SOUTH CANOE WIND POWER PROJECT

Environmental Assessment Registration Document

May 17, 2012

Prepared For and By:

Oxford Frozen Foods

Minas Basin Pulp and Power

Nova Scotia Power Incorporated

EXECUTIVE SUMMARY

Oxford Frozen Foods and Minas Basin Pulp and Power have both partnered with Nova Scotia Power Inc. to submit proposals for approximately 100MW wind generating facility, entitled the South Canoe Wind Project (the Project). The Project will be constructed on privately owned lands in Lunenburg County, which are surrounded by the communities of Waterville, Upper Vaughan, New Russell and Leminster.

The Project is being developed in response to the Government of Nova Scotia's Request For Proposal (RFP) for the procurement of 300GWh per year of renewable electricity. The submission date for the RFP is expected to be during the month of June 2012, with the intended commissioning of the Project before 2015.

The Project is considered a Class 1 undertaking under the Nova Scotia Environmental Assessment Regulations and as such, requires a registered Environmental Assessment as identified under Schedule A of the Regulations.

The Environmental Assessments and the registration document have been completed according to the methodologies and requirements outlined in the "Proponent's Guide to Wind Power Projects: Guide for Preparing an Environmental Assessment Registration Document" (Nova Scotia Environment 2007, updated 2012) and accepted best practices for conducting Environmental Assessments.

The goal for completing the environmental assessment is to identify potential Valued Ecosystem Components (VECs), determine what effects the Project may have on each VEC and develop mitigation techniques that will eliminate, reduce or control any adverse environmental effects. To assist in this evaluation, a project sensitivity designation is assigned, which provides guidance to the level of complexity regarding the individual studies which will need to be taken to evaluate the residual effects or the determination of potential additional studies. The Project has been designated a Category 4, which indicates that very high level of evaluation will be required during the assessment process.

The VECs that have been considered during this assessment process are:

- Air quality;
- Surficial geology (soil);
- Bedrock geology;
- Groundwater;
- Aquatic habitats;
- Fish and fish habitat;
- Terrestrial habitat;
- Wetlands;
- Rare plants;

- Avifauna;
- Bats;
- Acoustics;
- Visual aesthetic;
- Radar/telecommunication;
- Land use/recreation;
- Archaeological resources;
- First Nations resources;
- Local communities and economy; and
- Human health and safety.

Special focus component studies were completed for the following:

- Wetlands;
- Habitat and flora;
- Terrestrial fauna;
- Archaeological resources;
- Avifauna;
- Acoustics;
- Shadow flicker; and
- Visual impact.

Based on the data collected during the component studies and the research conducted for each of the respective VECs, the proponent used the data to develop constraints mapping to ensure, to the extent possible, that avoidance was the first consideration. This data was further used to determine reasonable mitigation strategies to further lower the potential impacts to VECs.

The Proponents have utilized best management techniques to optimize the size of the Project Area, focusing development in areas with existing roads, recent clear-cuts, and areas of lower valued ecosystems. In doings so, the Proponent has ensured higher valued ecosystems will remain outside the scope of the Project.

The vast majority of the potential effects on the VECs evaluated were determined to have very low to no residual effects based on the activities surrounding the construction, operations and maintenance and decommissioning of the project. Potential impacts on VECs that may result in residual effects will be lowered to an acceptable level with the deployment of appropriate mitigation, best management practices and follow up programs.

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1. PROJECT INFORMATION

This section of the Environmental Assessment (EA) report provides a description of the project proponents, a brief overview of the project, and a description of the regulatory requirements. The structure of the overall document is also provided.

1.1. Proponent Description

Oxford Frozen Foods (OFF) and its associated companies are based in Nova Scotia and are part of the Bragg Group of Companies. Oxford is a vertically integrated, wild blueberry farming, processing and marketing group of companies and a major producer of frozen carrot products and battered vegetables. The Oxford label is recognized throughout the world as the standard for wild blueberries. The company's standard of excellence and commitment to quality has led to long term, successful alliances with suppliers and customers around the world.

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Name: Rick Cecchetto, Bragg Group of Companies
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Fax: 902 447 3245
Email: rick.cecchetto@tidnish.ca

Minas Basin Pulp and Power (MBPP) is a manufacturer of linerboard from 100% post-consumer materials that was founded in 1927. The company also acts as an independent power producer with a 5 MW hydro facility and a portfolio of power projects under development from technologies including wind and tidal energy. Minas is a berth holder at the Fundy Ocean Research Center for Energy (FORCE) and is an active trader of carbon credits.

Contact Info:
Name: Chris Peters, Minas Basin Pulp and Power Company Limited
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Nova Scotia Power Incorporated (NSPI) has been the main electricity provider for Nova Scotians for more than 80 years, supplying 95% of the electrical generation, transmission and distribution in the province, NSPI provides safe, dependable sources of energy to its 490,000 customers. NSPI is making strides in reducing emissions and adding renewable energy sources. It is focusing on new technologies to enhance customer service and reliability. NSPI is the principal operating subsidiary of Emera, with 1,900 employees, $4.0 billion in assets and a fleet that includes thermal, tidal and hydro plants as well as combustion and wind turbines.

Contact Info:
Name: Heather Holland, Nova Scotia Power Incorporated
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Telephone: 902-428-6089
Fax: 902-428-6801
Contact email: Heather.Holland@nspower.ca

These three Nova Scotia companies have joined together to bring both their business experience and financial capabilities to develop a new wind farm – the South Canoe Wind Power Project.

1.2. Project Overview

The South Canoe Wind Power Project (Project) is a proposed wind generating facility located between Highway 14 and the New Russell Road, near the communities of Waterville and Leminster (Hants County), and New Russell (Lunenburg County). The Project will have a nameplate capacity of approximately 100 MW. The Project is approximately 31 km from Chester and 24 km from Windsor. The Project lands are centered at 394861.792 E and 4957747.499 N (20T; NAD 83) and comprise approximately 2,790 hectares of privately owned land.

All Project lands within the Project Boundary have been evaluated to the extent contained in the EA report. The final capacity and number of turbines (and therefore the Project footprint) will depend on the outcome of the RFP process and the turbine manufacturer chosen.

1.3. Regulatory Framework

The Project is subject to a Class I EA as defined by the Environmental Assessment Regulations under the *Nova Scotia Environment Act*. As such, the proponents are required to register the Project with Nova Scotia Environment (NSE) and subsequently comply with the Class I registration process as defined by the "Proponent's Guide to Environmental Assessment" (NSE,2009a).

A federal EA is required when one or more triggers occur as defined under the *Canadian Environmental Assessment Act* (CEAA):

- A federal department or agency carries out a project;
- A federal department or agency provides financial assistance to enable a project to be carried out;
- A federal department or agency sells, leases or transfers control of land to enable a project to be carried out; and/or

- A federal department or agency issues an authorization to enable a project to be carried out.

No federal triggers are expected to apply to the Project; lands are privately owned and no federal funding is proposed to support the Project. Certain federal authorizations under the *Fisheries Act* and *Navigable Waters Protection Act* are applicable, but are not expected to be required. Sufficient best practices and mitigation measures will be applied to Project activities that have the potential to trigger federal legislation. A federal EA is therefore not anticipated.

Land Use By-Laws exist in the Municipality of the District of Chester; however, it does not have provisions specific to wind power, but describes permitted industrial developments. The Land Use By-Law for Chester requires a development agreement for "electric generating facilities with a production rating of 10 MW or more", which applies to the proposed Project (Municipality of the District of Chester, 2008). Wind developments are permitted only in areas designated as the "General Basic Zone" and must undergo a provincial EA prior to the agreement taking place.

1.4. Structure of Document

Table 1.1 outlines the content of each section of the EA report.

Table 1.1: EA Report Structure

Section	Content
Section 2	Project description including an overview of Project location, activities and schedule
Section 3	Scope and methodologies used during the EA process
Section 4	Existing biophysical environmental conditions, potential impacts and mitigation
Section 5	Existing socio-economic and cultural conditions, potential impacts and mitigation
Section 6	Other considerations, including visual impacts and sound
Section 7	Public, First Nations and municipal consultation
Section 8	Analysis of the effects of the Project on the environment
Section 9	Effects of the environment on the Project
Section 10	Analysis of cumulative effects
Section 11	Follow up measures and future studies
Section 12	Other approvals required
Section 13	Concluding remarks
Section 14	References
Section 15	Appendices

1.5. Investigators and Authors

Table 1.2 presents consultants and investigators for the Project and authors of the EA report. Credentials are provided in Appendix A.

Table 1.2: List of Consultants/Investigators, Main Contacts and Work Completed

Company	Main Contacts	Work Completed
Nova Scotia Power Incorporated	Jennifer Pratt, Melissa Haley, Stephanie Fuller	EA Report
Minas Basin Pulp and Power	Mary-Frances Lynch	Socio-economic Conditions
Strum Environmental	Bruce Strum, Melanie Smith, Andy Walters	Wetland Assessment, Hydrogeological Assessment, Bird Surveys, EA Report
McCallum Environmental Ltd.	Robert McCallum	Bat Study, Breeding Bird Study
Membertou Geomatics Consulting	Jason Googoo	MEKS Proposal
Genivar	Barry Turner	Radar and Radio Interference Study
Davis MacIntrye & Associates Ltd.	April MacIntyre	Archaeological Resource Assessment
Clarence Stevens	Clarence Stevens	Avian Study

2. PROJECT DESCRIPTION

2.1. Purpose of Project

Nova Scotia, through both the Renewable Energy Plan and the legislated (2010) amendments to the *Electricity Act,* has committed to supplying 25% of all consumed energy as renewable energy to Nova Scotian homes by 2015. This commitment is expected to be achieved through developments in hydro, biomass, wind and tidal energy; although wind is expected to play a lead role in reaching these targets.

The Government of Nova Scotia has appointed a Renewable Energy Administrator (REA) for the purpose of overseeing a competitive bid process for renewable electricity projects. In December 2011, a Request for Proposal (RFP) *for 300GWh/year of Renewable Energy from IPP* was issued. While NSPI retains responsibility for the purchase of energy, the REA will evaluate the bids and select a winner based on a detailed review of all submissions. JAs environmental considerations are part of the evaluation process for the proposal, the EA report is being prepared in advance of the RFP deadline.

The proposed Project is intended to generate electricity for sale to NSPI and consequently, to serve the purpose of contributing to NSPI's greenhouse gas emissions targets while at the same time addressing the provinces' renewable energy commitments.

2.2. Geographical Location

The Project Boundaries are located in Lunenburg county, with the Project centre located at 394861.792 E and 4957747.499 N (20T; NAD 83). The closest communities to the Project site are New Russell to the west, the communities of Leminster and Vaughan to the north, the community of Waterville to the east, and the community of Sherwood to the south. The community of Chester and the Town of Windsor are approximately 22 km and 24 km away, respectively. The easternmost boundary is located 2.8 km from Highway 14 which runs in a north-south direction from Chester to Windsor. The southernmost boundary is adjacent to mostly forested area, to which some active harvesting is applied. The New Russell Road runs along the northern boundaries of the Project and is approximately 600 m away. A map of the location of the Project is provided in Drawing 2.1.

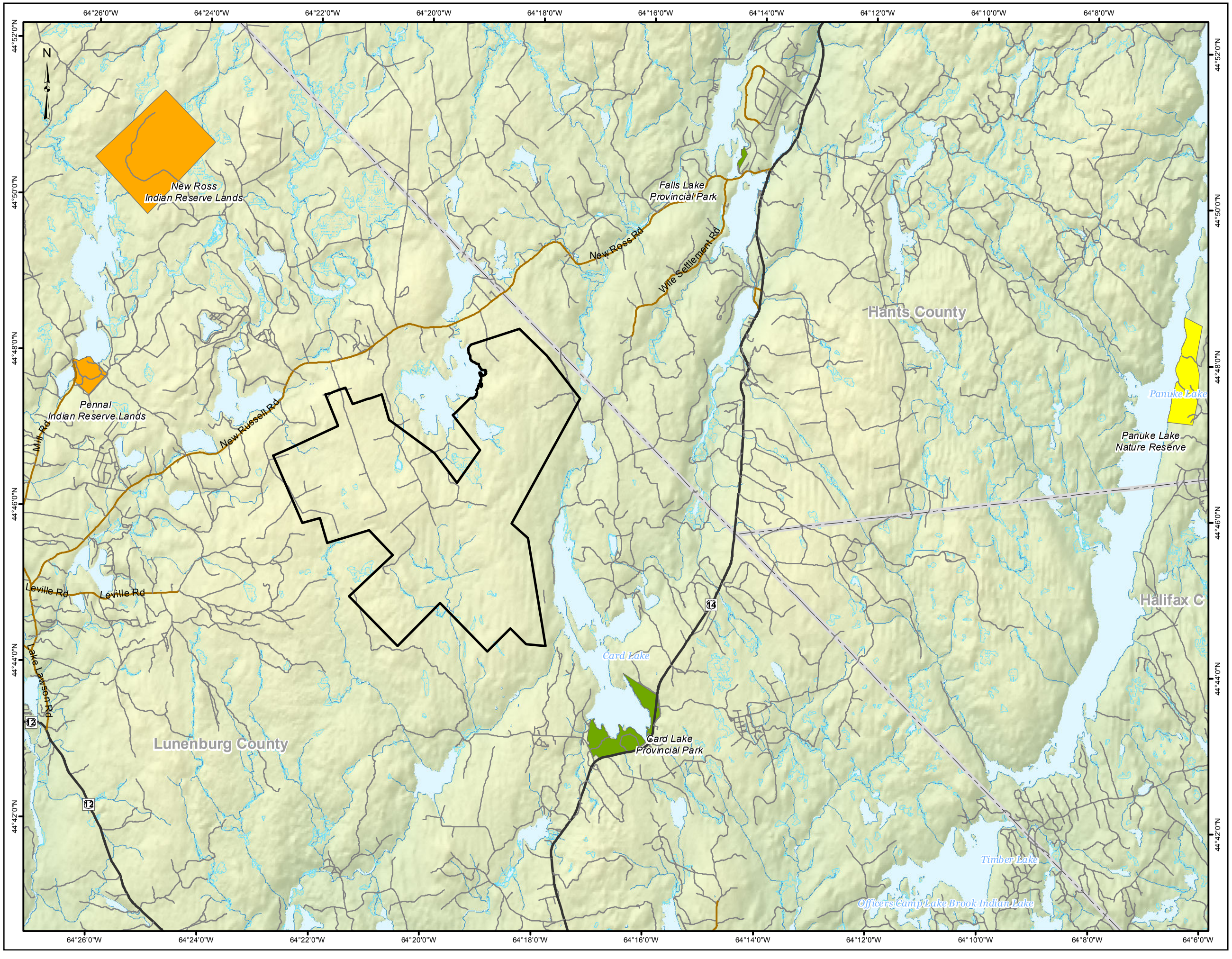
A list of all PIDs involved in the Project can be found in Table 2.1.

Table 2.1: List of PIDs Involved in the Project

PID	PID	PID
60398716	60399086	60399029
60398880	60398872	
60398906	60398898	
60399037	60398914	

South Canoe Wind Project

Restricted Use Areas

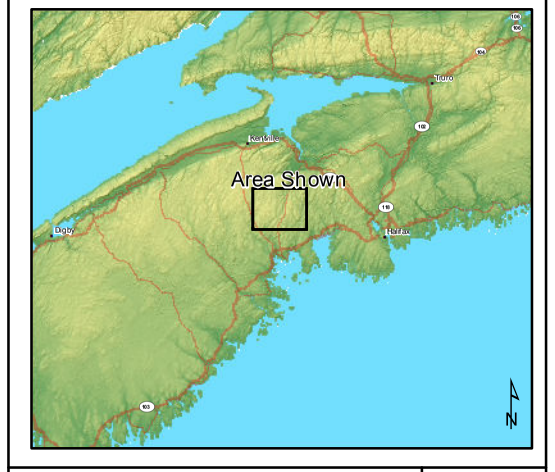


Project Components

- Project Boundary

Provincial Layers

- Other Road
- Local Roads
- Collector
- Arterial
- Watercourse
- Waterbody
- Wetland
- Areas under the Special Places Act
- Designated Prov. Park & Park Reserve
- Indian Reserve Lands



0 0.5 1 2 3 Kilometers

Date: May, 2012

Scale: 1: 85,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, RLLU

Sheet:

2.1

Initial Project boundaries were considered the Property Boundaries and the majority of the component studies completed (and attached to this document) were based on this geographic space. However, during the development of the Project and the site optimization process, these boundaries have changed; the final Project Boundaries are much smaller than initially considered. Areas discussed in the appended component studies, if not immediately relevant to the new footprint, may not be fully discussed. However, the data collected during the component study was used to assist the Project Developers in the site optimization stage of the project. More information on the development of the boundaries can be found in the Site Optimization (Section 3.6) of this document. Throughout the rest of this document, all distances will be referred to from the Project Area.

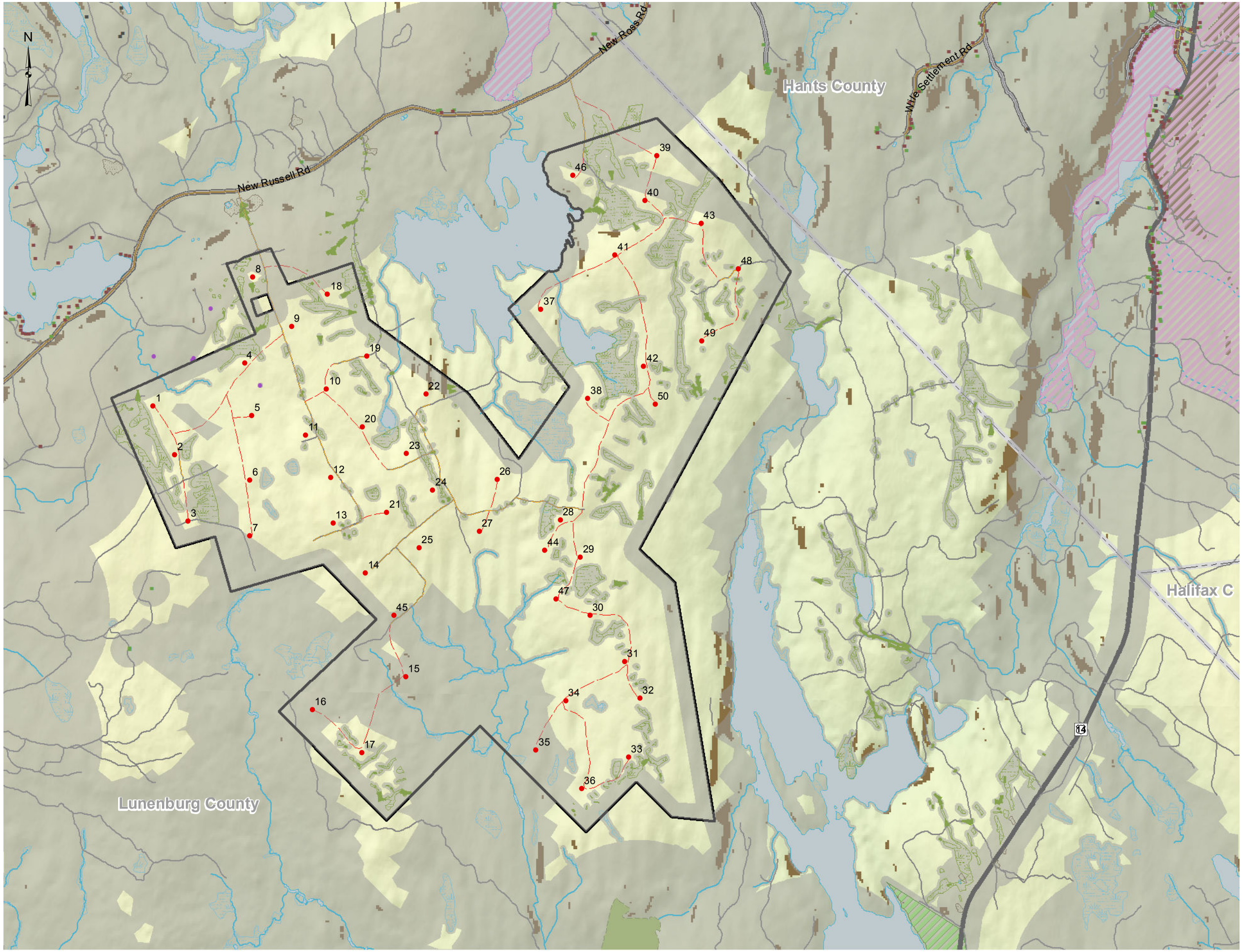
Several restricted and limited use lands are located in close proximity to the Project Boundaries. The closest protected area is Card Lake Provincial Park, located southeast of the site approximately 2 km away. A smaller Provincial Park, Falls Lake, sits approximately 6.3 km to the north of the site. Two other small parks exist to the south, including East River Provincial Park and Graves Island Provincial Park; both are located more than 10 km away (19 km and 20 km, respectively).

Panuke Lake Nature Reserve is located approximately 14 km to the east of the site; this area is protected under the *Special Places Protection Act* (1981). There are also two designated Indian Reserve Lands within 10 km of the proposed Project: the Pennal Indian Reserve and the New Ross Indian Reserve (4.4 km and 6.2 km, respectively).

The closest Important Bird Area (IBA) is the Southern Bight, Minas Basin IBA, located 35 km to the northeast. A second IBA, the South Shore-East Queens County IBA is located approximately 75 km away.

Drawing 2.1 shows the Project Boundaries in relation to restricted and limited land use areas.

A turbine manufacturer and size has not yet been chosen, this document is based on the environmental review for the largest number of machines being considered. The machine sizes being considered range with a nameplate capacity of 2-3MW. The turbine layout for the purpose of the EA report is based 50 (2MW nameplate machine) potential turbine locations, the final number being dependent on the nameplate size of the machines. The final layout is provided in Drawing 2.2, and represents all 50 possible turbine locations. Table 2.2 presents the associated GPS coordinates.



South Canoe Wind Project

Final Turbine Layout

Project Components
- Project Boundary
- Turbine Location

Strum Layers
- Rare Plant

Access Roads
- New (25.7km)
- On Existing (11.8km)
- Drainage
- Watercourse
- Wetland

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- Prov. Park - 60m
- Wind Speed <= 6.0m/s
- EMI - 115-1000m
- Slope > 15%

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:

1. Building status defined by various sources (GLGH)
2. Turbine Location point symbol ~ 60m in diameter

0 0.25 0.5 1 1.5 Kilometers

Date: March, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet

2.2

Table 2.2: GPS Coordinates of Proposed Turbine Locations

Turbine	Easting	Northing	Turbine	Easting	Northing
1	391320.216000	4959123.772400	26	395002.050200	4958338.983300
2	391551.407300	4958606.069100	27	394813.331000	4957785.678000
3	391692.674000	4957890.876700	28	395684.139700	4957904.114000
4	392300.590000	4959588.392200	29	395896.204900	4957507.249600
5	392378.652400	4959023.408800	30	396001.391900	4956883.523800
6	392358.959100	4958335.032700	31	396374.977600	4956389.426500
7	392355.531800	4957740.484200	32	396537.668200	4955997.764000
8	392391.716600	4960510.411000	33	396411.131100	4955365.078500
9	392805.281500	4959977.966300	34	395742.292100	4955967.636200
10	393177.754000	4959308.429100	35	395420.023500	4955438.170100
11	392954.587900	4958812.600300	36	395913.965000	4955028.560100
12	393223.248900	4958358.761000	37	395475.331300	4960163.969500
13	393251.043200	4957875.891900	38	395977.129800	4959210.552500
14	393595.907500	4957339.977500	39	396719.791400	4961809.868400
15	394030.598400	4956227.033600	40	396589.323900	4961328.141900
16	393025.424600	4955873.163000	41	396268.172900	4960746.055700
17	393553.833800	4955410.573000	42	396579.287900	4959551.775400
18	393191.443500	4960328.891000	43	397191.482000	4961087.278600
19	393609.416800	4959661.863100	44	395515.553300	4957578.719993
20	393563.158400	4958905.310800	45	393898.581000	4956883.121000
21	393822.645300	4957990.382100	46	395818.000000	4961601.000000
22	394243.673900	4959253.790800	47	395632.127712	4957062.461884
23	394036.474600	4958619.693500	48	397591.681000	4960598.929000
24	394317.133300	4958228.449300	49	397197.555527	4959826.940791
25	394172.909400	4957606.954300	50	396697.950905	4959144.147808

2.3. Project Activities

2.3.1 General

The usage of provincial roads during the construction, operation, and decommissioning phases of the Project will be in compliance with the “Nova Scotia Temporary Workplace Traffic Control Manual (2009)”. All required permits and approvals will be obtained prior to construction, such as “Work Within Highway Right-of-Way” permit.

The delivery of equipment and travel by delivery trucks are discussed in Section 5.7.1. Site services required prior to and during construction include, but are not limited to:

- Construction of entrances, which will be designed wide enough to accommodate large trucks and meet commercial stopping sight distance;

- Staging and storage facilities;
- Temporary offices;
- Laydown areas for construction and maintenance equipment;
- Temporary sanitary facilities;
- Water and rinsing facilities;
- Utilities and communications;
- Garbage collection and off-site disposal; and
- Concrete batch plants (to be determined).

Weather constraints may affect the proposed schedules and activities that are weather dependent (e.g. turbine delivery and construction) have been scheduled to occur during optimal time frames to minimize delay. For example, the delivery of the turbine pieces will occur outside of the spring weight restrictions, which are pursuant to Subsection 20(1) of Chapter 371 of the Revised Status of Nova Scotia, *The Public Highways Act* and published by Transportation and Infrastructural Renewal (http://gov.ns.ca/trans/trucking/springweight.asp). The timing and duration can change annually based on weather conditions, as such delivery will be scheduled between May and December and the spring restrictions will be reviewed prior to transporting the pieces if it is occurring close to typical spring closure months.

General activities required for construction of the Project are:

- Vegetation clearing and site preparation;
- Access road upgrading and construction including potential watercourse crossings;
- Lay down and storage area(s);
- Foundation construction;
- Tower erection;
- Installation of collection systems;
- Substation construction;
- Installation of transmission lines; and
- Construction of maintenance building(s).

2.3.2 Site Preparation

In order to prepare for construction, several activities must be completed, including:

- Land surveys for placement of roads, turbines, and associated works;
- Geotechnical investigations;
- Placement of erosion and sedimentation control measures;
- Installation of any temporary bridges, stream crossings, or other mitigation controls; and
- Clearing of trees and grubbing areas for construction.

Trees will be removed outside the bird nesting season, unless an approved mitigation plan has been agreed to by NSE, Department of Natural Resources (DNR) and the Canadian Wildlife Service (CWS). The proponents are aware of the Migratory Bird Regulations (MBR) and the fact that CWS cannot authorize incidental take of migratory bird nests or eggs for activities such as the construction of a wind farm and associated infrastructure, which is the reason that any activities will firstly avoid nesting season, otherwise such activities will not take place until the proponents, DNR and CWS have agreed to an appropriate mitigation plan.

Equipment needs will likely include:

- Light trucks;
- Drilling rigs;
- Backhoes (or similar equipment for temporary bridge placement); and
- Bunch feller (and similar harvesting equipment).

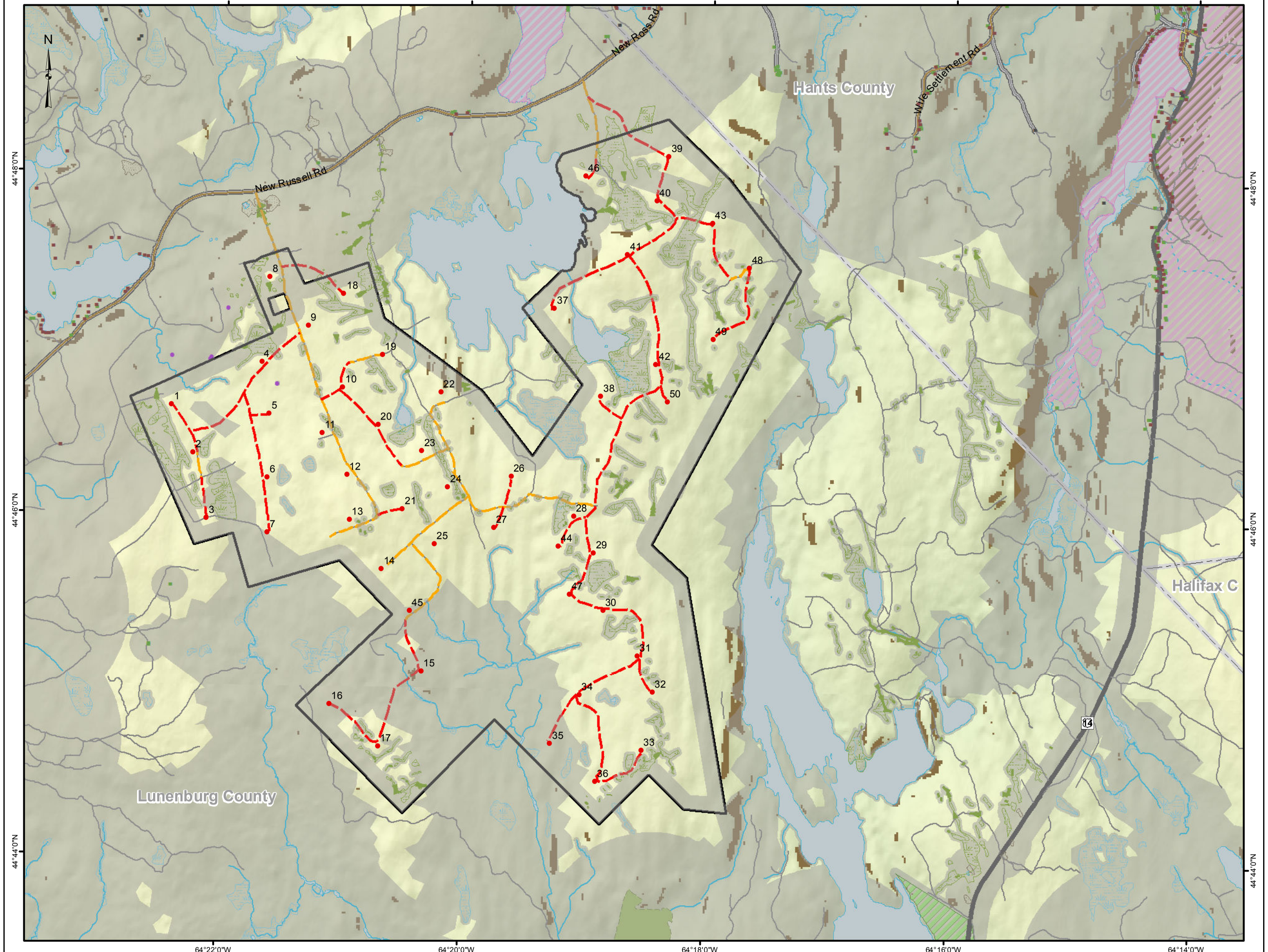
2.3.3 Construction

On site Roads

Existing roads will be used as starting points, where possible, for access development to minimize the amount of land disturbance. These roads will be upgraded to a standard width of 5 m, not including shoulders sloped at a ratio of 1:2. There will be areas where the width could be as much as 7 to 8 m to accommodate flow of vehicles and laydown areas; however, this will be dependent upon the turbine model selected. One turbine location typically requires 600 m of access road. The total length of on-site access roads will be based on the total number of turbines for the Project. Currently, approximately 37.5 km of roads are estimated to be required, of which approximately 11.8 km of existing logging roads within the Project boundaries will likely be upgraded. Existing and proposed roads, based on the preliminary layout, are shown on Drawing 2.3.

South Canoe Wind Project

Road Layout



Project Components
- Project Boundary
- Turbine Location

Strum Layers
- Rare Plant

Access Roads
- New (25.7km)
- On Existing (11.8km)
- Drainage
- Watercourse
- Wetland

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- Prov. Park - 60m
- Wind Speed <= 6.0m/s
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- Slope > 15%

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:

1. Building status defined by various sources (GLGH)
2. Turbine Location point symbol ~ 60m in diameter

0 0.25 0.5 1 1.5 Kilometers

Date: March, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet

2.3

Roads will be constructed to accommodate wide turning radii, with a minimum inside horizontal radius based on the length of the turbine blades and other components. Typically, a 7 m wide road with a 2% (or less) cross slope is used with a widening of up to 11 m for crane turning radius. Access roads will need to be capable of withstanding loads up to a maximum axle load of 15 tonnes.

The slope of the roads will need to be considered, with no slope being greater than 2% for cross slope.

Upgrades to the existing roads may consist of:

- Widening;
- Overhead conflicts (i.e. wires, tree branches, signs, etc.);
- Ditching (or other storm water management installations);
- Stream crossings (i.e. bridges, large culverts);
- Additional lifts of gravel;
- Compaction of lifts; and
- Use of uni-axial geo-textile membrane to reduce the amount of gravel quantities and placement.

The construction of new roads will involve the removal of vegetation and grubbing. The soil will be removed to a depth of 0.5 to 1 m (depending upon the ground conditions determined during geotechnical assessment). Roads will be constructed to the NS Standard Specifications for Municipal Services as provincial best practices for gravel based roads as well as to accommodate heavy loads from delivery trucks. As a rule of thumb, a 600 m long access road would use approximately 2,160 m^3 (or 2,825 yd^3) of gravel. However, 25% of this gravel volume can be eliminated by using a geo-textile membrane system. This method of road construction is commonly used in the wind turbine industry.

During the construction phase, the Project roads will be maintained with additional stone or periodic grading.

Any material removed for road construction will be stored or disposed of in accordance with regulations and best practices for road construction. Any material stored on site will be accompanied with appropriate erosion and sedimentation control measures, or reused.

The following equipment could be used during the road construction phase:

- Excavators;
- Dump trucks;
- Bull dozers;
- Rollers;

- Graders;
- Crusher; and
- Light trucks.

Wind Turbine Pads

Each tower location will have a geotechnical borehole drilled to determine the final design for turbine foundations, to establish bedrock and overburden depths, and to complete bedrock/soil material sampling.

General activities during turbine pad construction may include:

- Removal of trees;
- Installation of erosion and sedimentation control measures;
- Removal of overburden;
- Blasting of bedrock (to be determined);
- Excavating of soils;
- Pouring and curing of concrete pads (complete with reinforcing steel);
- Placement of competent soils to bring area to grade;
- Compaction of soils; and
- Excavation for electrical conduits and fibre optic communication trenches.

The foundations will typically be 15 m by 15 m (for a typical 2 MW tower) and will be octagon shaped, with a depth of approximately 3 m for the concrete foundation which will ultimately lie under the graded surface.

Any wash water from the cleaning of the concrete trucks will be disposed of on site, using standard industry practices and following environmental regulations/guidelines for the protection of watercourses and wetlands.

The crane assembly pad is typically 75 m x 75 m, dependent upon the height of the turbine tower selected. The exact arrangement of the turbine pads and crane pads will be designed to suit the specific requirements of each turbine and the surrounding topography. As such, the final design will be completed after the geotechnical assessments and turbine selection.

Depending on the availability of concrete during construction there may be a requirement to have a concrete batch plant on site. The construction of the turbine pads can be very time dependent, and curing between pours can impact the final strength of the concrete. If a concrete batch plant is required, appropriate permits will be obtained by the plant operators.

All soils removed during the excavation phase will be stored according to provincial regulations and best practice guidelines. Any soil needed for backfilling after the

foundation has been poured will be stored temporarily adjacent to the excavations until needed. Any remaining excavated material will be used on site or removed and sent to an approved facility. Prior to excavation activities, erosion and sedimentation control measures will be deployed and assessed on a regular basis. All control measures will be maintained to ensure protection of watercourses and wetlands.

The construction of the typical turbine pad (from clearing to final preparation for erecting of the turbines) can take between 1 to 4 months, depending on weather, soil, and construction vehicle access.

The following equipment may be used during this phase:

- Excavators;
- Dump trucks;
- Bull dozers;
- Rollers;
- Graders;
- Crusher(not required if a local quarry can supply gravel sizes)
- Concrete trucks (not required if a concrete batch plant is established on site)
- Light cranes; and
- Light trucks.

Wind Turbines

The wind turbine assembly includes tower sections, the nacelle, hub and three-blade rotors (a total of 8 major components). All units will be delivered by several flatbed trucks and the pieces will require a crane for removal from the vehicle at each of the prepared turbine pads.

The tower sections will be erected in sequence on the turbine foundation, followed by the nacelle, hub, and rotors (rotors are usually attached to the hub on the ground prior to lifting). This assembly will occur with the use of both light cranes and a heavier crane. Erection will depend on weather, specifically wind and lightening conditions. Typical assembly duration should be between 2-5 days.

The following equipment is expected to be used during this phase:

- Main crane unit (up to 400’ high in some cases);
- Main crane unit - assembly cranes; and
- Manufacturer’s support vehicles.

Electrical Transmission

Electricity produced from the turbines will be stepped up to 34.5kV via a pad mounted

transformer, located adjacent to each turbine (or within the turbine). Electricity will be collected by an on-site collector system. The collector system will terminate at an on-site substation, which will step up the voltage to 138kV.

From the substation, the electricity will be transmitted via a 17 km transmission line (typically 20 m in width), running parallel to Highway 14 (approximately 500 m east of the highway) to a substation approximately 4.5 km north of Smiths Corner. The tap will be on Line 6004 which runs between Sackville and Canaan Road substations. A new substation will be required at this location. All substation equipment and engineering will be approved and/or designed by NSPI staff.

The transmission line has not yet been finalized and is to be considered outside the scope of the EA report. Within the Nova Scotia Environmental Assessment Regulations, a transmission corridor with a cumulative voltage rating of 345kV would require an EA. The transmission corridor would only contain the line for the Project and it is only expected to have a voltage of 138kV; therefore this transmission line is exempt from requiring a specific EA. However, appropriate component assessments will be completed for the transmission right-of-way (ROW) based on ecological sensitivities within the ROW. The data collected will be used by the transmission line designers to avoid environmentally sensitive areas and the design will reflect an installation with as low an environmental impact as possible. In all cases, if a permit or approval is required, it will be sought out and received prior to the start of any work. An Environmental Protection Plan (EPP) specific to the transmission line installation will be developed and training provided to all individuals working on the Project to ensure all is informed of any environmental sensitivities.

The conductor connecting the turbines and the on-site substation will likely be above ground with a design similar to that found in residential areas throughout the province. Grounding cables (bare copper earthing cable), will be laid within the turbine pad for lightning protection.

The following equipment is expected to be used during this phase:

- Excavator and/or back hoe;
- Bucket trucks;
- Light cranes; and
- Light trucks.

Substation and Maintenance Buildings

A substation will be required to step up the voltage from 34.5kV to 138kV and will be located near the eastern area of the Project Boundary (location to be determined). It will be a conventional outdoor type design, which will likely include (but not be limited to); a station service transformer, lightning arresters, disconnects, Supervisory Control and Data Acquisition (SCADA), circuit breakers, grounding wire, transmission line

disconnect, and other general electrical substation equipment as designed and/or approved by NSPI.

The substation will be enclosed with a chain linked fence, with barbed wire along the top, complete with signage and yard lighting. Yard lighting will be minimized to ensure that birds are not drawn to the substation or to the individual turbines. Where appropriate per safety requirements, lighting will be “on demand” based on motion sensors or manual switch.

Included in the Project design is a maintenance building, which will provide storage for maintenance equipment, offices for site staff, and sanitary facilities. There will be a need for a drinking water well and on-site sewage treatment, both of which will be installed and approved per applicable regulations. As discussed in the previous paragraph, lighting for the maintenance building will be minimized (based on site safety) and will, where appropriate, be “on demand” lighting. This will minimize the amount of lighting potentially drawing birds to the maintenance buildings and the individual turbines.

The following equipment is expected to be used during this phase:

- Excavator and/or back hoe;
- Bucket trucks;
- Light track vehicles;
- Light cranes; and
- Light trucks.

Removal of Temporary Works and Site Restoration

Once construction of all phases has been completed, all temporary works will be removed and appropriate long term mitigation employed. Excess soil and gravel will be used on site, as required, or disposed of at an appropriate facility. All areas will be appropriately graded and long term erosion and sedimentation control measures installed. Once stabilized, temporary erosion and sedimentation controls are removed. Attention will be paid during site reinstatement to ensure areas will promote wildlife return to the area, to the extent possible.

The following is expected to be used during this phase:

- Excavator and/or back hoe;
- Grader;
- Hydroseeder; and
- Light trucks.

Commissioning

The turbines will undergo a series of tests for mechanical, electrical and controls prior to unit start-up sequence. Once the start-up sequence has been initiated, another series of performance checks for safety systems will be completed. When the turbines have cleared all tests, the commissioning of each unit can begin. This will need to be coordinated with NSPI as electrical energy will need to be managed both within the substations and on the transmission line. These performance tests will be completed by qualified wind power technicians and electrical utility employees. Additional testing may also be required for transformers, power lines, and substation components, all of which will be performed by qualified engineers and technical personnel.

2.3.4 Operations and Maintenance

During the life span of the Project (estimated to be 20 years), roads will be used to access the turbines by on site and field staff, as well as maintenance personnel. The roads will be maintained with additional gravel and grading, as required. During the winter months, roads will be plowed, sanded, and/or salted, as required for safe driving.

Because of the potential for public access to the wind farm, signage will be affixed to all access roads to provide essential safety information such as emergency contacts and telephone numbers, speed limits, and the hazards associated with being within close proximity to the turbines (i.e. ice throw). These signs will be maintained during the life of the Project.

Scheduled maintenance work will be carried out on a periodic basis. Maintenance work may require the use of a variety of cranes for brief periods of time for replacement of blades or other turbine components. The most common vehicle during maintenance work will be light/medium pickup trucks.

Waste materials will be picked up by a qualified waste hauler and disposed of per Nova Scotia's waste regulations. All applicable materials will be transported as per the *Transportation of Dangerous Goods Act* requirements and stored per the Workplace Hazardous Information Management System (WHMIS) requirements. Waste materials such as lubricating oils will be removed from the site and will be recycled or disposed of following provincial and federal waste management regulations.

During the operational phase, Valued Ecosystem Components (VECs) may be monitored, as required by NSE. This monitoring may only be for a specific length of time (i.e. one or two years). The VECs to be monitored will be specified within the EA Approval and plans will be developed per the terms and conditions.

2.3.5 Decommissioning

This Project currently has a projected life span exceeding 20 years. The Power Purchase Agreement (PPA) that will be signed if the Project is successful within the RFP process will be for a 20 year period.

Decommissioning will commence shortly after the retirement of the turbine units. A decommissioning plan will be completed and submitted to NSE in an appropriate time frame to ensure removal of all structures within the EA approval terms and conditions.

Generally, decommissioning will follow the same steps as construction:

- Wind turbines will be dismantled and removed from the site;
- Turbine bases will be removed to below grade and top soil will be reinstated to ensure stabilization of the land;
- Internal roads and the site entrance, if not required for forestry purposes, will be removed. If removed, land will be reinstated and stabilized;
- Collection system conductor and poles will be removed, recycled, where possible, and disposed of otherwise to an approved facility; and
- All other buildings and equipment will be removed and all land will be reinstated and stabilized.

2.4. Project/construction Schedule

Table 2.3 presents the Project schedule from EA approval to Project decommissioning. The Project schedule is subject to change due to changes in RFP deadlines and other seasonal restrictions (i.e. bird nesting season, spring weight restrictions, etc.).

Table 2.3: Project Schedule

Project Activity	Scheduled Start	Duration
Environmental Assessment Approval	July 2012	N/A
Follow-up Environmental Studies	Summer 2012 (post RFP results)	6-8 months
Geotechnical Assessment	Summer 2012	1-2 months
Engineering Design	Summer 2012	3 – 4 months
Power Purchase Agreement	Summer 2012	N/A
Turbine Agreement	Fall 2012	N/A
Clearing	Winter - Spring 2013 (pre-nesting season)	Up to 6 months because of potential impacts from weather
Construction	Spring 2013 (spring weight restrictions will be taken into account prior to detailed construction schedule)	12 - 18 months

Commissioning	Summer 2014	3 months
Operations	By end of 2014	20 years
Decommissioning	End of 2034	N/A

3. PROJECT SCOPE AND METHODOLOGY

3.1 Assessment Scope

EA is a planning tool used to predict the environmental effects of a proposed project, identify measures to mitigate adverse environmental effects, and to predict whether there will be significant adverse environmental effects after mitigation is implemented. The purpose of EA is threefold:

- To minimize or avoid adverse environmental effects before they occur;
- To promote sustainable development by protecting and conserving the environment; and
- To incorporate environmental factors into decision making.

To ensure the registration document complies with all requirements under Section 9(1A) of the NS *Environment Act*, the following information has been considered:

- Name, location and identification of proponent;
- Nature of the undertaking;
- Purpose and need of the undertaking;
- Proposed construction and operation schedules;
- Description of the undertaking;
- Environmental baseline information;
- All steps taken by the proponent to identify and address concerns of the public and Aboriginal people;
- A list of all concerns regarding the undertaking expressed by the public and Aboriginal people;
- A list of approvals which will be required and other forms of authorization; and
- Sources of any public funding.

In addition to the requirements of Section 9 (1A), the registration document has been prepared using the following provincial guidelines:

- "A Proponent's Guide to Wind Power Projects: Guide for preparing an Environmental Assessment" (NSE, 2009b); and
- "A Proponent's Guide to Environmental Assessment", published by the Environmental Assessment Branch of NSE and revised in 2009 (NSE, 2009a).

3.2 Assessment Boundaries

The boundaries for the EA include those areas assessed for potential environmental interactions with activities during the construction, operation and decommissioning phases of the Project. As all interactions may have varying degrees of spatial extent, three separate boundaries have been established to best represent all assessments conducted for the purpose of the EA. Using different spatial boundaries also allowed for some flexibility in assessing environmental interactions as the boundaries changed during the turbine layout optimization process.

- Property Boundary: refers to the privately owned land used to originally define the Project Area. The Property Boundary includes approximately 6,250 ha of land.
- Project Area: refers to the actual footprint of the Project to be approved, or the boundary specific to the final turbine layout, access roads and associated buffers. Interactions with VECs including watercourses, wetlands, rare species, geology, hydrogeology and archaeology were initially assessed in reference to the Property Boundary. However, as the final and optimized Project Area is being presented within this EA document for approval, discussions on the individual VECs will be based on the final Project Area. The data collected during the component studies was used to optimize the Project Area. The data collected outside the Project Area not presented within the body of this text can be obtained from the component reports appended to this EA. The Project Area includes approximately 2,790 ha of land.
- Study Area: refers to the area within 5 km of the Property Boundaries. The study area was used to capture potential interactions that extended beyond the Project Area itself, such as receptors for acoustic and visual impacts, consultation with local residents and communities, economic affects, First Nations resources and habitat considerations relating to wildlife and flora.

3.3 Site Sensitivity

Potential wind farms are assigned a category level, according to a matrix provided in the Proponent's Guide to Wind Power Projects (NSE, 2009b). This matrix considers the overall Project size and the sensitivity of the site to determine the category level. The category level then outlines guidance with respect to the collection of baseline data for the EA, as well as post-construction monitoring requirements.

Table 3.1 Project Size

Size	Definition
Very Large	Total local area projected to contain more than 100 turbines
Large	Total local area projected to contain 41-100 turbines
Medium	Total local area projected to contain 11-40 turbines
Small	Total local area projected to contain 1-10 turbines

Table 3.2 Site Sensitivity Table

Potential Sensitivity	Determining Factor
Very High	Species identified are: • probability of a species listed as "at risk" federally or provincially (NS *Endangered Species Act*, SARA, COSEWIC, or NS General Status as "Red") occurring within, or being negatively affected by the development. Site identified as: • habitat for a large or important bird colony, such as herons, gulls, terns, common eider, and seabirds • a known bat hibernacula (25 km radius) • a significant migration staging or wintering area for bats, waterfowl, or shorebirds • an area recognized as internationally, nationally, or provincially important for bird (e.g., by being located in or adjacent to a provincial Wildlife Management Area or Wildlife Sanctuary, National Wildlife Area, Migratory Bird Sanctuary, Important Bird Area, National Park, Western Hemisphere Shorebird Reserve Network (WHSRN) and/or Ramsar sites, or similar area specifically designated to protect birds) • providing habitat for large concentrations of raptors (e.g., wintering, migration) • a known, or reasonably inferred migration corridor • having potential to reduce functional quality/quantity of habitat and/or cause significant land fragmentation with loss of connectivity
High	Site identified as: • having landform factors that concentrate species (e.g., shoreline, ridge, peninsula, or other landform that may funnel bird movement) or significantly increase the relative height of the turbines • a coastal island, or less than 5 km inland from coastal waters • an area of large local bird movements (between habitats) or is close to significant migration staging or wintering area for waterfowl or shorebirds • an area recognized as provincially or nationally significant for habitat conservation and/or protection • having increased bird activity from the presence of an area recognized as nationally and/or provincially important habitat for birds (e.g., a National Wildlife Area, Migratory Bird Sanctuary, Important Bird Area, National Park, or similar area protected provincially or territorially because of its importance to birds) • containing species of high conservation concern (e.g., Species listed as "Yellow" under NS General Status of Wild Species)
Medium	• Site is recognized as regionally or locally important to birds, or contains provincially significant habitat types
Low	• Site does not contain any of the elements listed above

As the South Canoe Wind Project is expected to involve 33-50 turbines, it is considered a medium or a large project. Based on the known existence of several birds ranked as 'yellow', Southern twayblade (*Listeria australis*) which is ranked 'red', by Nova Scotia Department of Natural Resources (NSDNR), and the presence of a bat hibernacula less than 25 km from the site, the Project is classified as having a 'Very High' potential sensitivity. As such, the Project is determined to be a Category 4 according to the following matrix (Table 3.3) and as described below.

Table 3.3: Project Category

	Site Sensitivity			
Facility Size	Very High	High	Medium	Low
Very Large	Category 4	Category 4	Category 3	Category 2
Large	Category 4	Category 3	Category 2	Category 2
Medium	Category 4	Category 3	Category 2	Category 1
Small	Category 4	Category 2	Category 1	Category 1

Projects considered a Category 4 present the highest level of potential risk to wildlife, and/or their habitat(s) and will require the highest level of effort for EA with comprehensive baseline surveys being required. The proponent must apply standards and protocols for bird monitoring specified for Category 4 projects as defined by Environment Canada (EC) and the Canadian Wildlife Service (CWS). If the Project is approved, detailed follow-up will normally be required as a condition of the approval. Post-construction follow-up surveys, spread over at least two years and sometimes more, are required to determine changes in wildlife use of the area associated with construction of the turbines.

3.4 Assessment Methodology

The EA process involves:

- Identification of VECs that may potentially be affected, either negatively or positively, by the proposed Project;
- Determination of activities associated with the Project that may interact with identified VECs;
- Determination of mitigation measures that may reduce or eliminate potential negative effects;
- Evaluation of potential residual effects; and
- Development of follow-up measures to monitor residual effects.

The process by which VECs are identified is a stepwise approach that begins with a high-level, small scale examination of the Project Area using various data sources, such as preliminary mapping for site habitat types, wetlands and species at risk, and the creation of a preliminary report to present results and propose a field schedule. Once a general representation of the study area is known, a list of preliminary VECs is generated. Individual component assessments, or studies, are then based on the identified VECs.

Table 3.4 lists potential VECs and the corresponding assessment. In some cases, the VEC warranted a specific individual impact assessment, while others only required desktop research and data compilation. Some studies have not yet been executed and are scheduled to take place during the 2012 field season. For complete methodologies used for the individual assessments, please refer to corresponding sections/appendices.

Table 3.4: List of Component Assessments and Corresponding Section

Potential VEC	Method of Analysis/Assessment	Date completed	Reference
Air Quality	Research and data collection	N/A	Section 4.1
Surficial geology	Project Specific Hydrogeological Assessment	January 27, 2012	Section 4.2; Appendix B
Bedrock geology	Project Specific Hydrogeological Assessment	January 27, 2012	Section 4.2; Appendix B
Groundwater	Project Specific Hydrogeological Assessment	January 27, 2012	Section 4.2; Appendix B
Freshwater Habitats	Project Specific Hydrogeological Assessment	January 27, 2012	Section 4.3; Appendix B
	Research and data collection	N/A	Section 4.3
Fish and Fish Habitat	Research and Data Collection	N/A	Section 4.3
Terrestrial Habitats	Habitat mapping (desktop study)	September 15, 2011	Section 4.4
Wetlands	Preliminary wetland assessment (desktop study);	September 15, 2011	Section 4.4
	Project specific wetland field assessment	January 20, 2012	Section 4.5; Appendix C
Terrestrial Vegetation	Project specific plant surveys (Spring/Summer)	Spring 2007, 2008	Section 4.5; Appendix D
	Habitat mapping (desktop assessment);	September 15, 2011	Section 4.5; Appendix D
	Lichen Survey	October, 2007	Section 4.5; Appendix D
	Rare plant survey	June, 2008	Section 4.5; Appendix D
General Wildlife	Desktop evaluation and incidental sitings during 2011/2012 field assessments for birds and wetlands.	August 2011 – January 2012	Section 4.6
	Project specific avian assessment	2007 - January 2012	Section 4.7; Appendix E

	Acoustic monitoring	August – September 2011	Section 4.7; Appendix E
	Breeding Bird Survey	August 2011	Section 4.7; Appendix E
Bats	Project specific bat assessment	August – September 2011	Section 4.7; Appendix F
Local community	Research and data collection	N/A	Section 5.1
Land use/recreation	Research and data collection	N/A	Section 5.2,5.3
Human Health and safety	Research and data collection	N/A	Section 5.4
	Project specific shadow flicker assessment	May 2012	Section 5.5; Appendix G
Radar and telecommunication	Project specific electromagnetic interference assessment	February 1, 2012	Section 5.5
Archaeological and cultural resources	Project specific desktop archaeological review	December, 2011	Section 5.7; Appendix J
Mi'kmaq Ecological Knowledge Study (MEKS)	Project specific Mi'kmaq Ecological Knowledge Study	Summer 2012; Proposal received January 19, 2012	Section 5.8; Appendix K
Sound	Project specific acoustic assessment	May 2012	Section 6.1; Appendix L
Visual impact	Project specific visual impact assessment	May 2012	Section 6.2

The results of the individual component assessments supplement the existing baseline conditions of the Project Area as described in Sections 4 and 5 of the report, and also facilitated the development of constraints layers to evaluate potential turbine layouts. For instance, several VECs, specifically wetlands, surface water resources, fauna and terrestrial vegetation, and archaeology are used as constraints to which buffers and setback distances are applied. More detail on site selection, turbine layout and constraints mapping is provided in Section 3.5 and 3.6.

A preliminary list of potential VECs was developed once possible effects were examined and the appropriate mitigative measures applied. Some preliminary VECs examined in Section 4 and 5 were then subsequently eliminated as sufficient mitigation was considered in place to minimize potential impacts.

Potential Project/VEC interactions are discussed and analyzed as part of the effects assessment. Interactions are associated with specific activities that generally take place during the site preparation/construction, operation/maintenance and decommissioning phases of the Project.

Potential effects from Project activities that may result in residual effects were further evaluated based on a standard methodology presented in Section 8. The majority of residual effects are as a result of operational and maintenance activities that span the

lifetime of the wind farm.

3.5 Constraints Analysis

The purpose of the constraints analysis was to determine available lands on which to place turbines, access roads and other required infrastructure so as to avoid or minimize impacts to identified VECs to the extent possible. Data used for the constraints analysis were from a number of sources, including publicly available data sets and the results of individual component studies detailed in Section 3.4.

Once constraints were applied to the Project boundaries, the amount of available land left to develop was determined. The product of this exercise was used during the turbine layout optimization process as turbines were ideally placed in areas outside the buffered constraints.

The following parameters were mapped to create an overall constraints layer that was applied during turbine layout optimization:

- Provincial data sets including:
  - Provincial wetland mapping;
  - Provincial wet areas mapping; areas were considered “high potential for wetlands if they had a depth to groundwater of less than 0.5 m or a depth to groundwater of between 0.5 m-2.0 m and located adjacent to “mapped” wetlands;
  - Provincial 1:50,000 for watercourses and waterbodies;
  - Topography, including slope; slopes greater than 15% are not conducive to road or turbine construction;
  - Restricted land areas, including provincial parks, wildlife reserves, First Nations reserves and historic sites; and
  - Nova Scotia Wind Atlas.
- Datasets developed as a result of individual component studies:
  - Wetlands as identified in the wetland assessment; and
  - Locations of rare species, such as the southern twayblade, as identified in the rare plant assessments.
- Other “social” considerations, including:
  - Occupied dwellings, or residences;
  - Existing and proposed roads; and
  - Property lines.

The wind resource within the Property Boundaries was also a constraint as turbines’ placement priority (after all other constraints) were in areas with a wind strength to make the Project economically viable. These areas tend to have higher elevations (such as ridges), so topography and provincial wind mapping were added as layers during the constraint exercise to determine the optimal placement of turbines. Setbacks between turbines must also be considered to minimized wake loss and turbulence from blades.

Once the constraints were mapped, the appropriate buffers and setbacks were applied and areas designated for development were identified. The following buffers were applied:

- 30 m buffer around wetlands, waterbodies and watercourses (Drawing 3.1);
- 30 m buffer around rare species (Drawing 3.1);
- 165 m setback from property lines (Drawing 3.2);
- 200 m setback from public roads (Drawings 3.2);
- 1200 m setback from occupied dwellings, or residences (Drawing 3.2); and
- Minimum 360 m setback from turbines to minimize wake loss and turbulence.

Please note that although a 30 m buffer was applied for waterbodies during constraints analysis, the closest turbine pads to a waterbody (turbines 20 and 7) are approximately 200 m away from the shoreline once optimization was complete. Drawings 3.1, 3.2 and 3.3 provide constraints mapping applied to the Property Boundaries. Drawing 3.1 contains environmental constraints including wetlands, watercourses and waterbodies as well as the wet areas mapping and rare species. Drawing 3.2 provides social constraints including setbacks from residences, public roads and property lines. Drawing 3.3 provides topography and slope to demonstrate areas of high wind potential.

Drawing 3.4 provides a map of all constraints combined to demonstrate all areas that were either avoided or not conducive for turbine development. In considering the size of the area within the Property Boundary after constraints are applied, only 47% of area can be developed.

64°22'0"W 64°20'0"W 64°18'0"W 64°16'0"W 64°14'0"W

44°48'0"N 44°46'0"N 44°44'0"N

N

Hants County

Lunenburg County

Halifax C

South Canoe Wind Project

Environmental Constraints

Project Components
- Project Boundary

Provincial Layers
- Watercourse
- Contour -10m Interval
- Wetland

Strum Layers
- Rare Plant
- Drainage
- Watercourse
- Wetland

Constraints
- Prov. Waterbody Buffer - 30m
- Prov. Wetland Buffer - 30m
- Prov. Watercourse Buffer - 30m
- Strum Wetland Buffer - 30m
- Strum Watercourse Buffer - 30m

NSDNR Water Table

Depth (metres)
- 0 - 0.10 m
- 0.11 - 0.50 m
- 0.51 - 2 m
- 2.01 - 10 m
- > 10 m

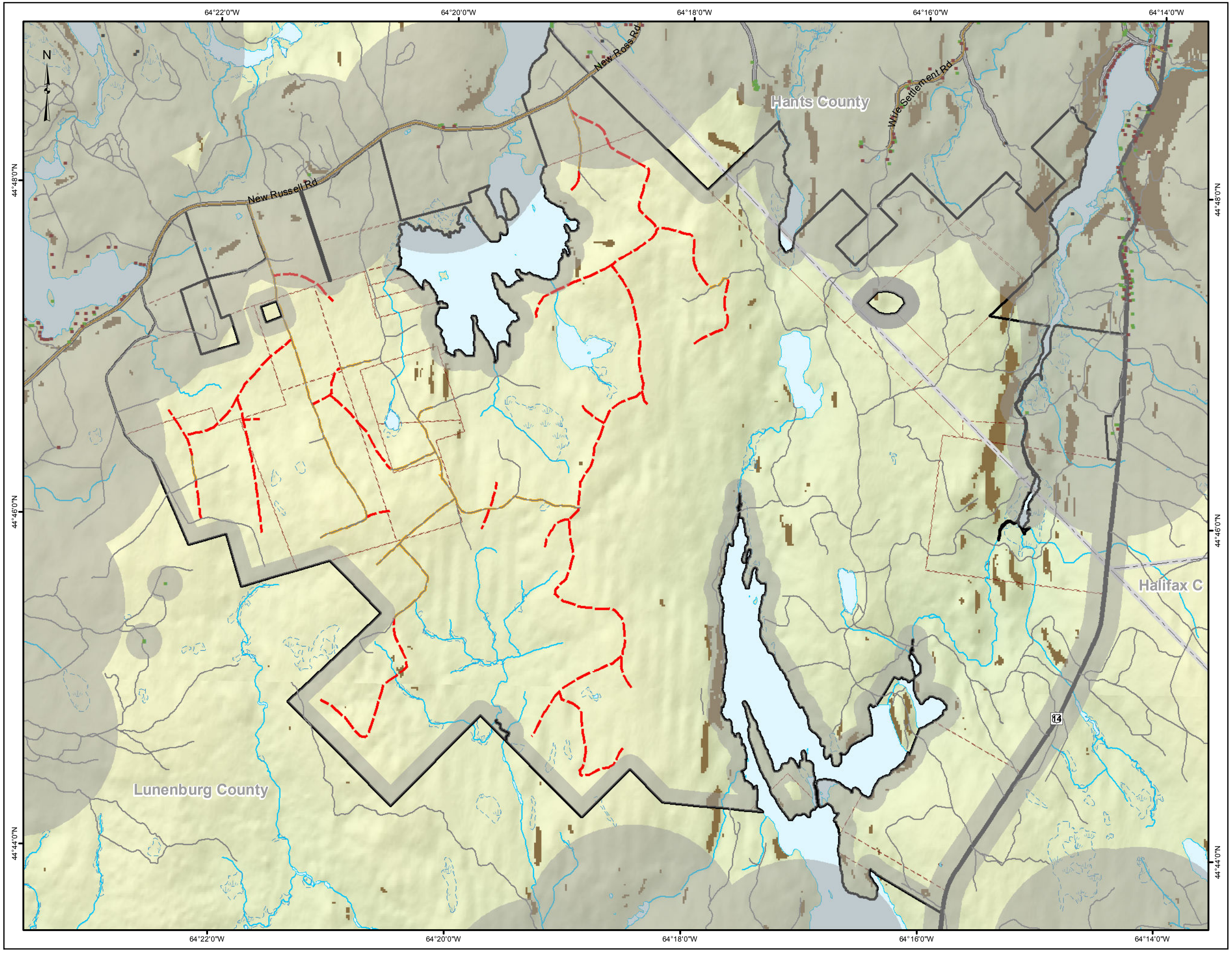
0 0.25 0.5 1 1.5 Kilometers

Date: May, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet:

3.1



South Canoe Wind Project

Social Constraints

Project Components
- Property Line
- Project Boundary

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road

Strum Layers
- New Rd. Build (25.7km)
- On Existing Road (11.8km)

Constraints
- Internal Lot Line-165m
- Dwelling Buffer-1.2km
- Other Building Buffer -200m
- Unidentified Building Buffer-1.2km
- Public Rd. Buffer -200m
- Slope > 15%

Notes:

1. Building status defined by various sources (GLGH)

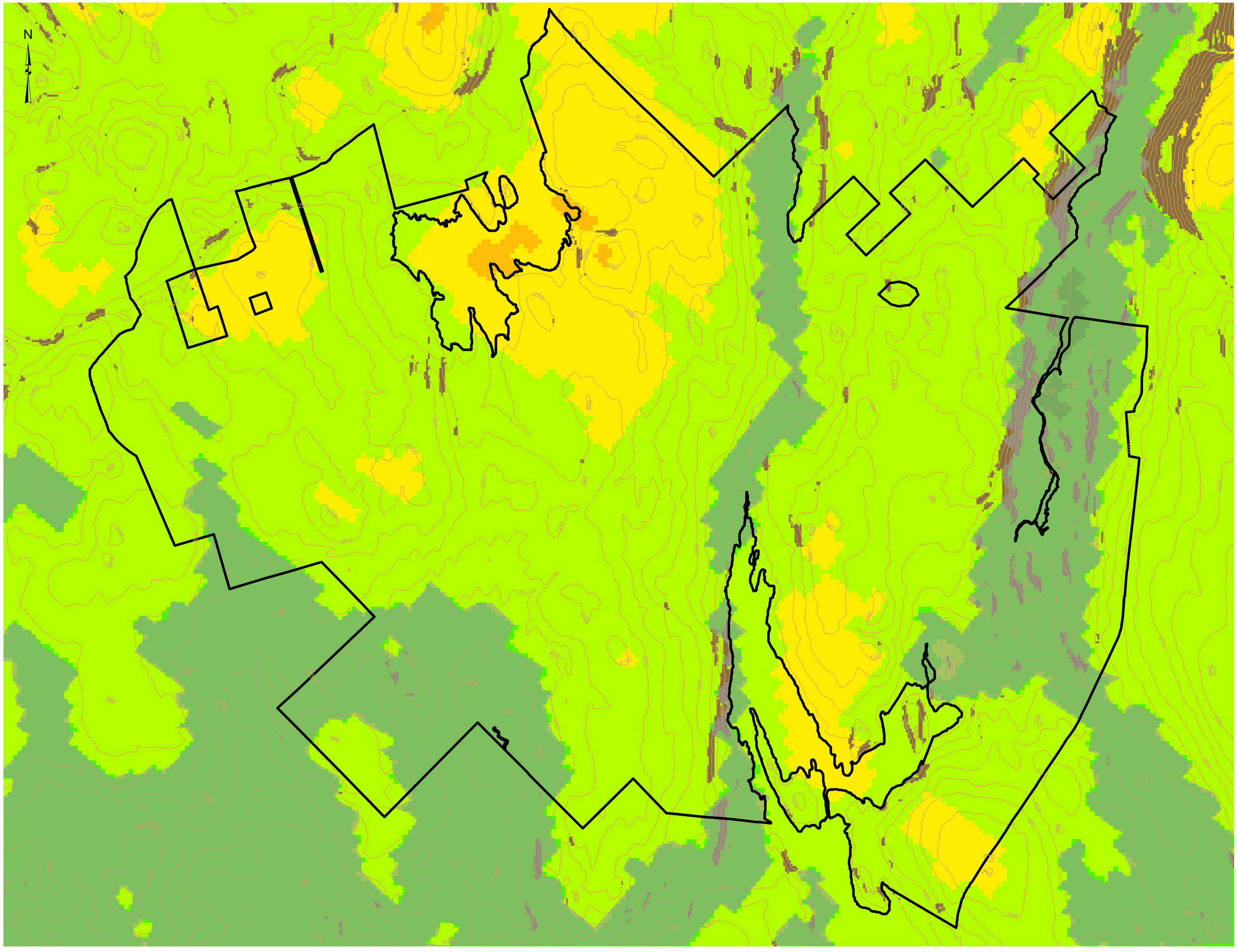
Kilometers
0 0.25 0.5 1 1.5

Date: May, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet:

3.2



South Canoe Wind Project

Wind Constraints

Project Components

Project Boundary

Provincial Layers

Contour Line - 10m Interval

Constraints

Wind Speed <=6.0m/s

Slope > 15%

Wind Speed (m/s)

- 9.51+
- 9.01 - 9.5
- 8.51 - 9.0
- 8.01 - 8.5
- 7.51 - 8.0
- 7.01 - 7.5
- 6.51 - 7.0
- 6.01 - 6.5
- 5.51 - 6.0
- 5.01 - 5.5
- 4.51 - 5.0
- 0.0 - 4.5

Notes:

1. NS Wind Atlas 80m AGL

Kilometers
0 0.25 0.5 1 1.5

Date: May, 2012

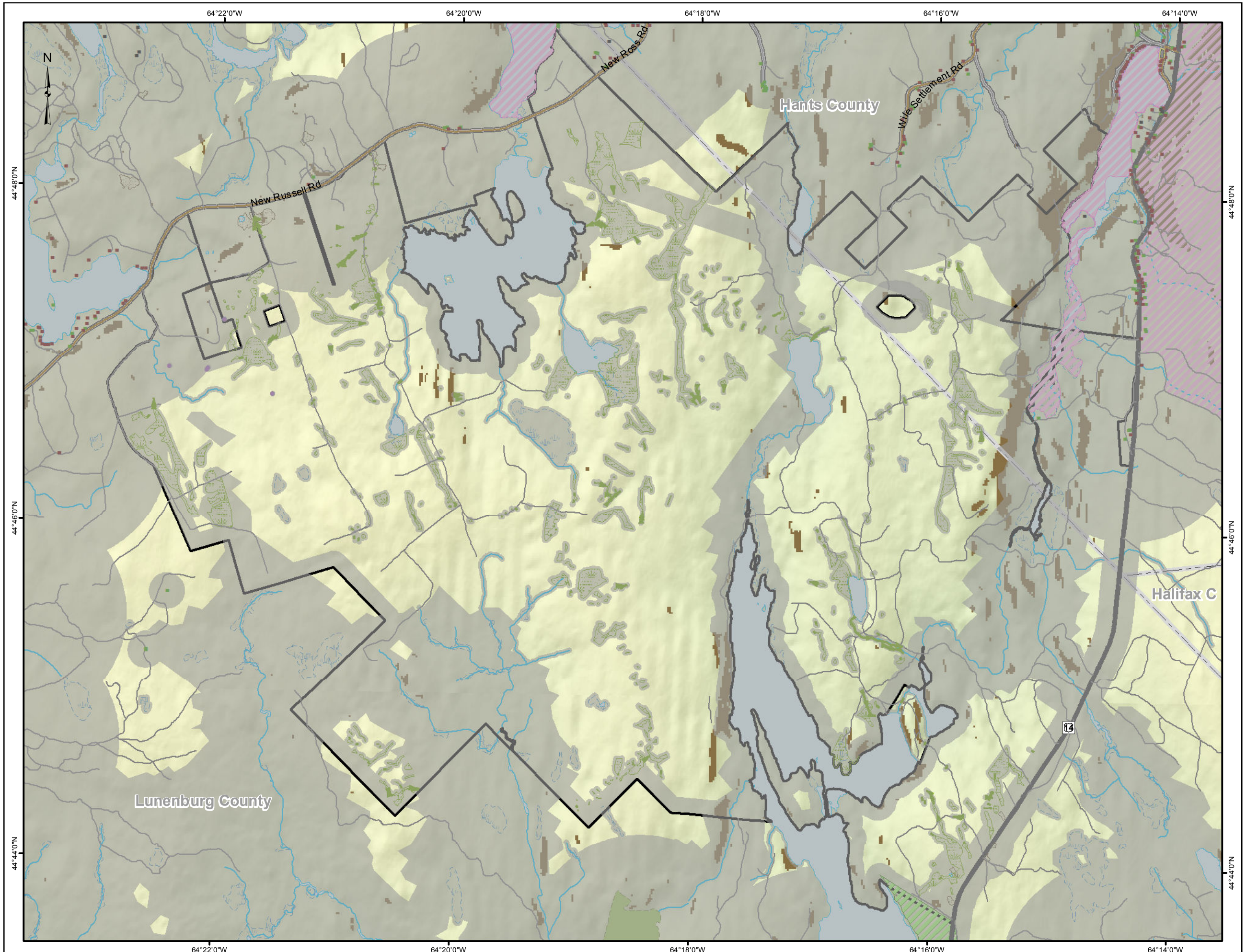
Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, NS Wind Atlas

Sheet:

3.3

South Canoe Wind Project

All Constraints



Project Components
- Project Boundary

Strum Layers
- Rare Plant
- Drainage
- Watercourse
- Wetland

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- EMI - 115-1000m
- Prov. Park - 60m
- Wind Speed <= 6.0m/s
- Slope > 15%

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:

1. Building status defined by various sources (GLGH)

0 0.25 0.5 1 1.5 Kilometers

Date: May, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet:

3.4

3.6 Site Optimization

MBPP has collected wind data from three meteorological towers in the study area continuously over the past several years (since 2004, 2008 and 2010 respectively); thus, the area within the Property Boundary is known to have sufficient wind for the Project to be economically viable. As mentioned in Section 3.5, there are limited areas that are suitable for turbine placement; wind speed directly correlates to higher elevation. Generally the higher the elevation the faster the wind speed; therefore locations were initially optimized with higher elevations.

Wake losses are found within the space behind a wind turbine. Wake loss is marked by decreased wind power capacity due to the turbine itself causing turbulence downwind of the rotors. The wake is less effective at generating energy for a distance from the machine. Thus, when siting a wind development, it is important to space turbines as to minimize the impact each has on the others' power production capacity. Typically, the prediction of wake impacts vary due to wind speed at hub height, wind speed over the site area, topography and the wake interactions between wind turbines themselves. This is a complicated and very site specific calculation completed via computer models, which are specifically designed to facilitate accurate predictions of wind turbine energy production.
The Project, as part of its predictions to show the development is economical, has completed this modeling. The optimized layout presented within the EA registration document shows the closest two (2) turbines to be approximately 360 m apart. Reduction of this spacing between any turbines could cause negative economic impacts to the development due to wake loss impacts.

During site optimization the Project had the following goals with respect to the wind farm layout:

- An installed capacity of approximately 100MW with up to 50 turbine locations;
- Maximization of the net energy yield;
- Optimization of distances between turbines taking into account construction considerations as well as wake-related energy losses while maximizing wind speeds (minimum distance between turbines of 360 m);
- Minimum wind speed of 6 m/s at turbine locations; and
- Physical, environmental and social constraints specifically but not limited to:
    - Sound levels;
    - Visual impact;
    - Ice throw;
    - Shadow flicker;
    - Electromagnetic interference; and
    - Minimizing footprint and habitat fragmentation.

A preliminary turbine layout was developed based on the following:

- The final constraints map (Drawing 3.4);
- The wind regime within the Property Boundaries; and
- Data collected through the meteorological towers and existing access roads on site.

As the turbine manufacturer has not yet been selected, the process of developing a turbine layout was based on 50 possible locations, which represents the maximum number of turbines to being considered. Turbines will be selected within the range of 2 to 3 MW, and as nameplate capacity increases the number of turbines required to render the Project economically viable decreases. The preliminary layout was considered a starting point for turbine optimization and did not consider energy yield, wake loss or balance of plant (BOP). The 50 locations were chosen based solely on optimal wind resource (i.e. speed and elevation) and the existing road network within the Property Boundaries.

Strum developed a proposed road network considering the following criteria:

- Maximization of existing roads;
- Maximization of clear cut habitat;
- Avoidance of wetland to the extent possible;
- Avoidance of identified rare plant species; and
- Considerations of slopes, runs and road length.

The proposed road network includes 37.5 km of roads, of which 25.7 km are new roads and 11.8 km are existing roads. Drawing 2.3 provides a map of the proposed road network.

Drawing 3.5 provides a map of the preliminary turbine layout based on 50 possible turbine locations. The total area of the Project based on this layout is approximately 6,250 ha.

South Canoe Wind Project

Preliminary Layout

64°22'0"W 64°20'0"W 64°18'0"W 64°16'0"W 64°14'0"W

44°48'0"N 44°46'0"N 44°44'0"N

N

New Ross Rd

New Russell Rd

Wile Settlement Rd

Hants County

Lunenburg County

Halifax C

14

1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

Project Components
- Project Boundary
- Turbine Location

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- Wind Speed <= 6.0m/s
- EMI - 115-1000m
- Slope > 15%

Strum Layers
- Rare Plant
- Drainage
- Watercourse
- Wetland

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:
1. Building status defined by various sources (GLGH)
2. Turbine Location point symbol ~ 60m in diameter

0 0.25 0.5 1 1.5 Kilometers

Date: Feb, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet

3.5

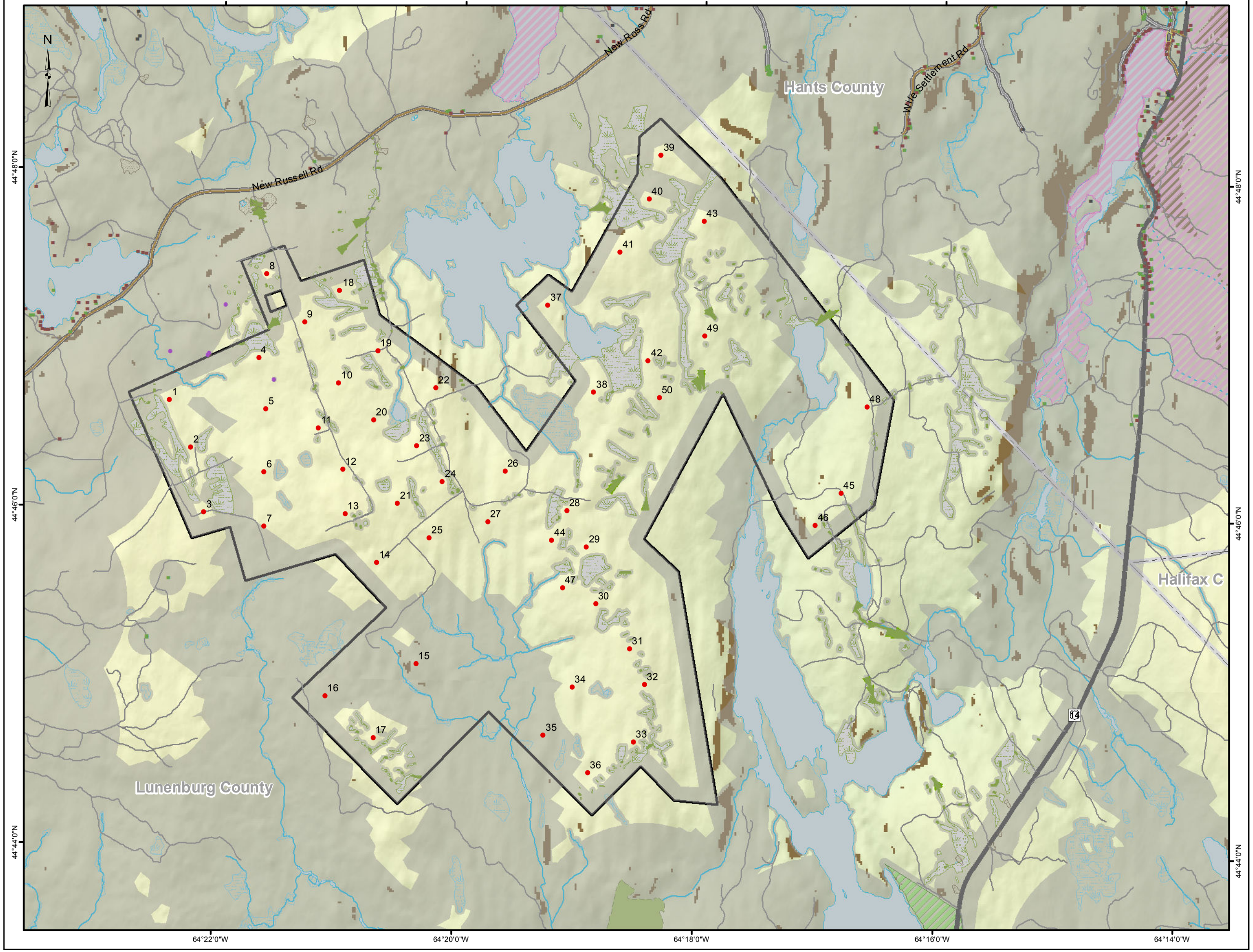
Upon review of the draft EA report, the proponent consulted with NSE and DNR on the Project to address concerns with footprint and habitat fragmentation. The preliminary turbine layout was revised taking into consideration DNRs comments to consolidate the Project Area. As the layout had not yet been optimized environmentally, there was opportunity to move turbines to address connectivity concerns, and as a result, reduce the overall footprint of the Project. The same constraints described in Section 3.4 were applied to the revised turbine layout, effectively reducing the percentage of available land to develop (25%) as the Proponent attempted to move turbines out of the Eastern portion of the Project Area. Drawing 3.6 provides a map of the revised turbine layout (Optimization #2); this layout demonstrates a 49% reduction in the overall Project footprint (approx. 3,042 ha).

Following the second iteration of the turbine layout, the Proponent requested a follow up meeting with DNR and NSE to discuss the revised layout and progress made toward reducing the footprint of the Project, prior to the submission of the final EA report. Comments were generally positive although there was still some concern regarding turbines 45, 46 and 48 as they were considered outliers. DNR requested that these turbines be moved to further reduce habitat fragmentation.

Upon review of the second iteration of the turbine layout taking into consideration DNRs comments, turbines 45, 46 and 48 were moved to accommodate DNR's concerns. The total Project footprint of the third layout revision is approximately 2,790 ha, a 55% reduction from the first layout iteration. However, when constraints are applied to this reduced area, the area for potential development is further reduced to 23% of the total area initially considered (1,563ha).

South Canoe Wind Project

Optimized Layout #2



Project Components
- Project Boundary
- Turbine Location

Strum Layers
- Rare Plant
- Drainage
- Watercourse
- Wetland

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- Prov. Park - 60m
- Wind Speed - <=6.0m/s
- EMI - 115-1000m
- Slope > 15%

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:

1. Building status defined by various sources (GLGH)
2. Turbine Location point symbol ~ 60m in diameter

0 0.25 0.5 1 1.5 Kilometers

Date: Feb, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

Sheet:

3.6

Table 3.5 summarizes the reduction in Project footprints as a result of the optimization process.

Table 3.5: Summary of change in Project footprint resulting from optimization process

Iteration	Project Footprint (ha)	Reduction in area (ha)	% Reduction in Project Footprint	% Available Land Once Constraints Are Applied
1 (preliminary layout)	6250	N/A	N/A	47%
2	3042	3208	49%	25%
3	2790	3460	55%	23%

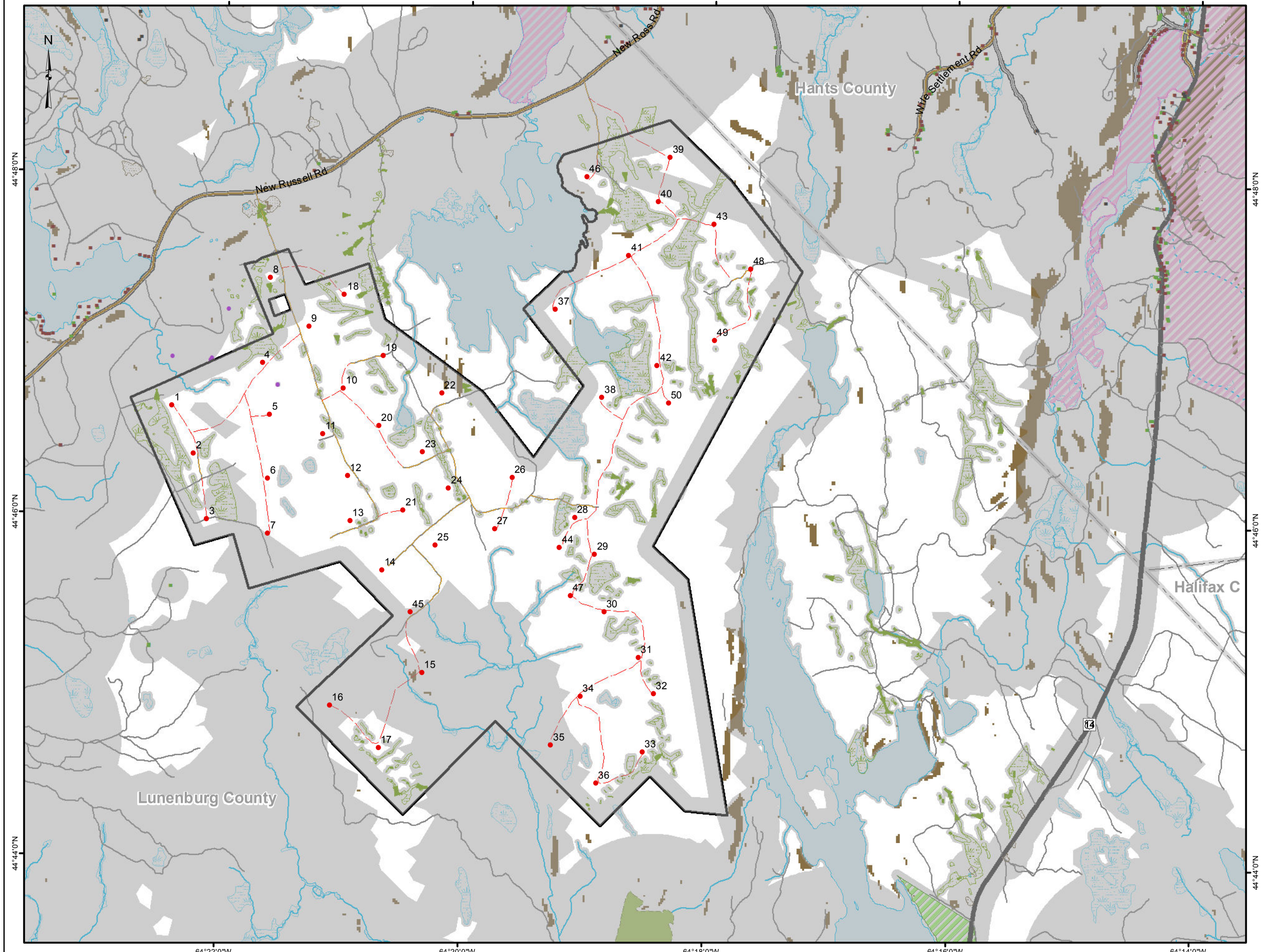
Drawing 3.7 provides a map of the third iteration of the turbine layout and proposed road network. This is considered the final Project footprint for the purpose of the final EA report. The total number of potential turbine locations remains at 50; the final number of turbines will be determined upon award of the RFP depending on the manufacturer chosen, if the proponent is successful.

Please note that turbines 45, 15 and 16 appear to be within the constraints buffer in Drawing 3.7; this is a result of turbines being moved into areas with less than ideal wind resource to accommodate other environmental and social constraints and recommendations from DNR.

The final Project footprint as described in Drawing 3.7 has been used for further evaluation of potential environmental effects throughout the remainder of the EA report. Although the footprint has been reduced dramatically through constraints analysis and the optimization process, individual component studies were conducted initially on the preliminary turbine and road layout. As a result, some turbine and road locations have been relocated to areas not previously assessed for wetlands and rare species and are outside of study area locations used during the field programs. The proponent is committed to micrositing the final turbine and road locations prior to construction to confirm presence or absence of species or habitats of concern. If species or habitats of concern are identified, mitigation discussed within this document will be applied, if mitigation will not lower the impact to an acceptable level, the proponent will discuss alternative mitigation with NSE immediately upon determining a potential impact has been discovered.

South Canoe Wind Project

Optimized Layout #3



Project Components
- Project Boundary
- Turbine Location

Strum Layers
- Rare Plant

Access Roads
- New (25.7km)
- On Existing (11.8km)
- Drainage
- Watercourse
- Wetland

Constraints
- Internal Lot Line-165m
- Dwelling -1.2km
- Other Building -200m
- Unidentified Building -1.2km
- Rare Plant - 30m
- Public Rd. -200m
- Prov. Park - 60m
- Wind Speed <= 6.0m/s
- EMI - 115-1000m
- Slope > 15%

Provincial Layers
- Dwelling
- Other Building
- Unidentified Building
- Other Road
- Local Roads
- Collector
- Arterial
- Public Road
- Watercourse
- Waterbody
- Wetland
- Significant Habitat
- Card Lake P. Park
- Campground
- Cemetery
- Dump
- Golf Course
- Park (picnic)
- Pit/Quarry

Notes:

1. Building status defined by various sources (GLGH)
2. Turbine Location point symbol ~ 60m in diameter

0 0.25 0.5 1 1.5 Kilometers

Date: March, 2012

Scale: 1:40,000
Projection: UTM Zone20 NAD83
Sources: NSPI, DNR, GeoBase, NSTDB 1:10,000, Strum

No guarantee is given as to the accuracy or currency of any of the data. The cadastral information portrayed has no legal value and should only be used as a guide.

Sheet

3.7