

2.0 PROJECT DESCRIPTION

2.1 Purpose of Project

Wind energy offers many advantages - it is emission-free, renewable, domestic, and relatively affordable.

Climate change, rising energy prices, energy security and sustainability are among the factors motivating the Nova Scotia Department of Energy (NSDE) to increase the amount of clean, secure sources of renewable energy generated throughout Nova Scotia.

The Government of 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 target further extends to 2020, by which 40% renewable energy is required. 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 objective of the Project is to contribute towards Nova Scotia's target for renewable energy generation.

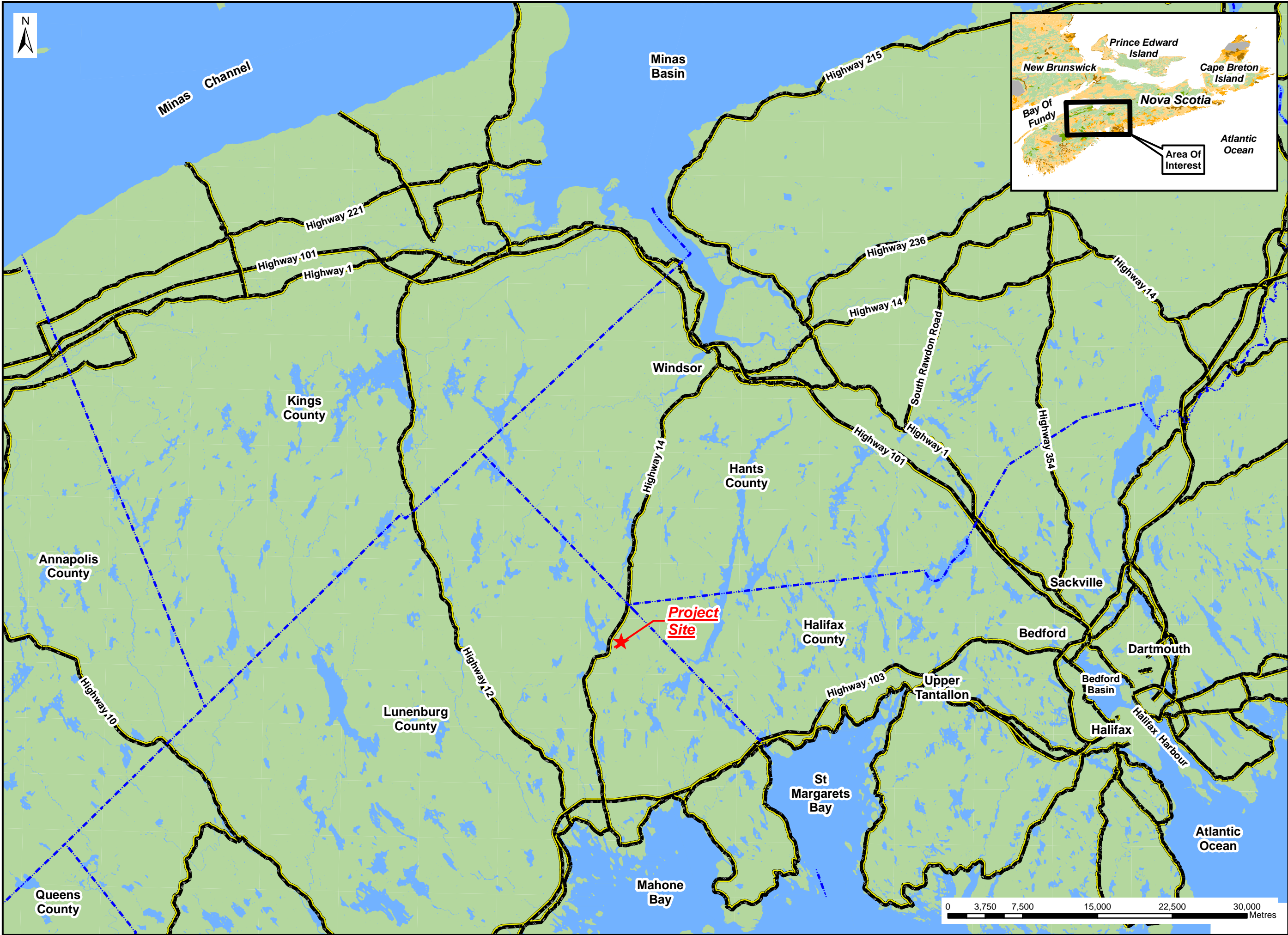
2.2 Geographical Location

The Project lands include Property Identification Number (PID) 60408192 registered under the Municipality of the District of Chester (Drawing 2.1). The 82.6 ha parcel of land is zoned as resource and is bordered by Kaizer Meadow Road to the south, Highway 14 to the west, forested lands to the north, and the entrance to the Kaizer Meadow Environmental Management Centre located approximately 1.1 km to the east.

Access to the site is provided from Kaizer Meadow Road via a gravel road to an area of clear cut, where an existing meteorological tower exists at the same location as the proposed wind turbine.

The closest communities to the Project site are Sherwood (approximately 3.8 km to the west), Canaan (approximately 5.7 km to the south), and Upper Vaughan (approximately 8.3 km to the north). The Town of Chester is located approximately 20 km to the south.

Several restricted and limited use lands are located in close proximity to the proposed Project (Drawing 2.2). Table 2.1 provides a list of provincially protected areas.



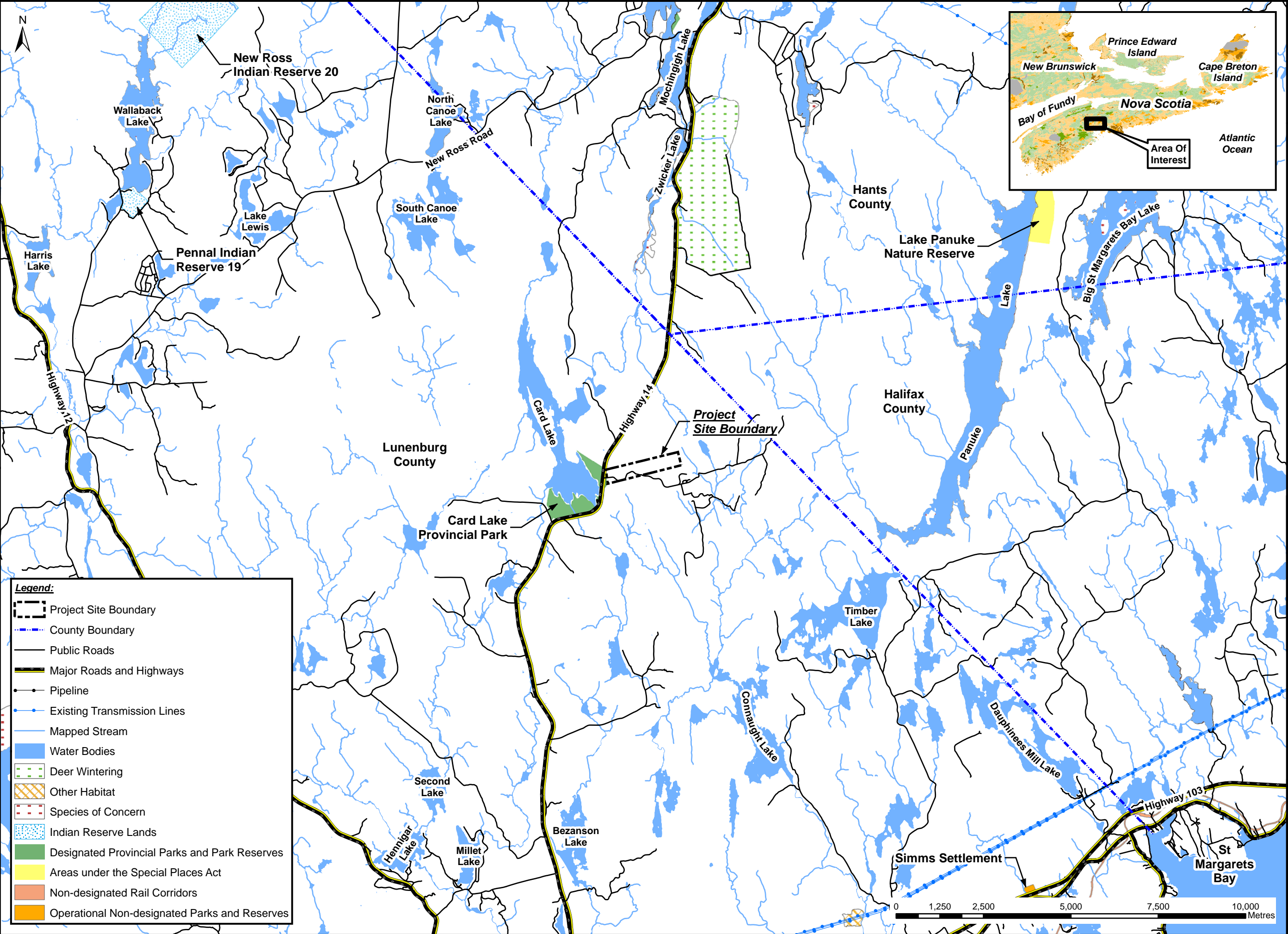
- Notes:**
- Reference: Digital Topographic Mapping By Nova Scotia Geomatics Centre.
 - Projection: NAD83(CSRS), UTM Zone 20 North.

- Legend:**
- County Boundary
 - Major Roads and Highways

Site Location



Date: June 2012	Project #: 12-4360
Scale: 1:350,000	Sheet: 2.1
Drawn By: H. Serhan	
Checked By: A. Walter	



- Notes:**
1. Reference: Digital Topographic Mapping By Nova Scotia Geomatics Centre. Nova Scotia Department of Natural Resources (NS DNR) Significant Habitat And Restricted And Limited Land Use Database.
 2. Projection: NAD83(CSRS), UTM Zone 20 North.

Ristricted And Limited Use Lands



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2.2

Table 2.1: Provincially Protected Areas near the Proposed Project

Protected Area	Applicable Provincial Act	Distance from Proposed Turbine	Size
Card Lake Provincial Park	<i>NS Provincial Parks Act</i> (1989)	1 km west	70.7 ha
Panuke Lake Nature Reserve	<i>NS Special Places Protection Act</i> (1989)	13.8 km northeast	121.3 ha
Simms Settlement Operational Non-designated Park	N/A	16.8 km southeast	11.1 ha

There is also one designated Indian Reserve Land located approximately 16 km northwest of the Project site: Pennal Reserve No. 19 is situated between Camp Lake and Wallaback Lake, approximately 6 km southwest of New Ross Settlement (*Indian Lands Act* 1989).

2.3 Turbine Specifications

The Project will consist of one 2.0 MW turbine. Under normal conditions the turbine will operate 24 hours per day, 7 days per week. Technical specifications of the turbine model will be provided in the EA.

2.4 Project Activities

The proposed Project includes three phases: site preparation and construction; operations and maintenance; and decommissioning.

2.4.1 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 (NSTIR 2012). All required permits and approvals will be obtained prior to construction.

Site services required prior to and during construction include, but are not limited to:

- Widening of the entrance to Kaizer Meadow Road and construction of the tower access road, which will be designed to accommodate large trucks and wide turning radii;
- Staging and storage facilities;
- Temporary offices;
- Laydown areas for construction and maintenance equipment;
- Temporary sanitary facilities;
- Water and rinsing facilities;
- Utilities and communications; and
- Garbage collection and off-site disposal.

Weather constraints that may affect the proposed schedule and any 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, pursuant to Subsection 20(1) of Chapter 371 of the Revised Status of Nova Scotia, *Public Highways Act*, and published by Nova Scotia Transportation and Infrastructural Renewal (NSTIR 1989). Since timing and duration can change annually, based on weather conditions, delivery will be scheduled between May and December. Spring restrictions will be reviewed prior to transporting turbine parts if the timing occurs close to typical spring closure months.

2.4.2 Construction Phase

General activities required for the construction phase of the Project include:

- Site preparation;
- Access road upgrading and construction;
- Laydown area and turbine pad construction;
- Turbine assembly;
- Grid connection;
- Maintenance building construction;
- Removal of temporary works and site restoration; and
- Commissioning.

2.4.3 Site Preparation

Site preparation activities include:

- Land surveys for placement of the access road, turbine, and associated works;
- Geotechnical investigations;
- Placement of erosion and sedimentation control measures; and
- Clearing of trees and grubbing areas for construction.

The first two activities listed above have been completed.

The proponents are aware of the Migratory Bird Regulations (MBR), under the *Migratory Birds Convention Act* (MBCA), and the fact that Canadian Wildlife Service (CWS) cannot authorize incidental take of migratory bird nests or eggs for activities such as the construction of a wind farm and associated infrastructure. Therefore, trees will be removed outside of bird nesting and breeding season, unless an approved mitigation plan has been agreed to by NSE, NSDNR, and CWS.

Equipment needs for site preparation will likely include:

- Light trucks;
- Drilling rigs; and
- Bunch feller (and similar harvesting equipment).

2.4.4 Access Road Upgrading and Construction

On-site Roads

The existing Kaizer Meadow Road will provide the main access to the Project site and will continue to provide access to the Kaizer Meadow Environmental Management Centre. Upgrades at the entrance of Kaizer Meadow Road from Highway 14 will be required to accommodate wide turning radii, with a minimum inside horizontal radius based on the length of the turbine blades, and other associated components.

A short tower access road (approximately 40 m in length) will be constructed from Kaizer Meadow Road to the turbine location. This road will be constructed to a standard width of 5.5 m, not including shoulders, and sloped at a ratio of 1:2. There will be areas where the width could be as much as 6 - 11 m to accommodate flow of vehicles and laydown areas. The construction of the tower access road will involve the removal of vegetation and grubbing. The road 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. Existing and proposed roads are shown in Drawing 2.3.

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 re-used.

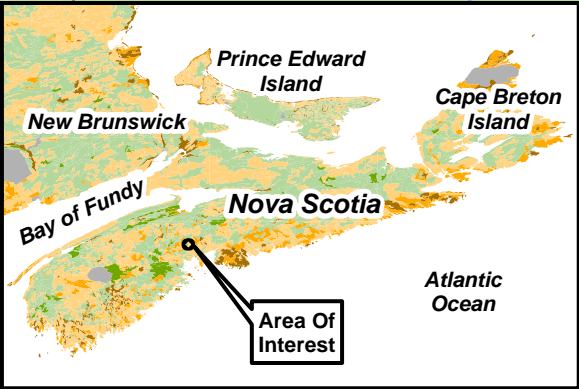
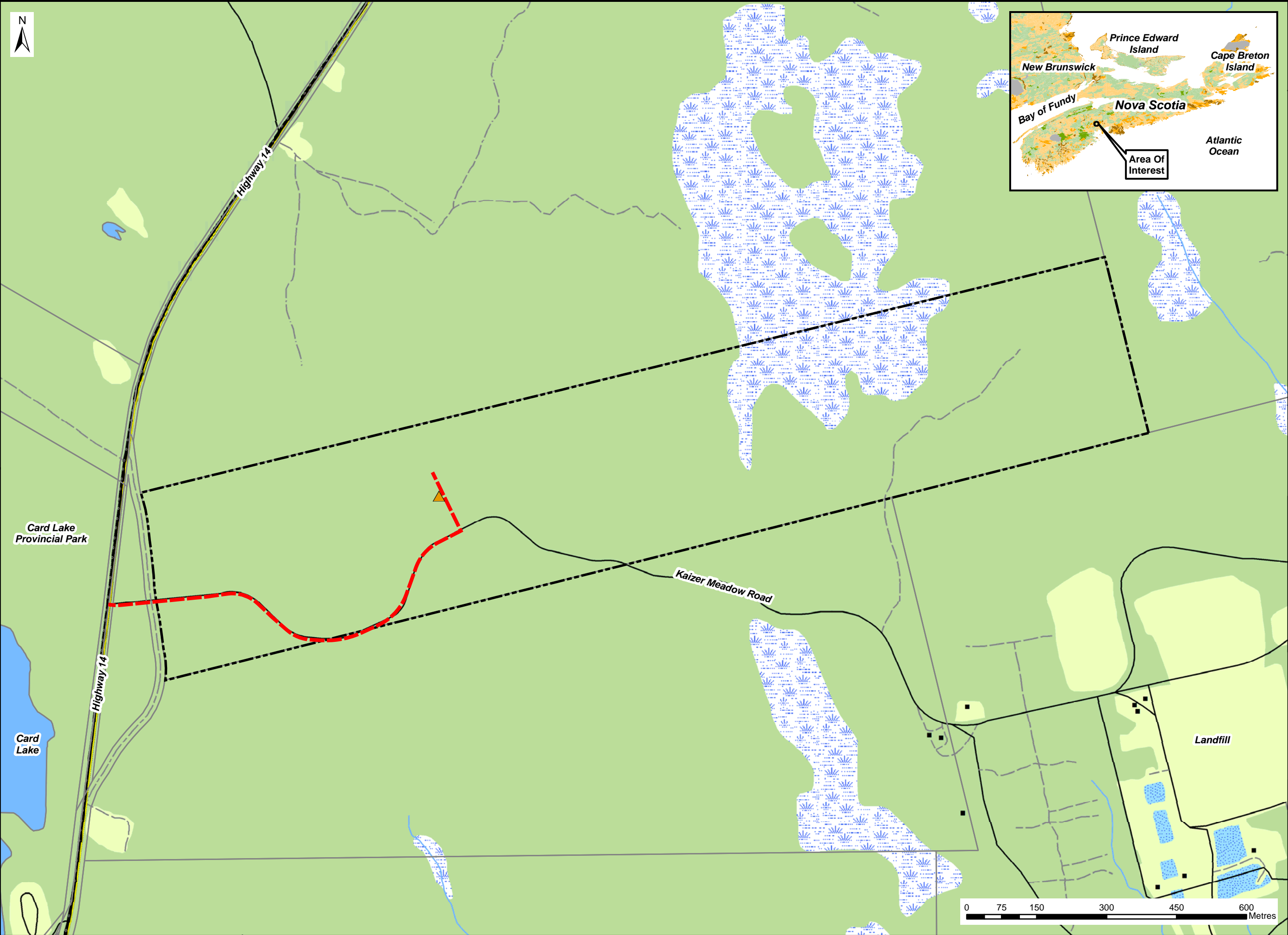
The following equipment could be used during road upgrading and construction:

- Excavators;
- Dump trucks;
- Bull dozers;
- Rollers;
- Graders;
- Crusher; and
- Light trucks.

Laydown Area and Turbine Pad Construction

General activities during the creation of the laydown area and turbine pad construction may include:

- Removal of vegetation;
- Installation of erosion and sedimentation control measures;
- Removal of overburden and soils;
- Blasting/chipping of bedrock (to be determined);
- Pouring and curing of concrete pad (complete with rock anchors);
- Placement of competent soils to bring the area to grade;
- Compaction of soils; and
- Excavation of trenches for electrical conduits and fibre optic communication.



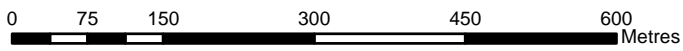
- Notes:**
- Reference: Digital Topographic Mapping By Nova Scotia Geomatics Centre.
 - Projection: NAD83(CSRS), UTM Zone 20 North.

- Legend:**
- Proposed Turbine
 - Proposed Road
 - Building
 - Project Site Boundary
 - Adjacent Properties
 - Major Roads and Highways
 - Roads
 - Access Roads / Trails
 - Sewage Settling Pond
 - Mapped Stream
 - Indefinite Stream
 - Water Bodies
 - Mapped Wet Area
 - Cleared Area

Turbine and Road Layout



Date:	June 2012	Project #:	12-4360
Scale:	1:7500	Sheet:	2.3
Drawn By:	H. Serhan		
Checked By:	A. Walter		



The turbine foundation will be approximately 15 m x 15 m, installed to a depth of approximately 2 to 3 m below grade, and anchored to the surrounding granite bedrock.

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 turbine pad and laydown area is expected to be approximately 90 m x 90 m. The exact arrangement of the turbine pad and crane pad will be designed to suit the specific requirements of the turbine and the surrounding topography during the detailed design process.

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

The following equipment may be used for the laydown area and turbine pad construction:

- Excavators;
- Dump trucks;
- Bull dozers;
- Rollers;
- Graders;
- Crusher (not required if a local quarry can supply gravel sizes);
- Concrete trucks;
- Light cranes; and
- Light trucks.

Turbine Assembly

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

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 cranes. 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 for the turbine assembly:

- Main crane unit (up to 120 m high in some cases);
- Main crane unit - assembly cranes; and
- Manufacturer's support vehicles.

Grid Connection

Electricity produced from the turbine will be stepped up to 34.5 kV via a pad mounted transformer, located adjacent to the turbine. A line extension of 0.5 km is assumed to extend circuit 84W-301 to the generator site. From the circuit system, the electricity will be transmitted via an existing transmission line running parallel to Highway 14 to the Robinson's Corner Substation (84 W) located 22 km south of the turbine location.

The following equipment is expected to be used during the grid connection process:

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

Maintenance Building Construction

Included in the Project design is a maintenance building, which will provide storage for maintenance equipment, offices for site staff, and sanitary facilities. 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 that may potentially attract birds to the site.

The following equipment is expected to be used during construction of the maintenance building:

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

Removal of Temporary Works and Site Restoration

Once construction is complete, 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 the site is stabilized, temporary erosion and sedimentation controls will be removed. Attention will be paid during site reinstatement to ensure promotion of wildlife return to the area, to the extent possible.

The following equipment is expected to be used during removal of works and restoration:

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

Commissioning

The turbine 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 turbine has cleared all tests, the commissioning of the unit will begin, in coordination with Nova Scotia Power Incorporated (NSPI). These performance tests will be completed by qualified wind power technicians and electrical utility employees.

Additional testing may also be required for the transformer, power lines, and substation components, all of which will be performed by qualified engineers and technical personnel.

2.4.5 Operations and Maintenance

During the life span of the Project (estimated to be 20 years), roads will be used to access the turbine by field staff, as well as maintenance personnel. Kaizer Meadow Road will also continue to be used to access the Kaizer Meadow Environmental Management Centre. The roads will be maintained with additional gravel and grading, in addition to vegetation management procedures as required. During the winter months, roads will be plowed, sanded, and/or salted, as required for safe driving.

Due to the potential for public access to the turbine, signage will be affixed to the short access road 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 turbine (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 used 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 environmental 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.

2.4.6 Decommissioning

This Project currently has a projected life span exceeding 20 years.

Decommissioning will commence shortly after the retirement of the turbine unit. 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, the decommissioning phase will follow the same steps as the construction phase:

- Dismantling and removal of the turbine from the Project site.
- Removal of the turbine foundation to below grade and reinstatement with top soil to ensure stabilization of the land.
- Removal of all on-site roads not used to access the Kaizer Meadow Environmental Management Centre. Once removal is complete, all lands will be reinstated and stabilized.
- Removal, recycling (where possible), and disposal of collection system, conductor, and poles.
- Removal of all other equipment and reinstatement and stabilization of land.

2.5 Project Schedule

Table 2.3 presents the Project schedule from EA approval to Project decommissioning.

Table 2.2: Project Schedule

Project Activity	Timeline
Environmental Assessment Approval	Fall 2012
Follow-up Environmental Studies	Summer/Fall 2012
Geotechnical Assessment	Completed Spring 2012
Engineering Design	Summer/Fall 2012
Power Purchase Agreement	Fall 2012
Turbine Agreement	Fall 2012
Clearing	Fall 2012
Construction	Spring 2013 (spring weight restrictions will be taken into account prior to detailed construction schedule)
Commissioning	Summer 2013
Operations	2013-2033
Decommissioning	2033