Dalhousie Mountain Wind Farm

CLYDESDALE RIDGE WIND LP

Clydesdale Ridge Wind Farm Environmental Assessment Registration

May 2012

Stantec

CLYDESDALE RIDGE WIND FARM ENVIRONMENTAL ASSESSMENT REGISTRATION

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May 2012

File: 121510812

Executive Summary

Introduction

RMSenergy Dalhousie Mountain LP, a Nova Scotia owned and operated corporation, currently owns and operates the 51 megawatt (MW) Dalhousie Mountain Wind Farm in Mount Thom, Nova Scotia. A new company, Clydesdale Ridge Wind LP has been created to expand the operation on lands west of the existing wind farm. The Limited Partners are Firelight Infrastructure Partners Inc. and Dalhousie Mountain Wind Farm Inc. This Project will be known as Clydesdale Ridge Wind Farm and will consist of up to 28 GE 1.68MW 82.5m wind turbine generators with a 34.5 kV collection system connected to the existing Dalhousie Mountain Wind Farm substation (91(N)), on land located between Mount Thom, Pictou County and Earltown, Colchester County, Nova Scotia. The proposed Project is referred to as the Clydesdale Ridge Wind Farm Project ("the Project").

The Clydesdale Ridge Wind Farm Project will provide renewable power sufficient for 20,000 homes annually and have a positive effect on the environment through displacement of burning fossil fuel. In light of both Canada's and Nova Scotia's commitment to reduce greenhouse gas emissions and invest in renewable energy, the Clydesdale Ridge Wind Farm Project will be an important component of Nova Scotia's energy mix.

Regulatory Approvals

The Clydesdale Ridge Wind Farm Project has a nameplate capacity exceeding 2 MW, which requires the Proponent to undergo environmental assessment as a Class I Undertaking pursuant to the Nova Scotia *Environment Act*. No federal triggers under the *Canadian Environmental Assessment Act* (*CEAA*) are anticipated at this time. This environmental assessment report (EA Report) is intended to meet the requirements of the provincial EA process. Additionally, this EA Report will provide support in seeking other environmental and planning approvals necessary for this Project.

Project Description

The Project will consist of up to 28, 1.68MW 82.5m wind turbine generators. In addition, the following ancillary facilities are also considered part of the Project:

- 34.5 kV collection lines (to link the wind turbines to the substation);
- 690V – 34.5kV pad mounted step-up transformers located beside each turbine;
- existing substation (to step up the electric output from 34.5 kV to 230 kV);
- access roads; and
- crane pads for assembly of wind turbines.

The onsite substation area is fenced and graveled and was built in 2009 to accommodate the electrical components required to connect the Dalhousie Mountain power generation as well as an additional 50 MW (considerations for the second phase). An existing maintenance shop/control building is located off site and was built for the Dalhousie Mountain Wind Farm (Phase I).

Current color photographs of proposed turbine sites, access roads and lay-down areas have been gathered by the Proponent. The photos depict the actual view of the ground cover and surrounding area specific to each site/road. These photos, with descriptions, can be found in Appendix M.

Project Activities

The development of the proposed Project will include several phases, including site preparation and construction, operations and maintenance, and decommissioning. Activities within these phases will include:

- surveying;
- developing access roads;
- clearing and grubbing;
- grading;
- foundation excavation;
- pouring turbine foundations;
- equipment lay-down and turbine assembly;
- tower, generator, and rotor assembly;
- collection system and transmission line/connection to grid;
- installation of substation equipment;
- clean-up and reclamation;
- turbine commissioning;
- access and inspection;
- rotor, generator and tower disassembly;
- removal of concrete foundation; and
- decommissioning of the distribution lines.

Construction Schedule

The proposed construction schedule for the Project is presented in Table E.1. The Project is expected to be operational for at least 25 years. Decommissioning activities will last roughly the same amount of time as comparable construction activities (*i.e.*, one year).

Table E.1 Anticipated Project Activity Schedule

Project Activity	Proposed Schedule
Surveying	May 2009 to present
Clearing (primarily on existing roads requiring widening and brush clearing; includes laydown areas, collector circuits and all access roads)	January to March 2013
Development of access roads	January to March 2013
Excavation and installation of power poles	January toMarch 2013
Foundation excavation	January to March 2013
Foundation construction	April to June 2013
Delivery of equipment	July to October 2013
Wind turbine installation	July to November 2013
Stringing of wires for collector system	July to November 2013
Installation of substation equipment	September and October 2013
Turbine commissioning	September to November 2013
In-service	December 2013
Site remediation, clean-up, mitigation measures and follow-up measures will be incorporated	Will start from day one construction and continue throughout operations as required

Environmental Management Strategy

Clydesdale Ridge Wind LP is committed to ensuring that the construction, operation, and decommissioning of the proposed Project are conducted in an environmentally responsible manner. Clydesdale Ridge Wind LP will successfully implement the recommended mitigation measures for the Project. To accomplish this objective, the following initiatives will be addressed: integration with the corporate environmental management framework; compliance with worker health and safety rules; emergency response planning; environmental protection planning; and environmental monitoring.

Stakeholder Consultation and Mi'kmaq Engagement

To date, the consultation activities for the Clydesdale Ridge Wind Farm Project have included meetings with the Municipality of Pictou and the Municipality of Colchester (November and December 2011, January 2012), meeting with Colchester North MLA, Karen Casey (February 20120), meeting with Pictou West MLA, Charlie Parker (February 2012), meeting with the Gully Lake Trails Society (April and December 2011 and ongoing), a public Open House in Mount Thom (December 2011), and direct contacts with regulatory agencies, landowners and other interested parties throughout the course of the study.

Clydesdale Ridge Wind LP has directly engaged the Mi'kmaq community, including the Pictou Landing First Nation, the Confederacey of Mainland Mi'kmaq (CMM), the Mi'kmaq Rights Initiative (KMK) and the Native Council of Nova Scotia/ Maritime Aboriginal Peoples' Council through information mailouts, face to face meetings and by commissioning an Mi'kmaq Ecological Knowledge Study (MEKS) (upon receipt of a Power Purchase Agreement (PPA) with Nova Scotia Power Inc. (NSPI). In addition to this, the Proponent commissioned an MEKS for the Dalhousie Mountain Wind Farm in 2008 which considers the Clydesdale project area in its consultation zone. The public and Mi'kmaq communities will be invited to submit written

comments on the proposed Project and information contained in the EA document during the EA review process. Additional stakeholder and community outreach initiatives are planned for the spring and summer of 2012 including the launch of a Project website (www.rmsenergy.ca), mailout of community newsletter, meeting with municipal council, door-to-door community outreach program and a public open house. The public and Mi'kmaq community will continue to be engaged in future phases of development. Clydesdale Ridge Wind LP will develop and implement a community liaison and issues resolution program for Project operations, where the public and Mi'kmaq will be invited to participate. The public has been very receptive of the existing Dalhousie Mountain Wind Farm since development began and has continued through the past 2.5 years of operations. Positive feedback has been received for the proposed new Clydesdale Ridge Wind Farm.

Impact Assessment

No significant adverse residual environmental effects of the Clydesdale Ridge Wind Farm Project are predicted, considering the existing conditions of the Project site, the design of the Project and mitigation measures to be implemented as part of the Project. A summary of the predicted environmental effects and mitigation measures for this Project is presented in Table E.2.

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
Birds and Other Wildlife	Construction & Decommissioning	Sensory disturbance	• Visitors will remain within relevant areas, both in-vehicle and on- foot and will aim to preserve the site's natural areas. • Overall disturbance will be limited to designated workspaces and performed in compliance with the *Migratory Birds Convention Act*. • Delivery vehicles will remain on designated roads.
		Habitat loss/alteration	• Habitat loss will be mitigated by only clearing the land necessary for construction activities and by limiting the overall land disturbance to within designated workspaces. • Upon completion of construction and/or decommissioning, habitat will be restored to the extent possible. • Areas of significance (*e.g.,* wetlands) will be avoided, to the extent possible.
		Mortality	• In order to reduce the potential of bird mortality, construction activities will be performed in compliance with the *Migratory Birds Convention Act (e.g.,* clearing outside the critical time periods for breeding birds). • The Proponent has scheduled training on June 1 for onsite personnel regarding how to identify and properly deal with any wood turtles that may enter a work site.
	Operation	Sensory disturbance	• A pre- and post-construction Mainland Moose Monitoring Program will be conducted. • In light of the discovery of what appears to be limited

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
			moose presence in the Project Study Area, a moose monitoring program (pellet group counts) will be implemented to determine the degree to which moose use the Project Study Area. • Winter track surveys will be conducted to determine if moose and other mammal species avoid turbine sites. This study will help to determine if the turbines and associated infrastructure are an impediment to free movement of mammals. • As requested by NSDNR, helicopter surveys will also be conducted. Details will be developed in consultation with NSDNR. • Overall, the Proponent is also committed to working with NSDNR and landowners to protect the mainland moose population, e.g., through initiatives in the Mainland Moose Recovery Program.
		Mortality	• To reduce the potential for increased bird fatalities due to collision with wind turbines, several decisions were made in the planning of the wind farm. The turbines to be used extend no higher than 121.25 m above the ground thus avoiding the flight height of nocturnally migrating landbirds. Lighting will be the minimum allowed by Transport Canada for aeronautical safety, and red lights (CL-865) may be used with the minimum intensity and flashes per minute allowable. Non-flashing red lights are also still an option, depending on the recommendations of NavCanada, Transport Canada, and CWS combined. The turbines for this Project will be built using tubular steel towers, as some data indicate that lattice towers encourage perching by raptors during hunting and, as a result, may put these birds at risk of collisions. Post-construction monitoring will direct the need and form of further post-construction mitigation measures. • A bird and bat monitoring program will be developed in consultation with NSDNR and CWS. Based on the results of the program, necessary modifications to mitigation plans and/or wind farm operations will be undertaken.
Soils and Vegetation	Construction & Decommissioning	Soil erosion and compaction	• Access to the turbine sites will be limited to established access roads, where possible. • Size of access roads will be kept to the minimum required for the safe construction, operation and decommissioning of the equipment. • Whenever possible, clearing activities will be timed to periods when the ground surface is best able to support construction equipment (winter or dry season). • Compacted soil will be reclaimed as required. • Standard erosion and sediment control measures will be implemented as required. • Topsoil and subsurface soils will be separated and stored on-site to be replaced appropriately after the pouring of the concrete foundation. When the soils are stored they will be protected from erosion and runoff.

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
		Loss of plant species	• Follow- up rare plant surveys will be conducted to assist with micro-siting of turbines and access roads. • Where Plant Species of Conservation Concern are encountered, avoidance to the extent possible will be considered, especially where there maybe be a threat to the regional population. Specifically, no turbines will be erected west of turbine S-31 to avoid an area containing dense populations of heart-leaved foamflower. Care will be taken in upgrading or constructing access roads to turbines S-12, S-13 and S-16 to avoid possible disturbance of the hydrology of the wetland in which alpine rush is located. The population of blood milkwort near Bezansons Lake will be marked with symbolic fencing and the access road will be modified to minimize the potential for accidental disturbance of this population. • Prior to construction, digital way-point files revealing the precise locations of all “Sensitive”, “May be at Risk”, “At Risk” and “Undetermined” listed species identified during field work within the area proposed for development will be provided to NSDNR.
Wetlands	Construction & Decommissioning	Loss of wetland area and/or function	• Wetlands will be avoided, where possible. • All activities, including equipment maintenance and refuelling, will be controlled, and/or will be done off-site, to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble, stockpiled soils, or concrete material, into a wetland. • Construction material, excess material, construction debris, and empty containers will be stored away from wetlands. • Erosion and sediment control measures will be implemented to minimize interactions with wetlands. • Functional analyses will be conducted for wetlands that cannot be avoided. • Regulatory approval will be obtained (including compensation for no net loss of function) from NSE for wetland alteration as required. Turbines will not be constructed within 30 m of a wetland unless approved by NSE.
Water Quality/ Aquatic Environment	Construction & Decommissioning	Surface water contamination	• Watercourses will be avoided to the extent possible. • If alteration of watercourses is required, regulatory approval from NSE of the proposed alteration will be obtained prior to construction. • All activities, including equipment maintenance and refuelling, will be controlled, and/or will be done off-site, to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble, stockpiled soils, or concrete material, into a watercourse. • Construction material, excess material, construction debris, and empty containers will be stored away from watercourses and watercourse banks. • A contingency plan for accidental spills will be developed for the Project. • Turbines will not be constructed within 30 m of a

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
			watercourse unless approved by NSE.
		Sediment loading	• Watercourses will be avoided to the extent possible • General mitigation measures from the NSE Erosion and Sediment Control Handbook will be utilized to control surface water, reduce erosion and limit sedimentation. • If watercourse alterations are required, they will be done in consultation with NSE/DFO in accordance with regulatory requirements. • Land clearing and construction near watercourses (including crossing structure construction) will occur between June 1 and September 30 where possible. • Temporary erosion and sediment control measures, silt fence, straw bales (*etc.*) will be used and maintained until 100% of all work within or near a watercourse has been completed and stabilized. • Visual assessments will be completed both quarterly and after severe storm events to ensure the effectiveness of erosion and sedimentation controls. • Temporary sediment control measures will be removed at the completion of the work but not until permanent erosion control measures, if required, have been established.
		Surface water flow	• Watercourses will be avoided to the extent possible. • Access roads constructed across an existing watercourse that require a culvert will follow standard industry practice, installing culverts of sufficient size to accommodate expected maximum flows within the watercourse. • A Water Approval will be obtained for all required watercourse crossings and the conditions of approvals will be followed.
		Loss of fish habitat	• In-water work will be avoided. • New and replacement culverts will be of an open-bottom design. • Existing stream flows will be maintained downstream of the de-watered work area during all stages of work. • All sediment and erosion control measures will be inspected weekly as well as immediately following rainfall events.
		Fish mortality	• Watercourses will be avoided to the extent possible. • Watercourse crossings, where required, will be constructed between June 1 to September 30 unless otherwise approved by NSE. • Where possible, culverts will be installed during low flow periods. If water is present, watercourses will be dammed and flow will be preserved through water pumps. In this case, a biologist would be on site to facilitate fish rescue within the dammed area.
Noise	Construction & Decommissioning	Increases in sound levels due to the transportation and operation of clearing equipment	• Nearby residents will be advised of significant sound generating activities and these will be scheduled to create the least disruption to receptors. • Heavy equipment will be operated between 7:00 a.m. and 10:00 p.m., avoiding Sundays and holidays unless absolutely necessary. • Construction equipment will have mufflers.

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
			• Noise abatement equipment, in good working order, will be used on all heavy machinery used on the Project.
	Operation	Increase sound levels	• None required.
Tourism	Construction & Decommissioning	Effect on tourism and recreation	• None required.
	Operation	Effect on tourism and recreation	• None required.
Visual	Operation	Change to visual landscape	• Turbines will be all of the same type and model, and will be painted light grey to reduce reflection. • Screening opportunities for adjacent residences through tree planting or other measures may be considered where post-construction evaluation indicates a legitimate concern.
		Lighting	• Lighting will be the minimum allowed by Transport Canada to ensure the appropriate level of aeronautical safety.
		Shadow flicker	• For any turbines that contribute to shadow flicker above 30 hrs/yr, the Proponent has agreed to shutting down these turbines for the times when shadow flicker may peak (e.g., shut down for a few hours to a day per year).
Archaeological and Cultural Resources	Construction	Disturbance	• An archaeological field survey will be conducted prior to construction and an Archaeological Contingency Plan will be developed. • Upon discovery of an artifact, work will be stopped in the area and the appropriate authorities will be contacted.
Land Use	Construction	Reduction of forested land	• Existing right-of-ways (RoWs) (*e.g.*, woods roads) will be used to the greatest extent possible to minimize the Project footprint. • Turbines, with their relatively small footprint on the land, have been sited with consideration for the potential impact to existing land uses. • Existing logging and access roads built earlier in the construction schedule will be used to install the collection system. • The Project will connect at the existing substation for Dalhousie, eliminating the need to clear and disturb the required space
	Operation	Disruption to undeveloped woodlands or infrastructure	• The Project has been designed to minimize impacts to the local land use. No mitigation, therefore, is required as no significant impacts are predicted.
Health and Safety	Operation	Electromagnetic Fields (EMFs)	• None required.
		Infrasound energy	• None required.
		Ice throw	• During construction and operation activities, access to the wind turbine facility will be restricted to authorized personnel wearing proper personal protective equipment and who have had appropriate safety training.

Table E.2 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
			• During site visits, vehicles will be parked up-wind of the turbines. • Warning signs will be posted at the perimeter of the Project Study Area, discouraging trespassing on private lands. • During operation, access to the wind turbine sites will be restricted to authorized personnel only.
Local Community	Construction	Hazards and/or inconveniences to forestry operation	• Road construction schedule will consider planned forestry operation in the area to ensure required access is maintained. • No modification to existing roads expected. • A Special Move Permit and any associated approvals will be obtained through the Department of Transportation and Infrastructure Renewal for heavy load transport.
	Operation	Effect on local economy	• Local residents will be employed to the extent possible during the construction, operation and decommissioning of the Project. • Municipal taxes will be remunerated, thus increasing the local tax base, which could be used to increase funding of local municipal initiatives.
		Effect on property values	• None required.

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1.0 Project Summary

RMSenergy Dalhousie Mountain LP, a Nova Scotia owned and operated corporation, currently owns and operates the 51 megawatt (MW) Dalhousie Mountain Wind Farm in Mount Thom, Nova Scotia. A new company, Clydesdale Ridge Wind LP has been created to expand the operation by adding up to 28 new turbines (approximately 50 MW) on lands west of the existing wind farm. This Project will be known as Clydesdale Ridge Wind Farm. Clydesdale Ridge Wind LP is responding to a provincial and federal strategy to provide approximately 25% renewable power to the provincial grid by 2015. If the Proponent is successful in its submission, the company will enter into a Power Purchase Agreement (PPA) with Nova Scotia Power Inc (NSPI) for up to 50 MW of electrical power from the proposed Clydesdale Ridge Wind Farm Project.

Clydesdale Ridge Wind LP has retained Stantec Consulting Ltd. (Stantec) to assist in the environmental assessment (EA) process for this Project. This Project is subject to provincial environmental registration requirements as a Class I Undertaking pursuant to the Nova Scotia *Environment Act*. "The Proponent's Guide to Wind Power Projects: Guide to Preparing an Environmental Assessment Registration Document" (NSE 2007, updated 2012) was used to ensure provincial requirements for registration are met. No federal triggers under the *Canadian Environmental Assessment Act* (*CEAA*) are anticipated at this time.

This EA report includes:

- a description of the Project, including its location and details regarding its construction, operation and decommissioning;
- a summary of the existing biophysical and socioeconomic features of the area which may be subject to Project-related adverse environmental effects;
- a summary of specific environmental concerns, identified through data collection, consultation with agencies and the public, and/or based on professional judgement;
- an assessment of the positive and/or adverse effects associated with this Project;
- an assessment of cumulative environmental effects of this Project;
- an assessment of the effect of the environment on the Project;
- a summary of mitigation, impact management and monitoring measures of this Project; and
- a summary of the advantages and disadvantages of the Project taking the foregoing into account.

1.1 PROJECT PROPONENT

The Proponent is Clydesdale Ridge Wind LP. It is a partnership between Dalhousie Mountain Wind Farms Inc., a Nova Scotia-owned and operated corporation, and Firelight Infrastructure

Partners Inc., a renewable energy investment firm. The head office of the proposed Clydesdale Ridge Wind Farm will be located at the existing Dalhousie Mountain Wind Farm. The Proponent's primary contact is:

Mr. Reuben Burge
President, Clydesdale Ridge Wind LP
1383 Mount Thom Rd. Salt Springs, Nova Scotia, B0K 1P0
Tel: (902) 925 9463
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Email: reubenburge@eastlink.ca

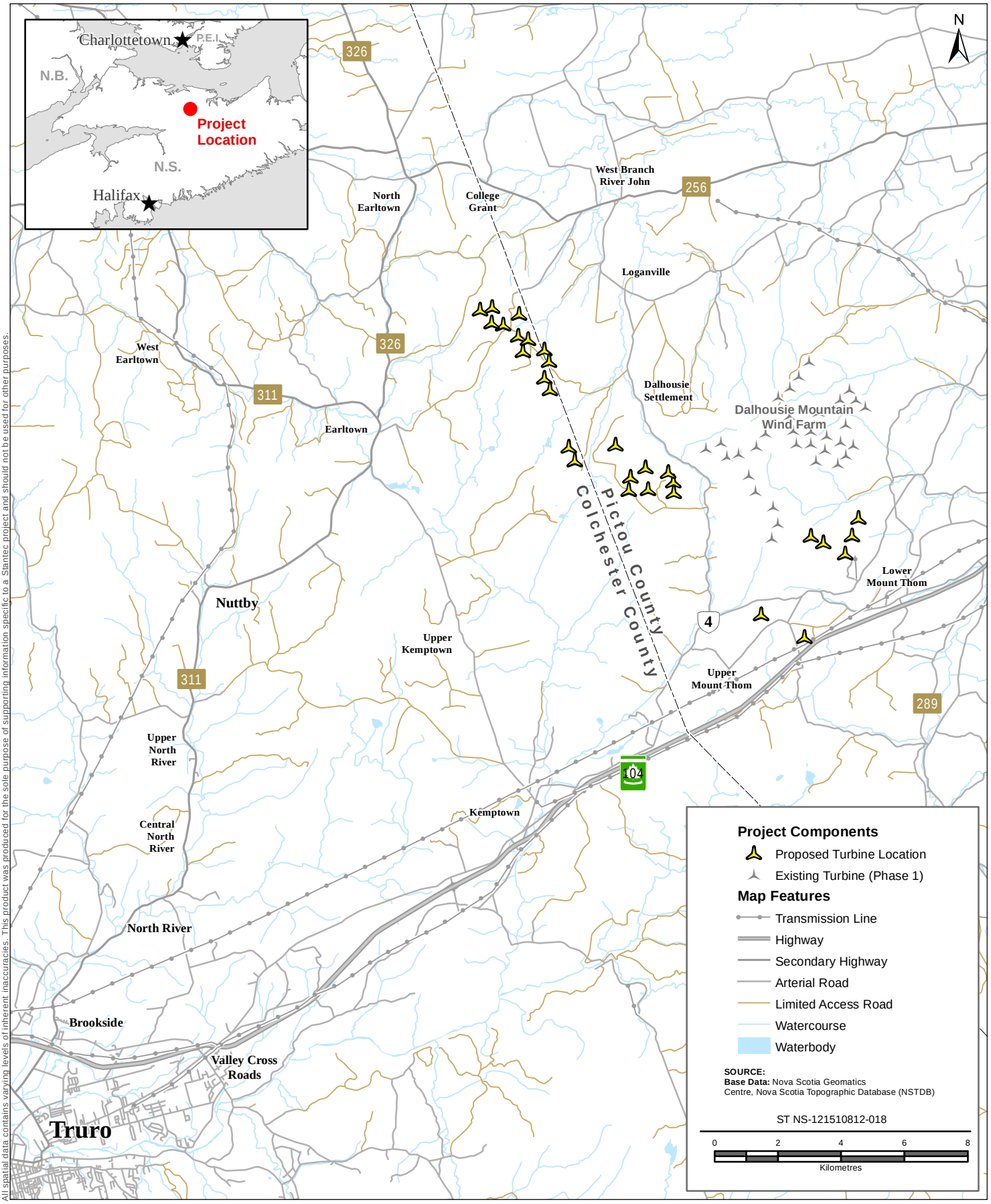
1.2 TITLE OF THE PROJECT

The Project is referred to as the Clydesdale Ridge Wind Farm Project.

1.3 PROJECT LOCATION

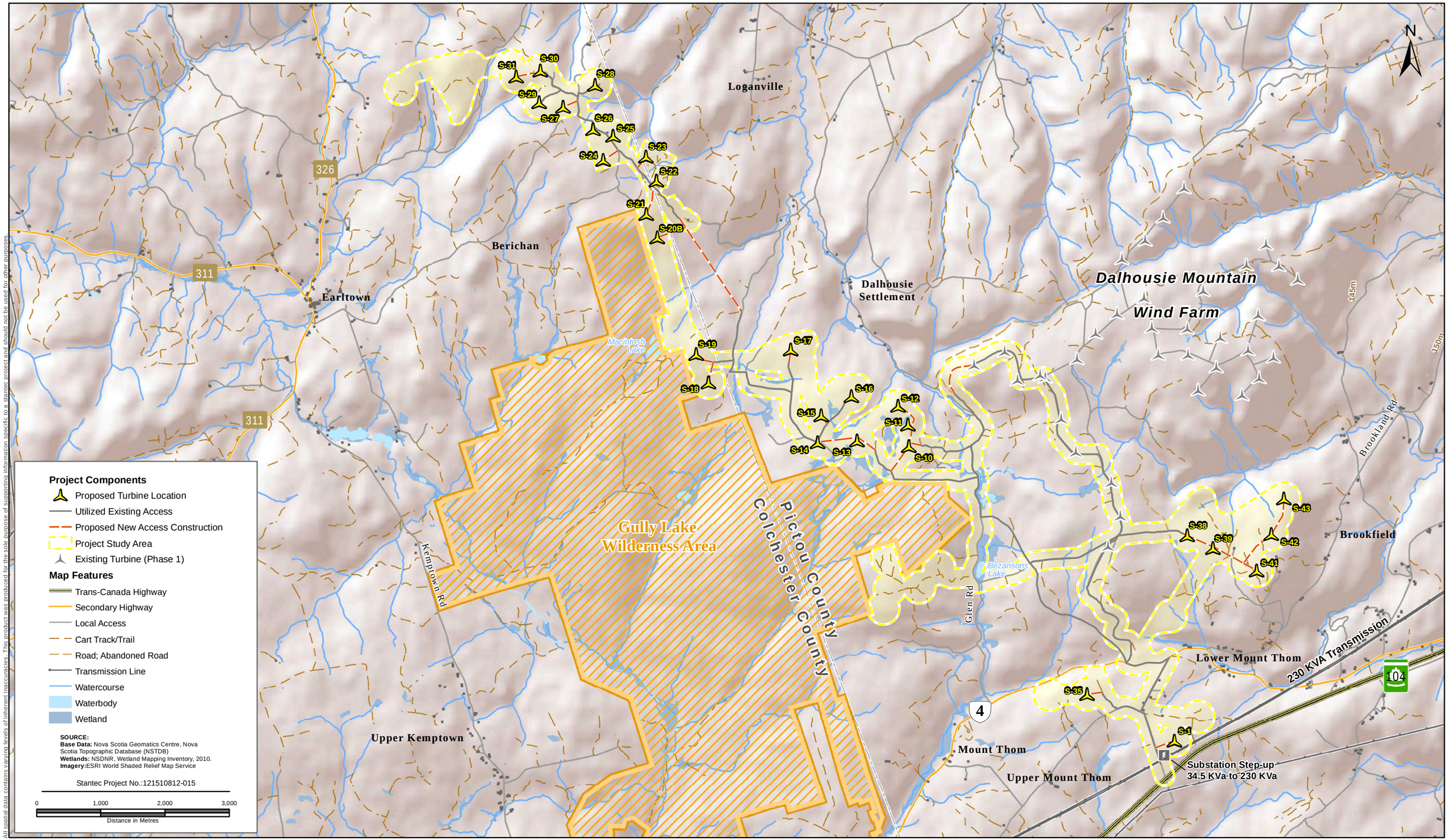
The proposed Project is located within 1 km west as well as within 1 km southeast of the existing Dalhousie Mountain Wind Farm (also referred to as Phase I) in Mount Thom, Pictou County, Nova Scotia. The Clydesdale Ridge Wind Farm site straddles Pictou and Colchester County (Figure 1.1). The wind energy facility will be constructed primarily on land that has previously been cleared for logging activities and utilizes existing roads. A Project Study Area (refer to Figure 1.2) was delineated taking advantage of this network of disturbed areas and existing infrastructure. The Project Study Area is considered the area within which direct Project interactions with the natural environment could occur and formed the basis for field studies. More information on site selection and design of the wind farm is provided in Section 2.4.

The wind energy facility will be constructed primarily on previously cleared woodlands generally bounded to the north and west by undeveloped land and sparsely populated residential areas; to the east by sparsely populated residential areas and the existing Dalhousie Mountain Wind Farm (Phase I); and to the south by Trunk Highway 4 and sparsely populated residential areas (refer to Figure 1.2). The Gully Lake Wilderness Area is located just southwest of the Study Area. The property required to install the Clydesdale Ridge Wind Farm Project is located mostly on privately owned land. Private long term leases and easements are in place to permit the entire installation of this Project. Wind and physical site assessments have also identified five sites on provincial crown land that have potential to be excellent sites in addition to other private lands secured for Project development. Clydesdale Ridge Wind LP submitted an application on December 12, 2011 to the Crown Land Lease Division for the use of one crown land parcel (PID 1037407). This application is currently undergoing an Integrated Resource Management (IRM) process which is required before a lease can be granted.



PREPARED BY: J. Petho	CLYDESDALE RIDGE WIND FARM PROJECT	FIGURE NO.: 1.1
REVIEWED BY: C. Shupe	**Project Overview**	DATE: May 15, 2012
CLIENT: Dalhousie Mountain Wind Farm		Stantec

File Path: V:\1215\active\121510xxx\121510812_clydesdale_ ridge\geomatics\mapping\mxd\Report Figures\ST_NS_121510812-018_Project_Location_20120404.mxd



Project Components

- Proposed Turbine Location
- Utilized Existing Access
- Proposed New Access Construction
- Project Study Area
- Existing Turbine (Phase 1)

Map Features

- Trans-Canada Highway
- Secondary Highway
- Local Access
- Cart Track/Trail
- Road; Abandoned Road
- Transmission Line
- Watercourse
- Waterbody
- Wetland

SOURCE:
Base Data: Nova Scotia Geomatics Centre, Nova Scotia Topographic Database (NSTDB)
Wetlands: NSDNR, Wetland Mapping Inventory, 2010.
Imagery: ESRI World Shaded Relief Map Service

Stantec Project No.:121510812-015

0 1,000 2,000 3,000
Distance in Metres

PREPARED BY:	J. Petho
REVIEWED BY:	C. Shupe
CLIENT:	Dalhousie Mountain Wind Farm

Clydesdale Ridge Wind Farm Project

Current Project Layout

FIGURE NO.:	1.2
DATE:	May 15, 2012

Stantec

Path: V:\1215\active\121510xxx\121510812_clydesdale_ ridge\geomatics\mapping\mxd\Report Figures\ST_NS_121510812-015_Site_Plan_20120404.mxd

Coordinate System: NAD 1983 UTM Zone 20N

1.4 ESTIMATED CAPACITY OF FACILITY

The proposed Project will consist of up to 28 wind turbine generators (WTGs) and ancillary facilities. The energy produced by the Project will be linked to the Nova Scotia electrical transmission system. Each turbine will have a nameplate capacity of 1.68MW, for a total capacity of 47.04 MW. This will generate renewable power sufficient for 20,000 homes annually. The electricity will be supplied directly to the NSPI electric grid under a PPA.

1.5 PROJECT SCHEDULE

The proposed construction schedule and major events for the Project are presented in Tables 1.1 and 1.2. The lifespan of the proposed Project is a minimum of 25 years. Decommissioning activities will last roughly the same amount of time as comparable construction activities (*e.g.*, one year).

Table 1.1 Proposed Project Activity Schedule

Project Activity	Proposed Schedule
Surveying	May 2009 to present
Clearing (primarily on existing roads requiring widening and brush clearing). Includes laydown areas, collector circuits and all access roads.	January to March 2013
Development of access roads	January to March 2013
Excavation and installation of power poles	January to March 2013
Foundation excavation	January to March 2013
Foundation construction	April to June 2013
Delivery of equipment	July to October 2013
Wind turbine installation	July to November 2013
Stringing of wires for collector system	July to November 2013
Installation of substation equipment	September and October 2013
Turbine commissioning	September to November 2013
In-service	December 2013
Site remediation, clean-up, mitigation measures and follow-up measures will be incorporated	Will start from day one construction and continue throughout operations as required

The construction schedule has been designed to account for minor delays that could result from delayed equipment arrival and adverse weather conditions.

1.6 REGULATORY CONTEXT

1.6.1 Environmental Assessment

Pursuant to the Nova Scotia *Environment Act*, environmental registration with Nova Scotia Environment (NSE) is required for an electric generating facility which has a production rating of 2 MW or more derived from wind energy.

The Clydesdale Ridge Wind Farm Project will have a capacity exceeding 2 MW and is therefore subject to environmental registration. This EA satisfies the requirements outlined for provincial

environmental registration as a Class I Undertaking and was prepared following guidance from "The Proponent's Guide to Wind Power Projects: Guide to Preparing an Environmental Assessment Registration Document" (NSE 2007, updated 2012). A Draft EA Report was submitted to NSE for regulatory review in January 2012. A disposition table showing comments and Proponent's response is provided in Appendix A.

To date, the Project has no known triggers under *CEAA*.

1.6.2 Environmental and Land Use Approvals

In addition to EA requirements, federal, provincial and municipal environmental and land use permits, licenses and approvals may be required for this Project. Table 1.2 summarizes approvals and authorizations likely to be required for the Project; this list is intended to be illustrative for EA purposes only.

Table 1.2 Required Environmental and Land Use Approvals

Approvals Required	Summary
Federal	
Canadian Aviation Regulations Standard 621.19	Section 5.9 of these regulations state that a wind turbine should have a flashing red or white beacon mounted on the highest practical point of the turbine if the structure is taller than 90 m. Lighting requirements have been determined in consultation with Transport Canada. Consultation is required with the appropriate regional Civil Aviation authority, providing information on the planned obstruction using the Aeronautical Obstruction Clearance Form (#26-0427). Approval for the Lighting Plan was received from Transport Canada on December 22, 2011. Land Use Submission Form was submitted to NavCanada on January 4, 2012. Approval was received on May 10, 2012 (refer to **Appendix B**).
CBC and RCMP	Nortek Resources has been contracted to complete the RABC Report on the potential effects the Clydesdale project may have on CBC, RCMP and other radio/ radar frequency users. The report was completed on May 18, 2012. (refer to **Appendix N**).
Provincial	
Water Approval for Watercourse Alteration (Activities Designation Regulations)	Alteration of any watercourse will require authorization from NSE under the Activities Designation Regulations. Clydesdale Ridge Wind LP proposes to avoid watercourses to the extent practical during detailed design; however due to the size of the site, some watercourses will have to be crossed. Based on the current proposed road layout, it is anticipated that there could potentially be up to 12 watercourse/drainage crossings, most of which are existing and in need of repair.
Water Approval for Wetland Alteration (Activities Designation Regulations)	Alterations of a wetland will require authorization from NSE under the Activities Designation Regulations. Clydesdale Ridge Wind LP proposes to avoid wetlands to the extent possible through turbine siting and road layout design. If however, it is not possible to avoid a wetland, a functional analysis will be conducted and an application will be submitted for approval of the proposed alteration.
Working within Highway Right-of-Way (*Public Highways Act*)	The proposed transmission line may disturb the surface, soil, or any structure within a highway right-of-way (including the road surface). In Nova Scotia this requires a Working within Highway Right-of-Way Permit from Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR). This application was submitted for both Pictou and Colchester Counties.

Table 1.2 Required Environmental and Land Use Approvals

Approvals Required	Summary
Use of Right-of-Way for Pole Lines Permit (*Public Highways Act*)	Approval from NSTIR may be required for installation of transmission line. Application has been made to Colchester and Pictou County Area Managers, a survey was completed and pole line drawing submitted by Acadia Surveyors, Pictou NS.
Special Move Permit with Department of Transportation and Infrastructure Renewal (*Public Highways Act*)	A Special Move Permit and any associated approvals will be obtained for heavy or oversized load transport as required.
Municipal	
Municipality of the County of Pictou	The Proponent will make application to the Development Officer for Pictou County for a Development Permit specific to the construction of a wind turbine generator. The design of the wind farm, manufacturer and model of machine chosen, and foundation design all fall within the regulations as required of the Municipality.
Municipality of the County of Colchester	The Proponent will make application to the Development Officer for Colchester County for a Development Permit specific to the construction of a wind turbine generator. The design of the wind farm, manufacturer and model of machine chosen, and foundation design all fall within the regulations as required of the Municipality.

1.7 REPORT ORGANIZATION

This report is intended to meet provincial EA requirements, in accordance with the Nova Scotia *Environment Act*.

The following outlines the structure of the Report:

- Section 1 introduces the Project and summarizes the key elements of the Project and the regulatory regime.
- Section 2 provides additional Project detail on components and activities required to support this EA.
- Section 3 describes the stakeholder consultation and Mi'kmaq engagement program undertaken for this Project.
- Section 4 describes the assessment method and scope of the assessment.
- Section 5 describes the existing environment of the Project site, including both biophysical and socioeconomic elements.
- Section 6 presents the assessment of potential environmental effects for each component of the Project, including accidents and malfunctions, and discusses the potential cumulative effects of the Project in association with other existing and planned projects.
- Section 7 identifies follow-up measures that are intended to be implemented for the Project.
- The conclusion of this EA is presented in Section 8.
- Section 9 presents the signature page followed by a list of supporting documents used to prepare the report in Section 10.

- Technical reports and supporting information are presented in appendices at the end of this document.

1.8 EA AUTHORSHIP

This EA was completed by Stantec Consulting Ltd., an independent, multi-disciplinary team of consultants with extensive experience in undertaking EAs across Canada and internationally. Specifically, and on behalf of Stantec Consulting Ltd., the report was prepared and reviewed by the following:

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2.0 PROJECT DESCRIPTION

The following describes the Proponent, background and location of the Project, and detailed Project activities.

2.1 PRESENTATION OF THE PROPONENT

RMSenergy Dalhousie Mountain LP (RMSenergy) is a Nova Scotia company that currently owns and operates the 51 MW Dalhousie Mountain Wind Farm in Mount Thom, Nova Scotia (also referred to as Phase I). The Dalhousie Mountain Wind Farm has been in operation since December 23, 2009. RMSenergy completed the $130 million project on time and under budget to become the only company in the 2007 Request for Proposals to meet the 2009 target completion date.

A new company, Clydesdale Ridge Wind LP has been created to expand the wind energy facility operation on lands west of the existing wind farm. This Project will be known as Clydesdale Ridge Wind Farm (also referred to as Phase II).

2.2 PROJECT BACKGROUND

Clydesdale Ridge Wind LP is proposing to construct and operate a wind energy facility, the Clydesdale Ridge Wind Farm Project, near Mount Thom, Nova Scotia. The Clydesdale Ridge Wind Farm Project will have a nameplate capacity of up to 50 MW. The Project is planned to connect into the Nova Scotia electrical grid.

Several years of wind data has been gathered from the site from six meteorological stations. A combination of consistent wind and community desire to develop the wind potential make the site an ideal location for wind development (refer to Section 2.5 for more information on Project siting).

2.3 PURPOSE OF PROJECT

The Project has been proposed in response to a request for proposals issued by the Nova Scotia Renewable Electricity Administrator. The Project would have the capacity to contribute up to 50 MW of clean, renewable energy to the provincial grid, producing energy sufficient to power 20,000 homes annually. The Clydesdale Ridge Wind Farm Project is a key part of the Nova Scotia Government's plan to integrate renewable assets into its energy mix and will assist the Province to meet its 2015 renewable energy targets.

2.4 SITE SELECTION AND DESIGN

The selection of the Clydesdale Ridge Wind Farm Project site was based on a number of factors including:

- proximity to the existing Dalhousie Mountain Wind Farm;

- preliminary wind resource assessment;
- review of terrain and topography with an altitude above sea level of around 300 m;
- access to power grid interconnection;
- site access;
- presence of existing logging roads;
- existing land use; and
- community support.

The location of the turbines and substation is shown in Figure 1.2. This current site configuration is based on a variety of factors. The locations selected for turbines are a critical element of power generation efficiency and optimal Project economics. The selection of locations is also conditional on the absence of significant ecological or heritage features of the Project Study Area. Site selection, therefore, must consider both of these elements, as well as residential set-backs, in order to have a successful Project with minimal social and environmental effects.

When siting the turbines, the applicable land use by-law setbacks (600 m from dwellings in Pictou County and 700 m in Colchester County; see Section 3.3) have been used by the Proponent as a starting point for exclusion zones. The Proponent has conducted each expert study in a manner through which the turbines may be adjusted within a 75 m radius of the mapped locations. When final micro-siting is complete, the development permits will be applied for by the Proponent to the Municipality of the County of Pictou and the Municipality of the County of Colchester.

The Proponent has installed six meteorological towers, leased land and completed extensive expert studies since June 2004. The planning and selection process for the Clydesdale Ridge Wind Farm turbine locations followed an iterative approach where each site was assessed both for its energy capacity and the presence of sensitive ecological or heritage resources. Sites, which were considered at early stages in the Project, have now been scrutinized from an ecological perspective and locations adjusted to mitigate potential environmental impacts. The same level of scrutiny has been applied to the location of access roads in order to minimize adverse effects on plant communities and aquatic habitat. To the extent possible, access roads follow high ground with the route selected to minimize water crossings. The site locations, shown on Figure 1.2 with the access road layout, have been derived using this careful selection process.

The linear layout of this Project as opposed to a cluster allows more distance for wildlife from the majority of turbines at any given location. The layout also focuses on the higher dry ground to avoid impinging on wetland habitat. The valleys or low lying areas are avoided mainly due to the fact that they have less available wind than the upland sites. The added benefit of avoiding the lowland areas is that valley bottoms that provide good travel corridors for wildlife are avoided.

In light of unforeseen requirements to move sites to mitigate impacts on natural environmental features, the Proponent feels it is important to have more than the minimum number of sites studied as potential wind turbine sites. For the Clydesdale Ridge Wind Farm Project, 39 locations have been evaluated from which up to 28 turbine locations will be initially selected. The current layout shown in this EA Report (refer to Figure 1.2) shows 29 sites, although only 28 will be required for development; one of these sites will be dropped from consideration during micro-siting. Thirty-nine sites have been studied for various environmental impacts including, but not limited to: visual representation; noise levels at various distances; avian point counts and species identification; historic bat study results (conducted in 2007 for the adjacent Dalhousie Mountain Wind Farm); mainland moose population searches and research; wetland and waterway crossing; botanical and biological habitat; and geological conditions. The Proponent is committed to conducting follow-up studies if required.

Ongoing discussions with NSDNR, including a draft review of this EA report, revealed concerns regarding fragmentation and loss of habitat. In response to these concerns and in an effort to optimize the site layout for the Project, the layout has been modified to eliminate turbines from the perimeters and from sensitive habitat types that may serve as wildlife movement corridors. The layout has been reduced from up to 30 in the Draft EA, to now 28 locations that offer the best use of the land suitable for wind development while leaving wide tracts of land that currently just have unpaved road crossings. This eliminates the concern of “funneling”. Two sections, one with five locations and the most northern section with three locations, have been eliminated in favor of the current layout; this is also in-line with the idea that large space between has been gained by condensing the layout. The original plan was 34 GE 1.5 MW turbines and therefore by increasing the MW size and now the blade diameter, the year-end production has been able to be achieved with 28 turbines. The Proponent shares with NSDNR the desire to reduce watercoursecrossings, road, powerline and overall site plan in favor a more efficient layout and lowering impacts to all stakeholders.

The Project Study Area comprises approximately 1,771 ha in total (refer to Figure 1.2). However the actual footprint of the tower structures and ancillary facilities for the proposed wind farm will occupy only a small fraction of the land base within the Project Study Area (cleared turbine area and area for the right-of-way between turbines). When considering all 29 turbines, the Project is predicted to result in physical disturbance of approximately 36.2 ha of land, including development and upgrading of access roads and turbine foundations. This represents approximately 2% of the total Project Study Area, much of which has been previously disturbed (*e.g.,* forestry activities). It is expected that the actual development will be constructed to result in a much smaller footprint with less disturbance.

As detailed design and planning progresses (including, but not limited to, site specific geotechnical tests and follow-up biological surveys), Clydesdale Ridge Wind LP will continue to optimize site layout to minimize biophysical and socioeconomic effects while improving Project efficiencies. A considerable amount of micrositing has already been conducted, with the proponent revising turbine sites in the field with Stantec biologists to avoid, to the extent

possible, sensitive features, including wetlands and rare plants. Appendix M shows recent (April 2012) photographs taken at each of the turbine sites.

A description of the biophysical and socio-economic features of the Project Study Area is provided in Section 4.0.

2.5 PROJECT COMPONENTS

The Project will consist of up to 28, GE 1.68MW 82.5 m wind turbine generators (refer to Figure 1.2 for site layout). In addition, the following ancillary facilities are also considered part of the Project:

- 34.5 kV collection lines (to link the wind turbines to the substation);
- 690V – 34.5kV pad mounted step-up transformers located beside each turbine;
- existing substation (to step up the electric output from 34.5 kV to 230 kV);
- access roads; and
- crane pads for assembly of wind turbines.

The onsite substation area is fenced, grounded and graveled and was built in 2009 to accommodate the electrical components required to connect the power from the Dalhousie Mountain Wind Farm as well as an additional 50 MW. An existing maintenance shop/control building is located off site and was built for the Dalhousie Mountain Wind Farm (Phase I).

2.5.1 Wind Turbine Generators

The Proponent intends to use General Electric (GE) turbines (GE 1.68MW 82.5m turbines) for this Project. For the existing Dalhousie Mountain Wind Farm, GE 1.5sle turbines were used. Table 2.1 includes a summary of the technical specifications for this Project's turbine model.

Table 2.1 Technical Specifications: GE 1.68MW 82.5m Turbine

Turbine Component	Specifications
Rated capacity	1.68 MW
Rated sound power level	106 dB
Cut-in wind speed	3.5 m/sec
Cut-out wind speed	25 m/sec (1 minute)
Rated wind speed	12 m/sec
Number of blades	3
Diameter	82.5 m
Swept area	5345/7853 m^2
Rotor speed (variable)	20.4 rpm
Tower (hub) height	80 m
Gearbox	Three-step planetary spur gear system
Generator	Double-fed three-phase asynchronous generator

Table 2.1 Technical Specifications: GE 1.68MW 82.5m Turbine

Turbine Component	Specifications
Yaw system	Electromechanical driven with wind direction sensor and automatic cable unwind
Control system	Programmable logic controller (PLC)/ remote and monitoring system
Tower design lightning protection	Lighting receptors installed on blade tips / surge protection in electrical components

The GE 1.68MW 82.5m 60 Hz unit is a three bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 82.5 m. The turbine rotor and nacelle are mounted on top of a tubular tower giving a rotor hub height of 80 m. The components and dimensions of the turbines are illustrated in Figures 2.1 and 2.2. Service platforms are provided. The tubular tower is tapered and manufactured in three sections from steel plates. Access to the turbine is through a lockable steel door at the base of the tower. Access to the nacelle is provided by an interior ladder with a fall arresting safety system. Interior lights are installed at critical points from the base to the top of the tower.

The machine employs: active yaw control (designed to steer the machine with respect to the wind direction); active blade pitch control (designed to regulate turbine rotor speed); and generator/power electronic converter system from the speed variable drive train concept (designed to produce nominal 60 Hz, 690V electric power).

The generator is a doubly fed induction-generator with wound rotor and slip rings. Nominal speed at 1.68 MW power output series is 1550 rpm. The generator is mounted to the bedplate on elastomeric foundations to reduce vibration and associated noise.

Temperature sensors are built into the generator windings to provide a temperature reading to the wind turbine controller. In the event the generator temperature is outside of the normal operating range, an automatic shutdown of the turbine is initiated.

The electrically actuated individual blade pitch systems act as the main braking system for the wind turbine. Braking under normal operating conditions is accomplished by feathering the blades out of the wind. Any single feathered rotor blade is designed to slow the rotor, and each rotor blade has its own back-up battery bank to provide power to the electric drive in the event of a grid line loss.

The turbine is also equipped with a mechanical brake located at the output (high-speed) shaft of the gearbox. This brake is only applied immediately on certain emergency stops (E-stops). This brake also prevents rotation of the machinery as required by certain service activities.

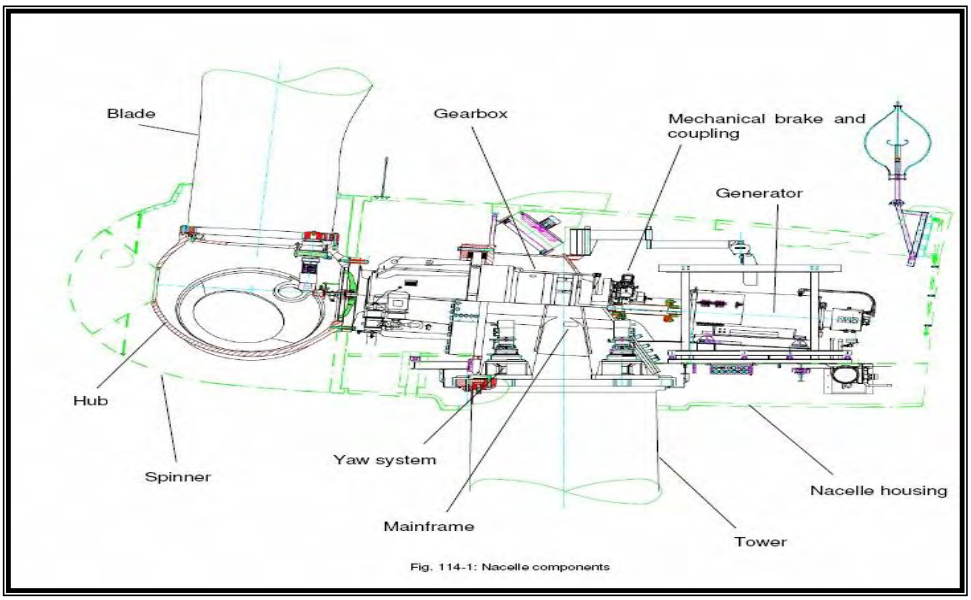

Figure 2.1 GE Energy 1.68MW 82.5m 60 Hz Wind Turbine Generator: Internal Components

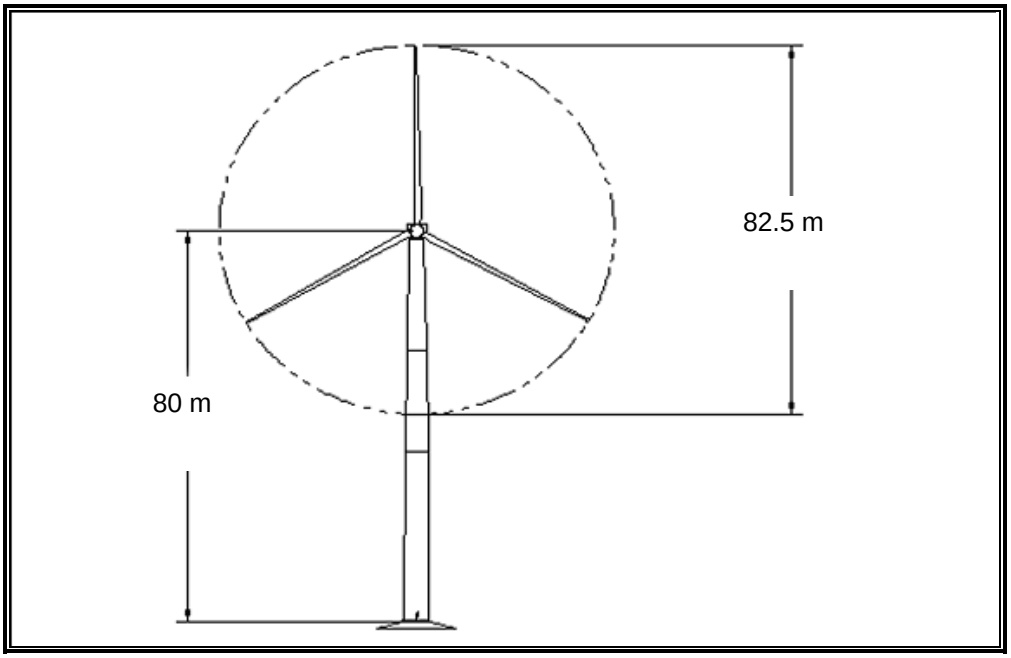

Figure 2.2 GE Energy 1.68MW 82.5m 60 Hz Wind Turbine Generator: External Dimensions

The rotor blades are equipped with a strike sensor mounted in the blade tip. Additionally, a solid copper conductor from the blade tip to root provides a grounding path that leads to the grounding system at the base of the tower foundation.

Service switches at the tower top prevent service personnel at the bottom of the tower from operating certain turbine systems while service personnel are in the nacelle. To override any machine operation, E-stop buttons located in the tower base and in the nacelle can be activated to stop the turbine in the event of an emergency.

The wind turbine can be controlled automatically or manually from either the control panel located inside the nacelle or from a personal computer (PC) located in a control box at the bottom of the tower, or from a PC located offsite through internet-enabled control.

Turbine installation is completed by the mounting of the three-bladed rotor hub to the main shaft after the nacelle assembly has been mounted to the top of the tower. The nacelle of the turbine is constructed of fibreglass and lined with sound insulating foam. This sound insulating foam helps reduce acoustic emissions from the wind turbine.

2.5.2 Electrical Components

The interconnection point is located on NSPI Transmission line L-7004 at a point near NAD 83 UTM 20T 502590, 5039970N from this point heading north to Mount Ephraim. The substation is designed with a 50 mVa main transformer and is capable of adapting two additional and identical transformers. The existing substation will require additional equipment to house the transformer required for Phase II. The equipment includes cement pads, perimeter fence, wooden poles and an 8’ x 24’ insulated structure to house the communication system, telephone, internet, computer monitors, WFMS (Wind Farm Management System) and electrical switching system.

A two-month construction period is anticipated to complete the main components and a two week commissioning period will be required after individual turbine commissioning is completed. At the substation, line voltage will be converted from a step-down transformer into two overhead collector line circuits with voltage of 34.5 kVa out to each wind turbine. The wind turbine itself produces 690V, 3 phase power and is sent via underground cables through the foundation base to a transformer pad outside the turbine. The power will be converted here by a small pad mounted step-up transformer to convert 690V from each turbine to line voltage on the above-ground collector lines.

The overhead electrical collector lines will follow the road system close to the ditch to provide reliable ongoing maintenance access. The poles will be placed by an excavator crew using standard methods (*e.g.*, drilling and/or jackhammer). Poles will be approximately 75 m apart and 350-400 poles will be required to complete Phase 2. The collector line circuits will be completed within a three month period. Installation of the electrical components will be conducted simultaneously and in conjunction with the turbine erection crew (see Table 1.1 Proposed Schedule).

2.5.3 Additional Components

Delivery roads are currently in place from previous land uses and some new roads will be constructed between turbine locations. Figure 1.2 shows the turbine layout and Project access roads along with other site features. To the extent possible, existing woods roads will be used, with appropriate upgrades to meet the load requirements for trucks transporting materials to the turbine sites. Some stream crossings on existing roads are in poor repair, do not have adequate culverts/ bridges installed or have been washed out. These conditions have allowed sediment and runoff from ATVs and motor vehicles to run into the watercourse at some locations.

The Proponent will contact NSE in Granton and DFO in Antigonish so they are fully aware of the water crossing and wetland crossing conditions. Clydesdale Ridge Wind LP employs a contractor who holds a license to install water crossings in accordance with NSE Requirements.

New bridges and culverts will be designed and installed in accordance with relevant NSE and DFO requirements to replace damaged and inadequate water crossings and upgrade existing roads (see Section 5.2).

2.6 PROJECT ACTIVITIES

The following section provides details on the planning, construction, operation, maintenance and decommissioning of the Project. Activities that have the potential for environmental effects in the Study Area are addressed in Section 5.0.

The development of the proposed Project will include several phases: site preparation and construction; operations and maintenance; and decommissioning (Table 2.2).

Table 2.2 Typical Project Activities

Site Preparation and Construction	
Surveying	Activities include staking the boundaries of the construction area, temporary workspace, aboveground collector lines and transmission lines, as well as marking the location of any existing underground pipelines and cables.

Table 2.2 Typical Project Activities

Site Preparation and Construction	
Development of access roads	Access roads will be surveyed and staked/flagged. To access the turbines, approximately 4.5 km of new road construction will be required and approximately 17.5 km of existing roads previously built to support logging activities will be upgraded. Roads on the wind farm site will be upgraded to 10 m wide. Ditches and culverts will be added where required during construction to accommodate crane movements for installation, trailers for transportation of heavy and bulky turbine and substation equipment, maintenance vehicles and equipment for repairs/replacements. Construction roads will be designed to accommodate the crane types that will be required to erect the wind turbine generators and towers. The gravel used to supply the 6" compacted surface will be obtained on site at Week's Construction Ltd. rock quarry in Mount Thom. The surface soil and grubbing will be re-located in borrow areas along the road side and graded to prevent erosion and sediment runoff. Wetlands and watercourses will be avoided to the extent practical in designing access roads. Follow –up surveys will be conducted as necessary to conduct wetland functional analyses and/or assist with design of watercourse crossings if required. Water Approvals will be sought from NSE for wetland/watercourse alterations if these features are unavoidable. Based on the current proposed road layout it is anticipated that up to 12 watercourse crossings will be required (most of which are existing and require upgrading). The ditches will be constructed along the road edge following provincial guidelines and procedures to control for surface water runoff. Culverts will be installed under the roads where necessary for cross drainage as well as installing check dams and take offs on slopes to guide run-off.
Clearing and grubbing	The Project Study Area generally consists of undeveloped wooded land which will require clearing and grubbing. Approximately 1.5 ha of land will be cleared for each turbine including averaging cleared land for access roads per turbine, within which turbine foundations and crane pads will be located. After construction and installation, the majority of the cleared area will be allowed to re-vegetate; a much smaller pad for service and maintenance vehicles will remain.
Grading	Grading will be necessary to finish the access roads and pad construction to compact and level stockpiles and will follow provincial guidelines and procedures.
Soil stockpiling	All soil will be stockpiled on site during construction so that it can be used in re-vegetation and reclamation of the site once the turbines are erected. Stockpiles will be located away from watercourses and wetlands.
Foundation excavation	The turbine foundations will be determined by the final geotechnical report and structural engineering at each turbine site, as is necessary to properly support the loads. The existing substation area consists of a raised pad approximately 5,600 m^2. The turbine foundations are designed and approved by GE and certified in Nova Scotia as required. The sand, aggregate and concrete will be prepared on site in the Week's Construction Ltd. rock quarry in Mount Thom in a certified portable batch plant in accordance with NSE standards. This will reduce the fuel consumption of the concrete delivery trucks by over 80% and greatly reduce noise, dust disturbance and delays. Excavation for the turbine foundations will begin by removing compacted sediment/ topsoil and placing it in a dry pile, covered with plastic and will be re-placed over the area to provide a natural soil base for regeneration of indigenous plant species. The foundation requires digging to a depth of 2 m to the severely fractured bedrock layer typically found in this region under the topsoil mat, the diameter requiring excavation will be approximately 17m wide. Blasting is not anticipated, but if required, it would be local blasting not exceeding 2 m in depth, and would not be strong enough to break up the bedrock below the foundation. Working down to this depth with a jackhammer is the preferred method, and blasting would only occur for extremely compacted bedrock above the 2 m required depth.

Table 2.2 Typical Project Activities

Site Preparation and Construction	
Pouring turbine foundation	For excavated foundations, after excavation, the bedrock surface will be levelled, compacted and covered with a 100 millimetre (mm) thick levelling layer of concrete to allow an engineered surface to install the bolt ring section and the reinforced concrete structure. The foundation forms and rebar will be installed. Concrete will be poured into the forms continuously. When the foundation construction is complete, the topsoil and gravel mixture will be replaced and compacted in accordance with the engineering requirements for soil density.
Equipment lay-down and turbine assembly	All machinery and turbine components will use existing and/or proposed roads or crane pads for parking and lay-down areas. The sites will be complete prior to accepting delivery to allow delivery of the components directly to the individual sites, preventing unnecessary extra movement, lay-down areas and cost. Each of the turbines and generators will be trucked on a flat-deck trailer to the site and assembled.
Delivery to site	Delivery of the tower sections and main turbine components will commence as early as July 2013 as described in Table 1.1 Construction Schedule. This date will ensure that all road restrictions imposed by the Department of Transportation and Infrastructure Renewal are not exceeded resulting in construction delays. Typically in April and May, when the frost recedes, heavy vehicles may cause damage and erosion problems. When this occurs, the shoulders of the road become unpredictable and can lead to vehicle rollover. For safety reasons and logistics, delivery will take place only when safe road conditions are met. The benefits of a clean, gravelled road surface will reduce the environmental impact of: dust and airborne pollutants; mud on the employees work boots causing a slip or fall; truck tires transferring mud to Highway #4; and cranes driving in between turbine sites and possibly sliding off the roads. The transportation of wind tower components to the site will include approximately 8 trucks per turbine. The transportation of the 300 ton erection crane and the crane components will require up to four flatbed trucks. The 75 ton and 150 ton hydraulic wheeled cranes will unload the trucks and place each turbine on the setup pad located at each individual turbine location. The first tower section may be placed during unloading for convenience and to minimize the size of the layup area. The erection crane will use a tailing crane to erect the two top tower sections, the nacelle, then the hub and blades will be placed last to complete major construction.
Tower, generator, and rotor assembly	The tower will be transported in three sections that will be assembled on site. The blade system, consisting of 3 blades and a hub, will also be assembled on site, attached to the generator and lifted into place at the top of the tower by a crane.
Collection system and transmission line/connection to grid	It is anticipated that the 34.5 kV electrical collection system will consist of aboveground electrical poles between turbines, distributing power from each turbine to the onsite substation where the output will stepped up from 34.5 kV to the 230 kV distribution line. Aerial cabling is installed by first drilling and placing poles, then stringing each phase of wire.
Installation of substation equipment	Onsite substation equipment is currently installed within a fenced yard that is surfaced with gravel. The substation was constructed with the anticipation of installing a Phase II and the area disturbed for this construction was included in the EA Registration Document for the Dalhousie Mountain Wind Farm, approved in September 2008.

Table 2.2 Typical Project Activities

Site Preparation and Construction	
Clean-up and reclamation	Construction waste will be removed and disposed of at an approved location in accordance with local and provincial waste management requirements. As with the Dalhousie Mountain Wind Farm (Phase I), Keltic Trucking Ltd. will be hired locally to ensure proper waste management procedures are in place throughout all stages of development, construction and operations of the Clydesdale Ridge Wind Farm. The temporary lay-down areas and disturbed areas around the foundation of each turbine and at the substation will be replaced with the previously excavated and stockpiled topsoil. The disturbed areas will be re-seeded. High voltage signage will be installed at the substation and elsewhere, as necessary.
Turbine commissioning	Turbine commissioning can occur once the wind turbines have been fully installed and when NSPI is ready to accept grid interconnection. Commissioning involves testing and inspection of electrical, mechanical, and communications operability. A detailed set of operating instructions must be followed in order to connect with the electrical grid.
Operation and Maintenance	
Access and inspection	Maintenance inspections will be required for routine servicing. Light 4 x 4 trucks, vehicles, and ATVs may be used to access the towers. Larger trucks and cranes may be required periodically for larger repairs, but this is expected to occur infrequently. In addition, throughout the course of the year, access to the turbines as part of regular non-scheduled maintenance activities will be required for resetting faults, minor component replacement and related activities. New and used lubricants, cleaning supplies and other controlled substances will be delivered, stored, handled and disposed of according to local regulations.
Decommissioning and Abandonment	
Rotor, generator and tower disassembly	The rotor, generator and towers would be disassembled using a crane and removed from the site for re-use, reconditioning or disposal using a flatbed truck.
Access roads	Access roads will be removed where appropriate and in consultation with landowners.
Removal of concrete foundation	Decommissioning and reclamation will be done in accordance with landowner agreements. In some cases, foundations will be removed to a depth of approximately 1 m below original ground level and filled with subsoil to rebuild the grade. The concrete foundation below 1 m can remain in place. Stockpiled topsoil will be placed over the area to approximate depth of adjacent ground, depending on the land use at the time and the preference of the landowner. In some cases, depending on landowner agreements, concrete pads may stay in place.
Decommissioning of distribution lines	Aboveground power-lines will be removed from the ground during decommissioning, or as determined necessary by NSPI.

2.6.1 Construction Phase

Clearing activities will be scheduled outside of the breeding bird season (May to August) to the extent practical. However, in the remote possibility that clearing activities will need to take place during the breeding bird season, an adequately trained specialist will be required to inspect the proposed work area for nesting birds prior to any site clearing. In addition, any clearing and disturbance within 50 m of identified nesting or breeding areas will be avoided. Current forest roads have been considered to the extent possible as access roads to turbine locations. Compaction of soil will be minimized to the extent possible with compacted soil recovered following turbine installation. In addition, silt fencing will be erected, if required, to help prevent erosion of bare lands caused by construction activities.

Watercourses and wetlands will be avoided to the extent practical. Where applicable, wetland functional analyses will be conducted for unavoidable wetlands and Water Approvals for watercourse and/or wetland alterations will be obtained from NSE. If construction is necessary in or near watercourses or wetlands, erosion and sediment control measures will be put in place for the duration of construction in those areas. Based on the current proposed road layout, it is anticipated that up to 12 watercourse crossings will be required (field identified and desktop-identified watercourses, refer to Section 5.2). Additional information on watercourse crossings, including descriptions of drainage areas, and proposed mitigation measures, are provided in Section 5.2 (Aquatic Environment).

Information and warning signs will be erected adjacent to the wind farm at the start of construction, to provide public information about the facility and to discourage trespassing on private lands. This signage will be maintained and updated as necessary.

Equipment on site during construction could include hydraulic fluid, brake fluid, transmission fluid, and oil from the wind turbine generator. Any refilling activities will take place in designated areas and at a minimum of 30 m from wetlands or watercourses.

The turbine nacelles (which house the gearbox and the generator) and hubs will be delivered directly to the Project site. Equipment delivery is anticipated to be in July to October 2013 and therefore will avoid the spring season where weight restrictions are in place. It is anticipated that the current road network (outside of onsite turbine access roads) will not require upgrades to accommodate construction traffic. The same travel routes that were used for the Dalhousie Mountain Wind Farm will be used for the proposed Clydesdale Ridge Wind Farm. Implementing good transportation planning and safety measures during construction will minimize the potential for traffic related safety concerns. Public safety has been and will continue to be incorporated into the Project design. As stated above, land access to the construction site will be controlled through signage and restricted to authorized personnel only.

Approvals for transporting these materials will be sought from the provincial transportation departments. As the turbine components are oversized, a Special Move Permit and any associated approvals will be obtained through the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) for heavy load transport. The sand, aggregate and concrete will be prepared on site in the Weeks Construction Ltd. quarry in accordance with the Provincial standards. This will reduce the fuel consumption of the concrete delivery trucks by over 80% and greatly reduce noise, dust disturbance and delays. No complaints were received regarding gravel and cement trucks during the construction phase of the Dalhousie Mountain Wind Farm (Phase I), mainly because of the onsite Weeks Construction Ltd. quarry and the onsite concrete batch plant that allowed transportation activities to remain mostly off the government roads.

2.6.2 Operation and Maintenance Activities

Activities associated with the operation and maintenance of the Clydesdale Ridge Wind Farm Project will not be as extensive as during the construction phase. The wind turbines, once constructed, do not generate air emissions. Maintenance inspections are required

approximately once a month for routine servicing and lubricant replacement. Malfunctions and parts replacement will be assessed on an individual basis. A spares inventory will be provided by the manufacturer at the maintenance facility, and will be available for the recovery of unexpected breakdowns. Light-duty 4x4 trucks, vehicles, and ATVs may be used to access the wind turbines. For maintenance planning, access to the site will be controlled and managed through private land under the terms of the individual site leases. Site access will be carried out on routes pre-planned to reduce excess travel and impact on existing use. Larger trucks and cranes may be required infrequently for larger repairs.

Aside from normal recovery of lubricants from the gearbox and yaw mechanism, operation activities do not generate waste. Lubricants will not contain any PCBs. New and used lubricants, cleaning supplies and other controlled substances will be delivered, stored, handled and disposed of according to local regulations. Vehicle emissions will be reduced by pre-planned maintenance activities and pre-planned access routes.

Each turbine houses a sophisticated Supervisory Control and Data Acquisition (SCADA) which continuously monitors equipment performance and instantly detects any faults to be addressed. This system will determine the frequency of regular and non-scheduled maintenance activities onsite.

Aeronautical Obstruction Lighting

The proposed Aeronautical Obstruction lighting will be installed in compliance with Part VI of the Canadian Aviation Regulations 2007-2 Standard 6321.19 as administered by Transport Canada. This complies with CL-864 in Appendix B of the Standard. Additional information is provided in **Appendix B** of this EA, including the selected turbines to be used in the Aeronautical Lighting Plan.

2.6.3 Decommissioning

The Clydesdale Ridge Wind Project is expected to be operational for at least 25 years. In the event that decommissioning and abandonment is necessary, the activities associated with the Project include:

- rotor, generator and tower disassembly;
- decommissioning of access roadways, where necessary;
- removal of concrete foundation;
- removal of distribution and transmission lines;
- removal of pad mount transformers; and
- removal of substation.

Well-designed and constructed wind energy facilities may be operated for decades. Individual wind turbines are expected to perform for up to 35 years without significant repair or replacement. Transformer facilities, underground wiring and substation facilities are designed

for at least a 50 year life span. Individual wind turbines may be replaced or repaired as their useful life comes to an end, or if more efficient and cost-effective technology becomes available.

Upon a decision to decommission a single wind turbine or the entire wind farm, all equipment above ground, including towers, nacelles, transformers and controllers will be removed. Wind turbines that are operational and have market value would be carefully removed using a crane, essentially in a reverse process to assembly and installation. The resale value of such equipment would cover the cost of removal in such a case. A market for good, used wind turbines has developed in North America, and a number of wind turbines installed in Alberta in the early 1990s originated from the U.S. used wind turbine market.

Other above-ground equipment in the wind farm, including transformers and wiring, has a ready market in either used equipment sales or in salvage. Transformers will be simply removed and sold. Wiring will be removed and sold to metal salvage companies.

As discussed above, wind energy facilities do not use or produce harmful waste products and therefore aside from normal recovery of lubricants from the gearbox and yaw mechanism, there are no requirements for harmful waste handling during decommissioning.

Wind energy facilities removed from undeveloped woodlands will require minimal remediation; native seed mixtures will be used to re-vegetate the area. Where necessary, topsoil and re-grading of access roads in the fields will occur as per the landowner's preference.

All decommissioning activities will be conducted in accordance with landowner agreements and applicable regulations and agreements at that time. It is not anticipated that watercourse crossings would be removed during decommissioning.

As documented throughout this EA, the Project has been designed to minimize the risk of contamination during its operational lifespan. Containment and storage areas will limit contamination. Any remedial clean-up during the decommissioning or asset transfer will therefore also be limited. Provided the Project is operated and maintained in-line with industry best practices, there should be no significant environmental liabilities associated with clean-up or remediation. Regardless of the ultimate outcome, all decommissioning activities will be performed in compliance with the applicable regulations in force at that time.

2.7 FUNDING

The Project will be 100% privately funded.

3.0 STAKEHOLDER CONSULTATION AND MI'KMAQ ENGAGEMENT

Public consultation is an integral part of the environmental planning process and plays a key role in addressing potential public concerns identified in early stages of the Project. Public consultation is a requirement under NSE's "Proponent's Guide to Wind Power Projects: Guide to Preparing an Environmental Assessment Registration Document" (NSE 2007, updated 2012) and is a step in the environmental registration process.

Consultation activities have included an Open House public information session (December 15, 2011), meetings with stakeholders including local landowners, municipal representatives, provincial representatives and various informal meetings, phone calls and letters. The Proponent has directly engaged the Mi'Kmaq community through information mailouts, face to face meetings, scheduled phone meetings, digital file sharing, and the commissioning of a new Mi'Kmaq Ecological Knowledge Study (MEKS) (apart from the existing Dalhousie Mountain Wind Farm MEKS (2008)) (upon receipt of a PPA).

The following sections present further details on those opportunities given to the public and reviewing agencies for comment. Supporting documentation is provided in **Appendix C.** The Proponent will continue to communicate with the public and Mi'kmaq in future phases of development. During the EA review process, additional issues may be raised by the public and the Mi'kmaq will be invited to submit written comments on the proposed Project and information contained in the EA document during the EA registration phase.

3.1 REGULATORY CONSULTATION

Various regulatory and other agencies were consulted early in the planning process to provide input into the Project and the process, and advice in terms of likely approvals and considerations for environmental assessment.

To date, the following agencies have been contacted by Clydesdale Ridge Wind LP and/or the Stantec Study Team:

- Environment Canada - Canadian Wildlife Service (CWS);
- Environment Canada – Meteorological Service of Canada;
- Department of National Defense (DND);
- Transport Canada;
- NAV Canada;
- Royal Canadian Mounted Police (RCMP);
- Canadian Coast Guard;
- Province of Nova Scotia Integrated Mobile Radio System;

- Nova Scotia Environment (NSE);
- Nova Scotia Department of Natural Resources (NSDNR) Species at Risk;
- NSDNR, Land Acquisition;
- Nova Scotia Transportation and Infrastructure Renewal (NSTIR);
- Municipality of the County of Pictou; and
- Municipality of the County of Colchester.

A Draft EA was submitted in January 2012 for regulatory review and comment and was distributed by NSE to relevant provincial and federal agencies. Comments received were taken into consideration in preparing the Final EA Registration document and are included in the disposition table in **Appendix A**. Clydesdale Ridge Wind LP will continue to work with regulatory agencies to develop appropriate follow-up measures (*e.g.*, post-construction monitoring) and submit applicable permit applications.

3.2 PUBLIC CONSULTATION

An Open House public information session was held on December 15, 2011 from 4:00 PM to 7:00 PM at the existing Dalhousie Mountain Wind Farm Project office in Mount Thom, NS. The session was attended by 14 people who were overall in support of the Project. The intent of the Open House session was to:

- encourage dialogue between members of the Project team in attendance and the general public and stakeholders;
- enable the public and stakeholders to obtain Project information;
- view information on the proposed site and turbine locations;
- encourage the public and stakeholders to join a tour of the existing Dalhousie Mountain Wind Farm (at a later date); and
- participate in the environmental and socio-economic assessment process.

Advertisements for the Open House were circulated in the Truro and New Glasgow Daily News on Saturday, December 10, Wednesday, December 14, and Thursday, December 15, 2011. Poster invitations were placed in three local community locations: Scott's Bakery in Kemptown; Johnny's Convenience in Salt Springs; and in the band office at the Pictou Landing First Nation. In addition, the Proponent delivered over 150 flyers to mailboxes of houses surrounding the proposed Project.

During the Open House, representatives from Clydesdale Ridge Wind LP and Stantec were present to answer questions and to document any issues related to the Project. All attendees were encouraged to sign-in and they were provided with information including a Project overview handout as well as corporate information and general information on wind energy (see **Appendix C**). Attendees were encouraged to complete a feedback form prior to leaving the session. The session was informal and consisted of a series of posters and handouts which included information on:

- a map of the proposed Project Study Area with the latest turbine layout;
- specifications of the proposed wind turbines;
- information on the construction and installation process;
- Project schedule;
- noise study results;
- visual impact study results;
- corporate information on the Proponent; and
- information on the EA and regulatory approval process.

Copies of the information panels and the exit questionnaire are included in **Appendix C**.

Few issues of concern were raised by the general public at the open house (verbally or via the exit/feedback form). The written comments received during the Open House public information session are listed below:

- "Support the Project – no concerns";
- "Want to lease land to the Project";
- "Great idea";
- "Offered lots of information";
- "Very clear on Project intentions";
- "I feel this proposal is a good idea"; and
- "Noise is not a problem in my opinion".

Additional stakeholder and community outreach initiatives include or will include the Project website (www.rmsenergy.ca), mailout of community newsletter, meeting with municipal council, door-to-door community outreach program and another public open house closer to Project development.

Clydesdale Ridge Wind LP has developed and implemented an issues resolution program for Project construction and operation. This program includes company contacts as well as an issues resolution procedure for community members to identify issues of concern. The procedure will document the issue and action taken to resolve and/or improve the situation.

3.3 MUNICIPAL PLANNING PROCESS

Clydesdale Ridge Wind LP representatives have consulted with the Municipalities of the Counties of Pictou and Colchester on various occasions during Project planning prior to and after the public open house on December 15, 2011.

The Project Study Area is located within the Municipality of the County of Pictou and the Municipality of the County of Colchester planning districts. Aside from the Wind Energy Bylaws

which apply to each of the entire counties, there are no other land use zoning bylaws within the Project Study Area.

The Project Study Area is located in two designated Provincial Districts: Colchester North and Pictou West. The two Members of Legislative Assembly for these areas have been consulted regarding the planned Project. They are Karen Casey and Charlie Parker, respectively.

In order to support the development of wind energy in Pictou County without jeopardizing the rights of the residents to fully enjoy their property and way of life, Council developed the Municipal Planning Strategy and Land Use Bylaw for wind energy development in 2007. The Municipality of the County of Pictou Land Use Bylaws for wind energy development has identified setbacks for utility scale wind turbines (200 kW or more) from residences, property lines and public roads. Setbacks for domestic wind turbines (less than 200 kW) have been developed for adjacent lot boundaries. The setback distances are listed in Table 3.1.

Table 3.1 Municipality of the County of Pictou Setbacks

Scale	Boundary	Distance
Utility	Setback from residences, except residences located on the same lot as the wind turbine	600 m
Utility	Setback from all property lines	One times the height of the turbine with blades in vertical position
Utility	Setback from the boundary of a public road	300 m
Domestic	Setback from all adjacent lot boundaries	One times the height of the turbine with blades in vertical position

The Municipality of Colchester has developed Wind Turbine Development Bylaws which apply to all lands within the Municipality of the County of Colchester. Setbacks have been developed for large scale (greater than 100 kW) and small scale (equal to or less than 100 kW but not less than 1 kW) wind turbines. The setback distances are listed in Table 3.2. In addition to the setback bylaws, the County of Colchester regulates the finish of the wind turbine, lettering and signage, tower accessibility and safety, lighting, test towers and outdoor storage.

Table 3.2 Municipality of the County of Colchester Setbacks

Scale	Boundary	Distance
Large	Setback from an external property line and public roads	One times the total height of the turbine with blades in vertical position – does not apply where the adjoining property is part of the wind power project
Large	Setback from existing dwelling on a neighbouring property	700 m*
Small	Setback from an external property line	two times the height of the turbine – does not apply where the adjoining property is part of the wind power project

*May request a reduction of the 700 m setback down to a minimum 500 m with written permission from the neighbouring property owner.

When siting the turbines, the by-law distances above (600 m in Pictou County and 700 m in Colchester County) have been used by the Proponent as a starting point for exclusion zones. The Proponent has conducted each expert study in a manner through which the turbines may be adjusted within a 75 m radius of the mapped locations. When final micro-siting is complete,

the development permits will be applied for by the Proponent to the Municipality of the County of Pictou and the Municipality of the County of Colchester.

3.4 MI'KMAQ ENGAGEMENT

During 2011 and 2012, the Proponent communicated with representatives from the Mi'kmaq Rights Initiative (KMK) as well as the Confederacy of Mainland Mi'kmaq (CMM), the Native Council of Nova Scotia (NCNS) and the Pictou Landing First Nation to facilitate early, meaningful consultation with the Nova Scotia Mi'kmaq.

The Confederacy of Mainland Mi'kmaq (CMM) was commissioned to conduct a Mi'kmaq Ecological Knowledge Study (MEKS) for the Dalhousie Mountain Wind Farm (Phase I of the Project – refer to **Appendix D**) and the Proponent has engaged CMM to propose and complete a second MEKS for the Clydesdale Ridge Wind Farm (Phase II) upon receipt of a PPA from NSPI. The MEKS will identify land and resource use which is of particular importance to the Mi'kmaq people with respect to the Clydesdale Ridge Wind Farm Project and as well, will seek to identify and document ecological knowledge which may be significant to the Project. It is anticipated that this MEKS will commence by the fall of 2012. As part of the EA review process, NSE will invite various Mi'kmaq organizations to review and comment on the EA document. There were no known issues identified by the Mi'kmaq from the Dalhousie Mountain Wind Farm EA.

The Project Study Area in the MEKS for Dalhousie includes the Clydesdale Project Study Area in general, although site specific surveys will take place.

3.5 SUMMARY OF CONSULTATION AND MI'KMAQ ENGAGEMENT

Tables 3.3 and 3.4 summarize the various consultation and Mi'kmaq engagement efforts, respectively, conducted in support of the Clydesdale Ridge Wind Farm Project.

Table 3.3 Consultation Efforts Conducted in Support of the Clydesdale Ridge Wind Farm Project

Association/Contact	Dates	Topic	Comments
Government Stakeholders			
Transport Canada	November – December 2011	Regulatory approval process	• Submitted Aeronautical Obstruction Clearance Forms and received approval of lighting plan as well as Aeronautical Obstruction Clearance
NAV Canada	December 2011-May 2012	Email and telephone correspondence with respect to civilian radar and air navigation equipment	• Submitted application to NAV Canada (Land Use Submission Form) and received approval on May 4, 2012.
DND	January-May 2012	Email correspondence with respect to existing radiocommunication systems	• Project layout and coordinates sent for review and comment • DND responded on January 19 that they do not anticipate any interference with the Project (it is outside of the 100km consultation zone)
RCMP	February 2012	Email correspondence with respect to existing radiocommunication systems	• Project layout and coordinates sent for review and comment
Environment Canada	February 2012	Email correspondence with respect to weather radar interference	• Project layout and coordinates sent for review and comment • Environment Canada (Meteorological Service of Canada) responded on February 15, 2012 that any potential interference created by the Project, based on the current plans, would be manageable and therefore they do not have any strong objections to the Project.
Canadian Coast Guard	February 2012	Email correspondence with respect to vessel traffic systems radars	• Project layout and coordinates sent for review and comment • Response received on February 6, 2012 stating that the Canadian Coast Guard does not have any communications or radar sites in the vicinity of the proposed location of the Clydesdale Ridge Wind Farm and therefore they do not expect any interference issues.
Province of Nova Scotia Integrated Mobile Radio System	February 2012	Email correspondence with respect to existing radiocommunication systems	• Project layout and coordinates sent for review and comment
Nova Scotia Environment Nova Scotia Department of Natural Resources, Species at Risk Biologist	July 2011	Meeting at NSE office in Halifax	• Meeting to introduce the Project and seek input for scope and any potential issues. Discussion re: VEC scoping, Project siting, mainland moose. Proponent discussed experience with Dalhousie and frequent site visits by the Proponent and wind farm staff.
Nova Scotia Department of Natural Resources, Land Acquisition	November 2011 – May 2012	Crown Land Lease Application	• Submission of crown land lease application and

Table 3.3 Consultation Efforts Conducted in Support of the Clydesdale Ridge Wind Farm Project

Association/Contact	Dates	Topic	Comments
			discussionre: site tour of crown land parcel, IRM procedure complete and approved, awaiting final Ministerial confirmation
Nova Scotia Transportation and Infrastructure Renewal (TIR) (*Colchester County)*	Summer 2011 to present	Regulatory approval process	• Discussion regarding installation of poles within RoW of the Glenn Road for Pictou County and the Gun Shot Road and the Barrachan Road • Application in process for access roads
Colchester County Municipal Development Officer and Chief Administrative Officer	November and December 2011	Regulatory approval process	• Development permits for the turbines proposed to be located in Colchester. • Scheduled presentation to Council on January 26, 2012
Pictou County Municipal Development Officer and Chief Administrative Officer	November 2011–January 2012	Regulatory approval process	• Development permits for the turbines proposed to be located in Pictou County. • Scheduled presentation to Council on January 30, 2012
Nova Scotia Environment Nova Scotia Department of Natural Resources, Species at Risk Biologist	March 2012	Meeting at NSDNR office in Kentville	• Meeting to review comments on draft EA Report and discuss optimization of wind farm layout to reduce fragmentation and effects on migratory birds and moose • Proponent requested information from NSDNR to facilitate landowner awareness of habitat loss and protection of moose • Discussed ways to reduce the amount of forest fragmentation and to reduce the overall footprint of the project and maximize efficiencies of the wind farm layout
Public Consultation			
Gully Lake Trails Society	December 2010, January 2011, April 2011, December 2011, February 2012	New parking lot entrance to the Gully lake Wilderness Trail constructed by RMSenergy Ltd., discussion of general support of Clydesdale Ridge Wind LP's operations and proposal	• RMSenergy donated volunteers, excavator and man hours to construct a parking lot at the entrance to the Gully Lake Wilderness Trail located off the Glenn Road • Society representative attended Open House and commented that society is grateful of the parking lot construction at the entrance to the Trail and overall positive toward the proposed Clydesdale expansion. • Society President submits written Letter of Support for project
Local Landowners	December 2011	Visits to homes by Proponent, phone calls and emails.	Comments included: • "If you were closer up the hill the noise may be a concern" • "I can't hear noise overhead from Dalhousie" • "I walk through the wind farm " • "Not aware of any neighbours concerns or issues with the wind farm" • "No major concerns for more windmills"

Table 3.3 Consultation Efforts Conducted in Support of the Clydesdale Ridge Wind Farm Project

Association/Contact	Dates	Topic	Comments
			• "Sometimes hear them in the yard, just under certain conditions and just for small periods of time, never hear them inside the house" • Resident called to Reuben Burge (Proponent) to give support to the Project, particularly to offer family's land to lease to the Project for development. • Local Bed and Breakfast owner called and emailed Reuben Burge to give support for the expansion of the wind farm and would like to offer her services for employees during the expansion construction of the Clydesdale Ridge Wind Farm. She had workers from the Dalhousie Wind Farm stay at her establishment in the past and offered services available to board and cook for employees.
Dalhousie Mountain Snowmobile Club	Ongoing	Snowmobile use in area	• The Proponent has engaged in various trail upkeep activities as well as sponsoring signage along the trail routes. • At meetings discussed proposed new access roads for the Clydesdale Ridge Wind Farm Project and their proximity to existing snowmobile/ ATV trails have taken place. Other topics of conversation include gating and access to the facility and the trails housed within the boundaries of the Project(s), and public safety concerns (lighting, maintenance, potential ice throw, snow levels and power line corridors).
Local Interest Groups	Ongoing	Local interests	• During the operations phase of the existing facility, numerous field trips and site visits/ tours have taken place for local public schools, TUNS engineering department, NSCC classes and other organizations. This trend will continue with the development and operations phase of the Clydesdale Project. • Having the Proponent as a local homeowner, farmer, and landowner maintains the local aspect of approachability by certain groups interested in visiting the wind farm. • Clydesdale Ridge Wind LP has spoken at several dozen local schools, business groups, organizations and conferences about the existing and proposed wind farms and the wind energy industry and will continue to do so into the future.

Table 3.4 Mi'kmaq Engagement Efforts Conducted in Support of the Clydesdale Ridge Wind Farm Project

Association/Contact	Dates	Topic	Comments
Mi'kmaq Rights Initiative (KMK)	December 2011, May 2012	Mi'kmaq interests	• Phone conversation with KMK discussing Clydesdale project and up to date consultation with CMM, Pictou Landing • Provided KMK copy of archaeological report • Invited KMK to Open House • Update of Clydesdale project activities and timeframes and provided copy of archaeological repot
Confederacy of Mainland Mi'kmaq (CMM)	December 2011, May 2012	MEKS	• CMM representative received site tour of the Dalhousie Mountain Wind Farm • Proponent has engaged CMM and received a proposal to commission a new MEKS for Phase II in April 2012 • Provided CMM copy of archaeological report and invitation to Open House in December • Proponent has contacted CMM to discuss ongoing timeline changes from April 2012 to August/ September 2012 in terms of contracting CMM to conduct a new MEKS upon receipt of PPA
Maritime Aboriginal People's Council (MAPC)/ Native Council of Nova Scotia (NCNS)	May 2012	Mi'kmaq interests	• Met with Roger Hunka and discussed vegetation and wildlife survey results • Will provide Mr. Hunka and staff of construction timelines and results of studies to ensure any harvesters are aware of the Proponents activities.
Local Band Council (Pictou Landing First Nation)	October 2011	Mi'kmaq interests	• Proponent offered site visit to Council members • Proponent spoke at council meeting, 4 of 6 Council were present, as well as the Chief and Manager • Proponent has spoken with Economic Development Officer on several occasions
	February 2012	Mi'kmaq interests	• Proponent discussed Project with four (of six) Council members, new Chief, and Band Manager • Proponent indicated MEKS would be updated pending PPA award • No specific issues raised by Band Council

3.6 SUMMARY OF EMI STUDY

The EMI Study was carried out by Nortek Resources and included calculating consultation zones around existing communication towers based on frequency, radar, and CBC/Radio Canada interference. The complete study with comments from regulators can be found in **Appendix N**. The summary results from Table 8 in the EMI Study is below.

- Point to Point Systems Above 890 MHz: There are four radio links that are within 1.0 km of the Project. The Proponent has opened a dialogue with the radio frequency licensee's to determine potential impacts and possible mitigative measures.

- Broadcast Transmittors: No AM transmitter within the 15 km directional antennae consultation zone. One FM transmitter within the 2 km consultation zone. Agreement is in place between Proponent and FM license holder. No TV Transmittters within the 2km consultation zone.

- CBC Preliminary Report: No CBC AM, FM or TV transmitters within 5km of Project. Ten TV transmitters are located within 89km of the Project.

- Over-the-air Reception: A large number of receivers are located within the 15km consultation zone recommended by the RABC for analogue TV transmitters. A Broadcast Reception Study will be initiated (upon receipt of PPA).

- Cellular Type Networks: There are 2 cellular towers located within the 1km consultation zone; discussions with licensee's ongoing.

- Land Mobile Radio Networks & Point to Point Systems Below 890 MHz: Non within the 1km consultation zone.

- Satelite Systems: No ground satellite stations located within 500m of the Project. No dwellings or buildings located within the projected consultation cone.

- Air Defense, Vessel Traffic, Air Traffic Control, and Weather Radars: DND contacted – no issues. No issues with civilian Air Traffic Control, Vessel Systems and weather radars.

4.0 SCOPE OF THE ASSESSMENT

The following section provides the scope of the Project to be assessed as well as the factors and scope of factors to be assessed. The methods used for the EA are also described.

4.1 SCOPE OF THE ASSESSMENT

The scope of the Project to be assessed includes:

- surveying activities, such as identifying location of wind turbines and follow-up biophysical and archaeological surveys as required;
- clearing of vegetation;
- constructing and upgrading access roads, including installation of culverts as required;
- delivery of equipment and materials including the wind turbines, foundation materials, electrical cables and ancillary equipment;
- foundation construction;
- wind turbine installation;
- electrical cabling installation (*i.e.,* installation of 34.5 kV above ground collection system);
- operation and maintenance of the Project; and
- decommissioning of the turbines and the overall Project.

The potential effects of accidents and malfunctions are also considered within this EA, as are the potential cumulative effects of this Project in relation to other projects/activities in the regional area. The potential effects of the environment on the Project are also addressed.

Environmental assessments are typically organized and focused according to VECs which are those biophysical and socioeconomic elements that are of particular importance to the Proponent, as well as public and regulatory stakeholders involved in the assessment process. This EA evaluates the potential environmental effects of the proposed Project elements and activities, for all Project phases, with regard to each VEC. By assessing potential impacts on VECs within the study boundaries, a meaningful evaluation of Project effects on relevant environmental aspects is achieved. VECs evaluated for this assessment include:

- soil;
- water quality (surface and groundwater);
- aquatic environment (including fish and fish habitat);
- terrestrial vegetation;
- wildlife (including birds, mammals, reptiles and amphibians);
- archaeological and heritage resources;

- existing and planned land use (including forestry);
- local community;
- visual aesthetics;
- noise;
- recreation and tourism; and
- public health and safety.

4.2 METHODS

The EA is structured to include proposed mitigation to reduce or eliminate potential adverse environmental effects. The determination of significance of adverse environmental effects is based on post-mitigation (residual or net) effects, rather than unmitigated potential effects. The significance of residual or net effects of the Project was determined using the following criteria, based on federal and provincial EA guidance:

- value of the resource affected;
- magnitude of the effect;
- geographic extent of the effect;
- duration and frequency of the effect;
- reversibility of the effect; and
- ecological and/or social context.

A significant adverse effect is defined as a permanent change in the quality or condition of a component of the environment. It must be spatially and temporally extensive and not within acceptable limits in terms of magnitude or nature based on guidelines, standards and professional judgement. The potential level of impact (*i.e.,*adverse environmental effect) after mitigation measures (*i.e.,* net or residual effects) are identified based on NRCan's criteria and definitions provided in "Environmental Impact Statement Guidelines for Screenings of Inland Wind Farms Under the *Canadian Environmental Assessment Act*" (NRCan 2003), presented below in Table 4.1.

Table 4.1 Definitions for the Level of Impact After Mitigation Measures

Level	Definition
High	Potential impact could threaten sustainability of the resource and should be considered a management concern. Research, monitoring and/or recovery initiatives should be considered.
Medium	Potential impact could result in a decline in resource to lower-than baseline but stable levels in the study area after Project closure and into the foreseeable future. Regional management actions such as research, monitoring and/or recovery initiatives may be required.
Low	Potential impact may result in a slight decline in resource in study area during the life of the Project. Research, monitoring and/or recovery initiatives would not normally be required.

Table 4.1 Definitions for the Level of Impact After Mitigation Measures

Level	Definition
Minimal	Potential impact may result in a slight decline in resource in study area during construction phase, but the resource should return to baseline levels.
N/A	There is no interaction possible between the Project activity in question and the associated potential adverse effect.

Source:
Environmental Impact Statement Guidelines for Screenings of Inland Wind Farms Under the Canadian Environmental Assessment Act (NRCan 2003)

Issues scoping is a critical first step in the EA process to ensure completeness and focus for the EA process. The issues scoping process included the following activities:

- review of regulatory guidelines;
- public and agency consultation;
- literature and background information review;
- field studies; and
- professional judgment of the Study Team.

The following sections discuss these activities in more detail.

4.2.1 Regulatory Guidelines

As an energy generating facility that has a production rating of at least 2 MW derived from wind, this Project is a Class I Undertaking as defined in Schedule A of the Nova Scotia Environmental Assessment Regulations and as such requires an EA registration. The Proponent's Guide to Wind Power Projects: Guide for Preparing an Environmental Assessment Registration Document (NSEL 2007, updated 2012) provides guidance on EA approach and issues scoping and was used extensively to guide the EA for this Project. Additional provincial legislation and policies that influenced this EA include the *Endangered Species Act,* Activities Designation Regulations, Nova Scotia *Wetlands Conservation Policy* (NSE 2011a) and the *Operational Bulletin Respecting the Alterations of Wetlands* (NSE 2006).

Regulatory guidance for this Project was also obtained from several federal documents, including:

- *Environmental Impact Statement Guidelines for Screenings of Inland Wind Farms Under the Canadian Environmental Assessment Act* (NRCan 2003).
- *Wind Turbines and Birds – A Guidance Document for Environmental Assessment* (Environment Canada 2007a).
- *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (Environment Canada 2007b)

- *Cumulative Effects Assessment Practitioners Guide* (Canadian Environmental Assessment Agency 1999)
- *The Responsible Authority's Guide* (Canadian Environmental Assessment Agency 2003).

In addition to these regulatory guidelines, federal legislation has also been used to guide the EA in terms of issues scoping, effects assessment and mitigation requirements, including, but not limited to the *Species at Risk Act* (*SARA*) and *Migratory Birds Convention Act, 1994*.

4.2.2 Literature Review

For this EA, existing information was collected from a number of sources including, but not limited to:

- municipal documentation from the Municipality of the District of Pictou and the Municipality of the District of Colchester;
- 1:20,000 aerial photos;
- 1:10,000 Nova Scotia Base Mapping;
- NSDNR wetland inventory mapping;
- Atlantic Canada Conservation Data Centre (ACCDC);
- Provincial water well inventory;
- reports, books and other materials on the area's natural history and geology (see Section 10);
- reports, books and other materials relative to wind turbine developments and environmental effects (see Section 10); and
- information available at selected websites (*e.g.*, Statistics Canada, *Species at Risk Act* registry; see Section 10).

4.2.3 Field Studies

Field studies are aimed at characterizing the natural and social-economic environment of the Study Area. This work included:

- spring, summer, winter and fall avian monitoring (2010-2011 and ongoing);
- vegetation surveys (June and August 2011);
- aquatic surveys (August 2011); and
- site visit to support the visual impact assessment and characterization of socio-economic environment (November 2011).

As described in Section 5.0, various field studies were conducted prior to the availability of the current turbine and access road layout; therefore it will be necessary to conduct localized follow-up surveys to refine mitigation presented in the EA, refine turbine and access road locations, and support additional regulatory permitting (*e.g.*, Water Approvals). Follow-up surveys planned for the spring/summer of 2012 include:

- additional rare plant surveys within planned turbine footprints during detailed planning and design;
- wetland surveys and functional analyses (if wetland impacts cannot be avoided);
- additional breeding bird surveys;
- aquatic surveys (*e.g.,* if watercourses not previously surveyed are likely crossed by a road alignment); and
- archaeological survey.

4.2.4 Professional Judgment

Project personnel involved in the completion of this EA are trained, professional biologists, scientists, planners and/or EA practitioners. Professional judgment was exercised through the selection of environmental components and in the evaluation of environmental effects in this report. The use of professional judgment in EA practice is widely accepted and complements the aforementioned scoping techniques.

4.3 SPATIAL AND TEMPORAL BOUNDARIES OF THE ASSESSMENT

For this Project, the assessment of effects was undertaken for the area identified as the Project Study Area (see Figures 1.1 and 1.2), unless otherwise identified. Use of the term “Project Area” is meant to signify site development areas for the wind farm (*i.e.,* Project lands within the Study Area). For the purpose of data collection of the socio-economic environment, the Municipality of the District of Pictou and the Municipality of the District of Colchester were also considered. The temporal scope of this assessment covers the construction, operation and decommissioning phases of the Project, which is expected to extend over the next 25 years.