerson's Pond on Crown Land. The wind project is part of the NS ComFIT program and will be connected to an energy storage system, capable of storing wind when demand is low and supply is high.

The Proponent has begun initial wind data collection on the site with the installation of a meteorological tower.

Over the past calendar year, the Proponent has completed studies to assess the environmental factors on site and will be compiled into an Environmental Assessment document and submitted to Nova Scotia Environment for their formal review process.

The Proponent would like to request a meeting to sit down and discuss the Project in detail. Please contact myself at your convenience to decide on a time and to discuss the Project further.

Best Regards,

Trent MacDonald, EIT

**EON WindElectric Inc.**  
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Dartmouth, NS B3B 1C5

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Trent MacDonald <tmacdonald@eonwind.com>

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## Proposed Liverpool Wind Project - Watts Wind Energy

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Trent MacDonald <tmacdonald@eonwind.com>

Sun, May 31, 2015 at 2:29 PM

To: twilagaudet@mikmaqrights.com

Hi Twila,

Hope all is well.

I am writing to update you on the status of the proposed Liverpool Wind Project and to request a meeting with the KMK to sit down and discuss the Project if you are interested.

I have attached a Project description that includes much of our Project details to date and includes mapping of the proposed site.

We have completed environmental studies over the past year and are planning to submit an Environmental Assessment to Nova Scotia Environment late in June.

I look forward to hearing back from you.

Best Regards,

Trent

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Trent MacDonald, EIT

**EON WindElectric Inc.**  
4 MacDonald Avenue  
Dartmouth, NS B3B 1C5

Office: (902) 482-8687

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[www.eonwind.com](http://www.eonwind.com)



**122-LiverpoolProjectDescription, Revised 28-05-2015.pdf**

2189K

## Appendix M – Noise and Shadow Flicker Modelling



March 6, 2015

**Mr. Trent MacDonald**  
**EON WindElectric**  
#200 - 300 Prince Albert Road  
Dartmouth, NS B2Y 4J2

Dear Mr. MacDonald,

**Re: Sound and Shadow Flicker Modeling Results**  
**Liverpool Wind Power Project, Queens County, NS**

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## **INTRODUCTION**

Watts Wind Energy Inc. (WWEI) is proposing the development of the Liverpool Wind Power Project (the Project). The Project consists of three General Electric (GE) 2.3 MW turbines located near to the communities of Brooklyn and Milton, NS

To support Project planning and the Nova Scotia Environmental Assessment (EA) process, Strum completed the following sound and shadow flicker modelling assessments.

## **BACKGROUND**

### **Wind Turbines and Noise**

Wind turbines generate sound both through the movement of mechanical equipment inside the nacelle and through the interaction of the blades with the air as they rotate around the nacelle. In modern turbine designs, much of the mechanical noise is mitigated through the use of noise insulating materials. Aerodynamic sound resulting from blade rotation is an unavoidable by-product of wind energy generation, although advances in blade engineering have greatly reduced the sound power level emitted from operating turbines. The sound pressure level at a given point in the landscape surrounding the wind turbine is influenced by propagation distance, local topography, atmospheric conditions, and vegetative cover (Hau 2006).

Nova Scotia has no specific sound guidelines for wind farms; however, through the EA process, Nova Scotia Environment (NSE) requires that predicted noise levels at identified residential receptors (as well as daycares, hospitals, and schools) not exceed 40 dBA. As this guideline is intended to be protective of human sleep disturbance, 40 dBA does not apply to commercial or vacant lot receptors. This guideline was used in the current sound assessment for the Project.

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Moncton, NB E1A 3R1  
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f. 902.835.5574

Deer Lake Office  
101 Nicholasville Road  
Deer Lake, NL A8A 1V5  
t. 1.855.770.5560 (24/7)  
f. 902.835.5574

## Wind Turbines and Shadow Flicker

The rotating blades of a wind turbine can cast a moving shadow on locations within a certain distance of the turbine. This intermittent shadow, perceived as a change in light intensity to an observer, is referred to as shadow flicker. The potential impact area depends on the time of year and day and the wind turbine's physical characteristics (height, rotor diameter, blade width, and orientation of the rotor blades).

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

- The sun must be shining and not be obscured by clouds/fog.
- The source turbine must be operating.
- The wind turbine must be situated between the sun and the shadow receptor.
- The wind turbine must be facing directly towards, or away from, the sun such that the rotational plane of the blades (rotor plane) is perpendicular to the azimuth of incident sun rays. For this to occur, the wind direction would have to be parallel to the azimuth of the incident sun rays throughout the day.
- The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, tall structures, etc., will prevent shadow flicker from occurring at the receptor.
- The shadow receptor has to be close enough to the turbine to be in the shadow.

There are no municipal, provincial, or federal guidelines related to shadow flicker, but many jurisdictions (including NSE) have adopted the industry standard of no more than 30 hours of shadow flicker per year, or no more than 30 minutes of shadow flicker on the worst day of the year. These guidelines were developed in Germany to prevent excessive annoyance to neighbours of wind energy developments and are now included under that country's *Federal Emission Control Act* (as cited in Haugen 2011). These guidelines were used in the current shadow flicker assessment for the Project.

## ASSESSMENT METHODOLOGY AND RESULTS

### Project Layout and Turbine Characteristics

All modelling was based on the Project layout and the GE 2.3-107 turbine model. The precise coordinates and locations of each turbine are:

WTG 1: 44° 05' 31.61" N, 64° 42' 28.64" W

WTG 2: 44° 05' 13.81" N, 64° 42' 19.64" W

WTG 3: 44° 05' 02.94" N, 64° 42' 06.38" W

The GE 2.3-107 turbine model has the following structural characteristics (GE 2014):

- Hub height – 80 m;
- Rotor diameter – 107 m.

## Sound Assessment

### Sound Methodology

An acoustic assessment was conducted for the Project to predict sound pressure levels at identified receptors within a 2 km radius of the proposed turbine locations. The assessment was completed using the “Decibel” module of the WindPro v. 3.0 software package. For the purposes of this model, receptors included all structures identified in the provincial topographic mapping, as well as any additional identifiable structures based on aerial imagery. No attempt to distinguish sheds and outbuildings from dwellings or cottages was made.

The sound assessment model followed ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method and calculations, and was based on the following input information:

- UTM coordinates for the wind turbines;
- UTM coordinates for existing receptors (8) within a 2 km radius of the Project site;
- A wind speed of 10.1 m/s, the speed at which the highest sound power level output is achieved (based on test data from the manufacturer);
- Overall sound emission data for the GE 2.3-107, provided by the manufacturer in the document “Technical Documentation Wind Turbine Generator Systems 2.3-107 with LNTE-50 Hz and 60 Hz” (GE 2014);
- Topographic data for the surrounding area; and
- 1/1 and 1/3 octave level data provided by the manufacturer.

The ISO 9613-2 calculation method assumes meteorological conditions that are ideal for noise propagation, including a ground temperature of 10°C and 70% relative humidity. A conservative ground factor of 0.7 was applied to the model, although the forested nature of the landscape (e.g. predominantly porous ground which is capable of supporting vegetative growth) could support a higher value.

### Sound Modelling Results

Modelling results are provided in Table 1 (attached) and indicate that predicted sound pressure levels will not exceed 40 dBA at any existing receptor (Drawing 1, attached).

## Shadow Flicker Assessment

### Shadow Flicker Methodology

A shadow flicker assessment was completed for the Project to assess the potential impact of shadows at identified receptors within a 2 km radius of the proposed turbine locations. Receptors were identified using the same methodology as described in the previous section for the sound assessment. The assessment was completed using the “Shadow” module of the WindPro v. 3.0 software package using worst case scenario conditions, including:

- Constant sunshine during daylight hours;
- Turbines are always operational;
- Turbine blades are oriented perpendicular to the line between the sun and all receptors;
- No obstructions are present that may obscure shadows; and
- Receptor windows are oriented towards the turbine(s).

The extent of the shadow zone of each turbine was calculated in consideration of the structural characteristics of the turbine, according to guidelines used in Germany (WindPro 2012).

#### Shadow Flicker Results

Modelling results are provided in Table 2 (attached) and indicate that all existing receptors are predicted to comply with the industry standard of no more than 30 minutes of shadow on the worst day and no more than 30 hours of shadow flicker per year (Drawing 2, attached).

#### **CONCLUSIONS**

An evaluation of potential sound and shadow flicker levels of the Liverpool Wind Power Project was completed. Based on predictive modelling, sound and shadow flicker levels are not expected to exceed NSE guidelines or accepted industry standards at any existing receptor.

Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,



Scott Dickey, MREM  
Environmental Specialist  
[sdickey@strum.com](mailto:sdickey@strum.com)



Shawn Duncan, BSc.  
Vice President  
[sduncan@strum.com](mailto:sduncan@strum.com)

## **REFERENCES**

General Electric. 2014. Technical Documentation Wind Turbine Generator Systems 2.3-107 with LNTE - 50 Hz and 60 Hz.

Haugen K.M.B. 2011. International review of policies and recommendations for wind turbine setbacks from residences: setbacks, noise, shadow flicker, and other concerns. Minnesota Department of Commerce: Energy Facility Permitting. 43 pp.

WindPRO. 2012. Environment Manual Section 4.2.1



**Notes:**

1. Reference: Digital Topographic Mapping by Nova Scotia Geomatics Centre.
2. Projection: NAD83(CRS), UTM Zone 20 North.
3. Noise Emission Model was Done in Accordance with ISO 9613-2 General Guidelines and Using Wind Turbine Data Supplied by Client.

**Legend:**

- Proposed Turbine (Yellow Triangle)
- Existing Receptors (Purple Circle)
- 2km Buffer (Dashed Black Line)
- Major Roads and Highways (Thick Black Line)
- Public Roads (Thin Black Line)
- Access Roads / Trails (Dashed Grey Line)
- Existing Transmission Lines (Blue Line with 'X' markers)
- Mapped Stream (Blue Line)
- Mapped Indefinite Stream (Blue Line with 'X' markers)
- Water Bodies (Blue Area)
- Cleared Area (Light Green Area)

**Sound Modeling Results**

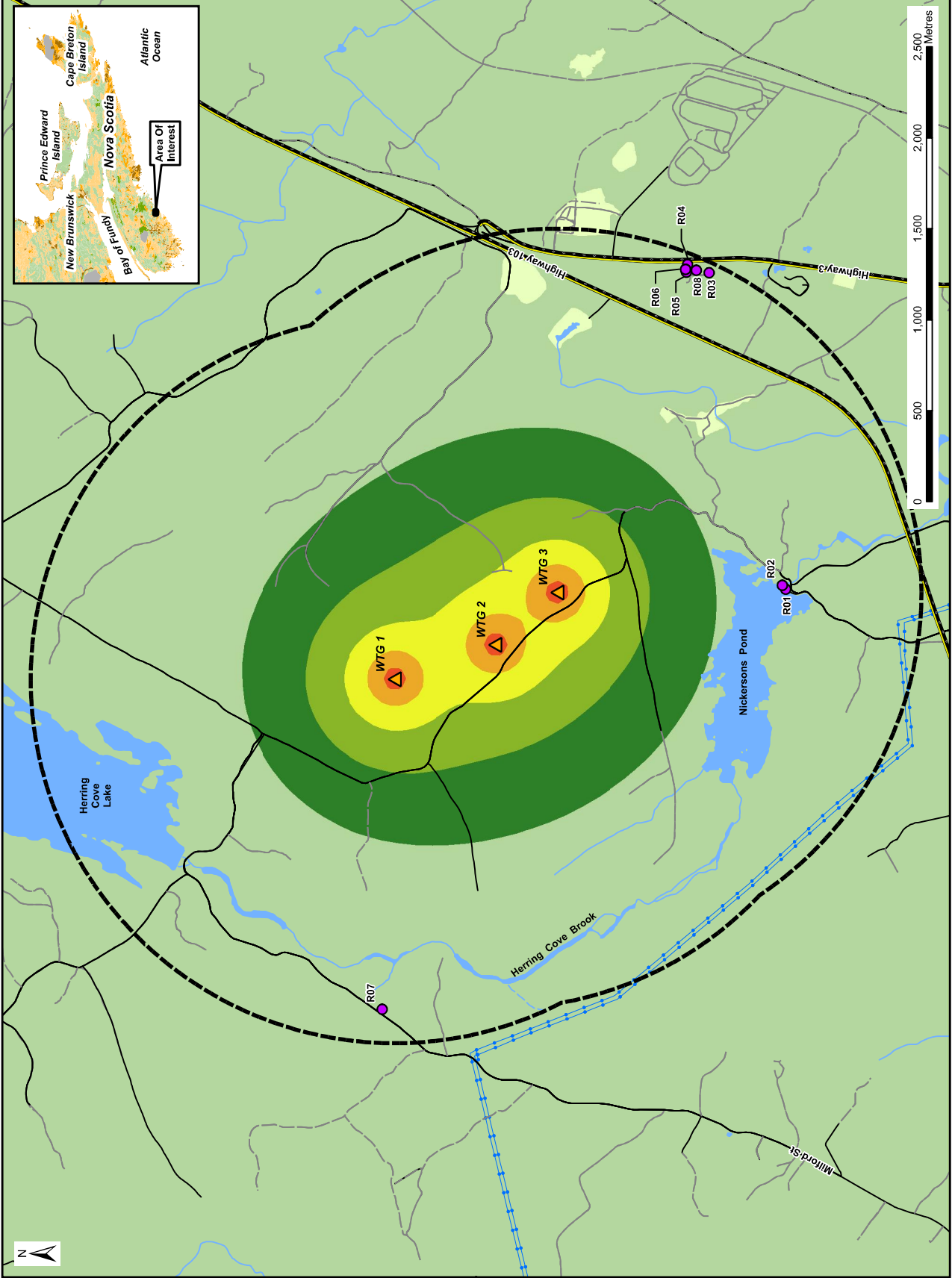
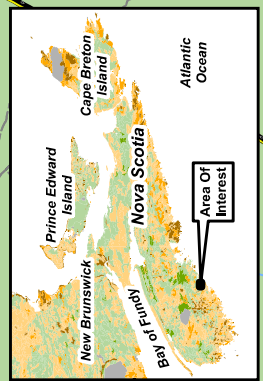
**Predicted Sound Level (dBA)**

- 35.0 - 40.0 (Dark Green)
- 40.0 - 45.0 (Light Green)
- 45.0 - 50.0 (Yellow-Green)
- 50.0 - 55.0 (Yellow)
- 55.0 - 100.0 (Orange-Red)

# Liverpool Wind Project - Sound Modeling Results



Date:	February 2015
Project #:	14-5103
Scale:	1:20,000
Drawing #:	1
Drawn By:	H. Serhan
Checked By:	S. Dickey



**Notes:**

1. Reference: Digital Topographic Mapping by Nova Scotia Geomatics Centre.
2. Projection: NAD83(CSRG), UTM Zone 20 North.
3. Shadow Calculation Model was Done Using Wind Turbine Data Supplied by Client.

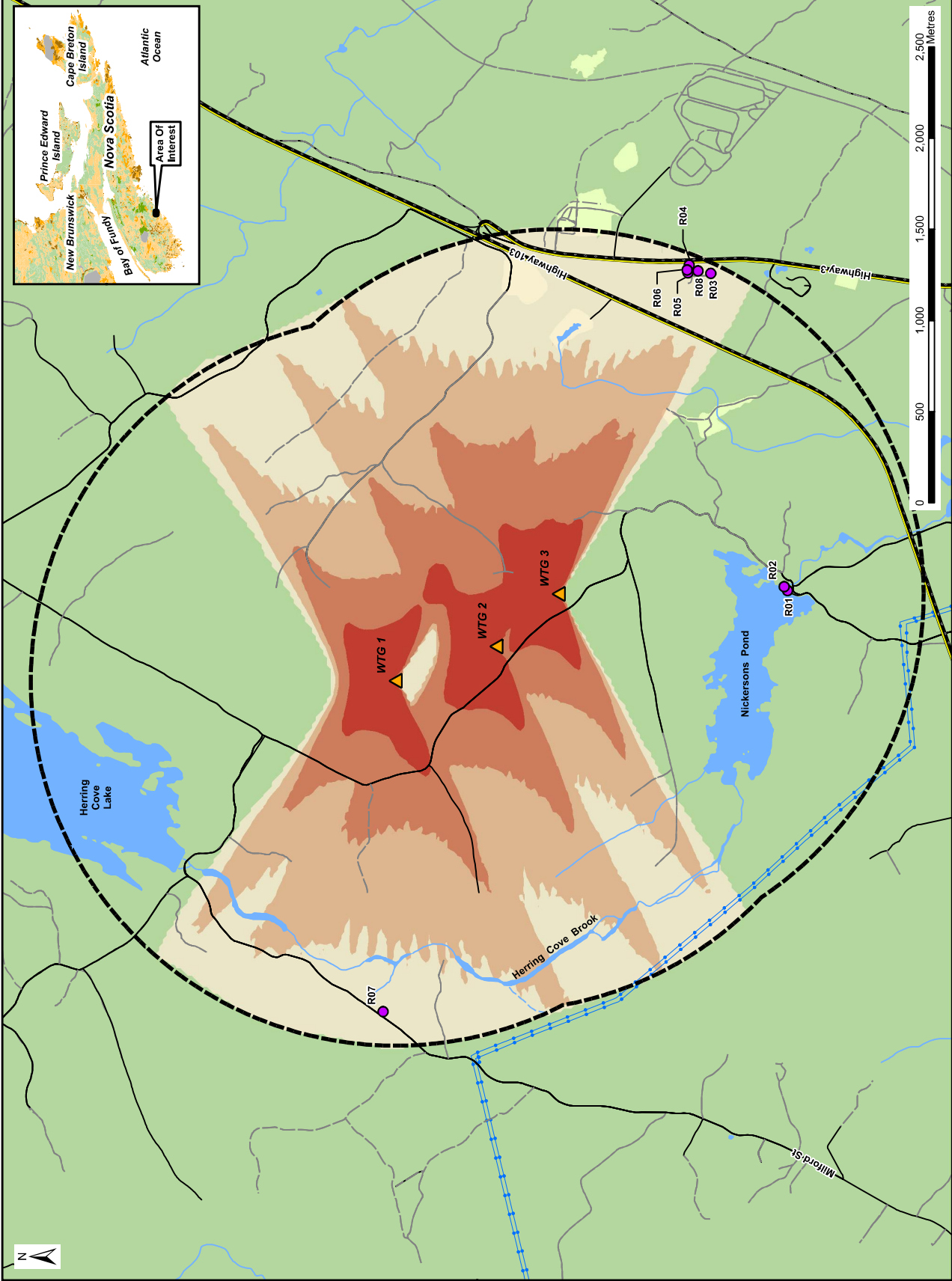
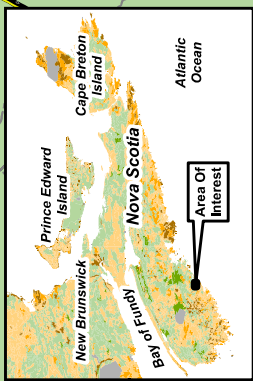
**Legend:**

- Proposed Turbine
  - Existing Receptors
  - 2km Buffer
  - Major Roads and Highways
  - Public Roads
  - Access Roads / Trails
  - Existing Transmission Lines
  - Mapped Stream
  - Mapped Indefinite Stream
  - Water Bodies
  - Cleared Area
- Shadow Flicker Modeling Results**  
**Predicted Shadow Hours/Year**
- 0.0 - 10.0
  - 10.0 - 30.0
  - 30.0 - 100.0
  - 100.0+

# Liverpool Wind Project - Shadow Modeling Results



Date:	February 2015	Project #:	14-5103
Scale:	1:20,000	Drawing #:	<b>2</b>
Drawn By:	H. Serhan	Checked By:	S. Dickey



<b>Receptor ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Predicted Noise Level (dBA)</b>
R01	363773.1	4881372.7	31.6
R02	363793.5	4881391.3	31.7
R03	365511.9	4881793	27.0
R04	365557.1	4881912.2	27.1
R05	365515.2	4881919	27.3
R06	365530.3	4881922.701	27.2
R07	361463.722	4883589.765	28.1
R08	365525.4332	4881863.935	27.1

**Table 2: Shadow Flicker Modeling Results, Liverpool Wind Power Project**

**Project #14-5103**

<b>Receptor ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Predicted Shadow Hours/per Year</b>	<b>Predicted Maximum Shadow Hours/Day</b>
R01	363773.1	4881372.7	0:00	0:00
R02	363793.5	4881391.3	0:00	0:00
R03	365511.9	4881793	3:13	0:07
R04	365557.1	4881912.2	1:59	0:07
R05	365515.2	4881919	2:24	0:07
R06	365530.3	4881922.701	2:12	0:07
R07	361463.722	4883589.765	5:11	0:13
R08	365525.4332	4881863.935	2:25	0:07

## Appendix N – Visual Impact Assessment



March 6, 2015

**Mr. Trent MacDonald**  
**EON WindElectric**  
#200-300 Prince Albert Road  
Dartmouth, NS B2Y 4J2

Dear Mr. MacDonald,

**Re: Visual Assessment**  
**Liverpool Community Wind Project**

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## **INTRODUCTION**

Watts Wind Energy Inc. (WWEI) is proposing the development of the Liverpool Wind Power Project (the Project). The Project consists of three General Electric (GE) 2.3 MW turbines located near to the communities of Brooklyn and Milton, NS.

To support Project planning and the Nova Scotia Environmental Assessment (EA) process, Strum completed the following visual assessment.

## **PREDICTED VIEW PLANE**

The predicted view plane was established by collecting representative photos from vantage points within the community to represent the existing and future visual landscape.

Photographs were collected with magnetic bearings and a GPS waypoint recorded at each photo location. Geographical Information System (GIS) software was used to plot the photo locations and construct bearing lines to assist in the construction of a 3D view, generated using the GIS. A 3D surface was then constructed using the provincial Digital Elevation Model (DEM) points from the Nova Scotia Topographic Database, which supports 5 m contour intervals. The proposed turbine locations and specifics regarding the height of the turbines were used to develop the view plane. Each selected viewing site was created using the viewer location (photo GPS point, elevation, and bearing line) resulting in an accurate 3D view. The resulting computer generated view was then merged with the digital photographs using a scaled image of the proposed turbine.

Photos were taken from three locations as shown in Drawing 1 (attached). Simulated results are provided in Figures 1-3.

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f. 902.863.1389

Moncton Office  
45 Price Street  
Moncton, NB E1A 3R1  
t. 1.855.770.5560 (24/7)  
f. 902.835.5574

Deer Lake Office  
101 Nicholasville Road  
Deer Lake, NL A8A 1V5  
t. 1.855.770.5560 (24/7)  
f. 902.835.5574

**Actual View:**



**Predicted View:**



Figure 1. Roadside from Great Hill Road: View to the northeast, towards the Project site.

**Actual View:**



**Predicted View:**



Figure 2. Shoreline of Nickerson Pond. View to the northwest, towards the Project site.



**Actual View:**



**Predicted View:**



Figure 3. Roadside from Highway 103. View to the northeast, towards the Project site.

Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,



Andy Walter, BSc.  
Environmental Specialist  
[awalter@strum.com](mailto:awalter@strum.com)



Shawn Duncan, BSc.  
Vice President  
[sduncan@strum.com](mailto:sduncan@strum.com)

**Notes:**

1. Reference: Digital Topographic Mapping by Nova Scotia Geomatics Centre.
2. Projection: NAD83(CSRS), UTM Zone 20 North.

**Legend:**

- Visual Assessment Location
- ▲ Proposed Turbine
- Major Roads and Highways
- Public Roads
- Access Roads / Trails
- Existing Transmission Lines
- Mapped Stream
- Mapped Indefinite Stream
- Water Bodies
- Cleared Area

# Liverpool Wind Project - Visual Assessments Locations



Date:	February 2015	Project #:	14-5103
Scale:	1:25,000	Drawing #:	<b>1</b>
Drawn By:	H. Serhan		
Checked By:	A. Walter		

