Porters Lake Wind Farm Environmental Assessment

Prepared for: Watts Wind Energy Inc.

Prepared by: EON WindElectric Inc.

In Association With: Verterra Group

November 26, 2014

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ACCDC	Atlantic Canada Conservation Data Center
ARIA	Archaeological Resource Impact Assessment
ASL	above sea level
BOP	Balance of plant
CanWEA	Canadian Wind Energy Association
CAO	Chief Administrative Officer
CEDIF	Community Economic Development Investment Fund
CLC	Community Liaison Committee
cm	centimeter
COMFIT	Community Feed-In-Tariff
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Services
dBA	A-weighted decibel
DND	Department of National Defense
EA	Environmental Assessment
EC	Environment Canada
ELC	Ecological Land Classification
EPP	Environmental Protection Plan
GIS	Geographic Information Systems
GJ	Gigajoule
ha	hectare
km	kilometer
KMK	Kwilmu'kw Maw-klusuaqn
kV	Kilovolt
m	meter
m^2	square meter
m^3	cubic meter
MAPC	Maritime Aboriginal Peoples Council
MARI	Maritime Archaeological Resource Inventory
MBBA	Maritime Bird Breeding Atlas

MBCA	Migratory Bird Convention Act
MBR	Migratory Bird Regulations
MEKS	Mi'kmaq Ecological Knowledge Study
MFN	Millbrook First Nation
MW	Megawatt
NSDNR	Nova Scotia Department of Natural Resources
NSDOE	Nova Scotia Department of Energy
NSE	Nova Scotia Environment
NSPI	Nova Scotia Power Inc.
NSTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
OAA	Office of Aboriginal Affairs
PGI	Pellet Group Inventory
PLWF	Porters Lake Wind Farm
PPA	Power Purchase Agreement
RDA	Regional Development Agency
RABC	Radio Advisory Board Canada
RCMP	Royal Canadian Mounted Police
RFP	Request for Proposals
RRSP	Registered Retirement Savings Plan
SARA	Species at Risk Act
SNSMR	Service Nova Scotia and Municipal Relations
SPL	Sound Power Level
VEC	Valued Environmental Component
WTG	Wind Turbine Generator
°C	degree Celsius

1. Introduction

1.1. Overview

The Porters Lake Wind Farm (Project; PLWF) is proposed as a 3.2 megawatt (MW) wind energy facility installation about 2.5 kilometers (km) southeast of Lake Echo in Halifax Regional Municipality (HRM). The site is located on Crown Land between Highway 7 (Hwy 7) and Highway 107 and is a section that was subject to the extensive Porters Lake Fire of 2008.

Watts Wind Energy Inc. (Proponent; Watts Wind) is a Nova Scotia based company. Watts Wind is developing a number of small wind energy projects around the province as part of the This document represents Watts Wind's Environmental Assessment (EA) for the Porters Lake project. The Project is organized as a Community Economic Development Investment Fund (CEDIF) which is Registered Retirement Savings Plan (RRSP) eligible and provides additional tax benefits to eligible Nova Scotia investors. Nova Scotia residents, including residents of HRM, will have an opportunity to invest in the Project as part of the CEDIF structure. In addition, the Project is expected to create opportunities for construction, electrical and transportation contracts in nearby communities and Halifax Regional Municipality itself. The Project is funded privately; no government funding has been or will be provided.

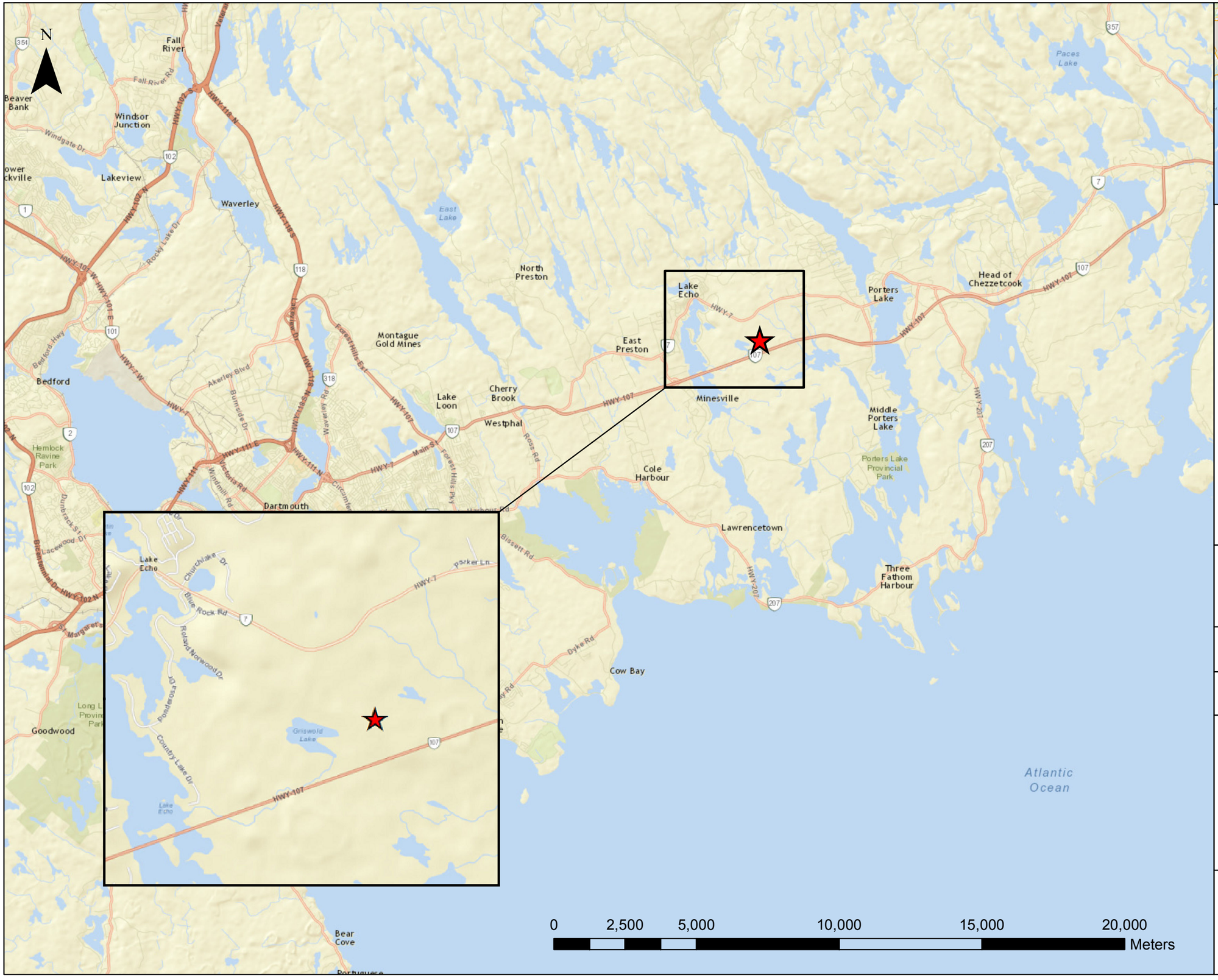
The general site location and setting is shown on Figure 1.1. The area is rural in nature with some ribbon residential development along Highway 7; the closest resident is more than 1000m in distance from the nearest turbine. Watercourses and wetlands have been identified on the property. Watercourses will be avoided by the Project. Wetland delineation and wind turbine micrositing has been completed with the goal of minimizing wetland impacts.

An equipment laydown area is required at each turbine site to facilitate the construction, including assembling and erecting the two wind turbine generators (WTGs). An access road will be required from Hwy 7 to deliver WTG components and for subsequent maintenance of the turbine. An electrical connection is needed from the WTGs; this will follow the new access road. No maintenance buildings, fencing or a substation will be required for the wind energy facility.

1.2. Proponent

The Proponent is a Nova Scotia based community wind energy developer whose principals have been developing, constructing and operating wind energy projects in Atlantic Canada for over a decade. The NSDOE COMFIT program is designed to encourage the development of community owned renewable energy projects across Nova Scotia. The program offers a fixed price for the sale of qualifying renewable electricity to Nova Scotia Power Inc. (NSPI), thus reducing the risk to the community entities by guaranteeing a market for the electricity.

Watts Wind was formed in 2008 as a special purpose CEDIF to fund the development and construction of a 1.5 MW wind power project in Watt Section, Nova Scotia. They were awarded a



Legend

★ PLWF Location

Figure 1.1

General Site Location

Drawn by: TAM	Date: 2014/10/31
1 : 125 000	Scale @ 11"x17"

EON WindElectric

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

twenty year power purchase agreement (PPA) for this endeavor from NSPI. This followed their response to a request for proposals (RFP) for distribution level wind power projects. This project was successfully funded by the community and commenced operation on March 30, 2011, following Federal EA approval. Since this time, Watts Wind has pursued other opportunities for community wind energy projects under the COMFIT program.

The principals in Watts Wind have extensive experience in all facets of renewable energy project development, operation and management, having collectively installed more than 200 MWs of wind and hydro power projects, and raised in excess of fifty million dollars in public market equity and debt. Watts Wind Energy Inc. and its principals have been involved with several projects that required a provincial environment assessment, such as:

- Digby Wind Farm, Nova Scotia
- Amherst Wind Farm, Nova Scotia
- Fermuse Wind Farm, Newfoundland
- McLellans Brook Wind Farm, Nova Scotia
- Barrington Wind Farm, Nova Scotia

The principals at Watts Wind include:

- Stanley Mason, President of Watts Wind, is the co-founder of Seaforth Engineering Group Inc., Atlantic Orient Canada Inc. and Seaforth Energy Inc. He has over twenty years of engineering and project management experience in the provision of consulting engineering services to the renewable energy and engineering industries.
- Paul Pynn, Vice President of Watts Wind, is the President and founder of EON WindElectric Inc. Since its inception in 2006, Eon has provided engineering and project management services to more than 200 MW of wind energy projects in Eastern Canada and abroad.
- David Regan, Chairman of Watts Wind, is Executive Vice President, Corporate Development of DHX Media Ltd. and previously worked in finance and consulting in New York and London.

The Porters Lake project (two wind turbines for a total of 3.2MW) was approved by NSDOE as eligible for the COMFIT program on January 29, 2013. (Appendix 1).

1.3. Regulatory Framework

1.3.1. Federal

There are no environmental approvals expected to be required from Federal authorities for the Project. The Project will not result in impacts such as harmful alteration, disruption or destruction of fish habitat or impact navigable waters. No work is proposed on Federal lands nor are Federal monies involved. Environment Canada (EC) / Canadian Wildlife Services (CWS) will be consulted with respect to migratory birds as appropriate.

Aviation approvals are required for wind energy projects. The Proponent has made appropriate applications to NAV Canada, Canadian Coast Guard, Transport Canada and Department of National Defense (DND). Appendix 2 shows all responses and approvals from Federal aviation and navigation authorities.

For more information on consultation with Federal authorities, refer to Section 5.3.

1.3.2. Provincial

As the Project is a 3.2 MW wind energy facility, it triggers a Provincial EA as per the Environmental Assessment Regulations. For any wind energy project with a capacity exceeding 2 MW, a Class 1 EA is required according to Schedule A of the Regulations.

The Proponent has identified wetlands on site and will implement the mitigation sequence of avoidance, minimization and compensation as per the Nova Scotia Wetland Conservation Policy (2011). Field work by certified delineators was completed in late August, with an additional survey completed in October, to follow up on initial wetland identification in July. Consultation with Nova Scotia Environment (NSE) and Nova Scotia Department of Natural Resources (NSDNR) will be completed as appropriate related to any necessary wetland impact to facilitate the requisite approval under the Activity Designation Regulations. At present, the wetlands where alteration cannot be avoided are pocket treed bogs of low-medium functionality; there will be a minimum setback of 150m from the higher valued wetlands on the site, i.e., the fen connected to Forked Pond. There are no proposed alterations of watercourses required in this Project.

As part of the proposed access road, up to four culverts could potentially be required to maintain the low flow and movement between small linear drainages that generally move in the southeast direction. This work will be completed in a manner consistent with current applicable guidelines and standards and the culvert(s) will be installed between June 1 and September 30; no approval is expected to be required. A Culvert Notification will be submitted to NSE (i.e., Category 1 Water Approval) as per Section 5(1) (d) of the Activities Designation Regulations (Government of Nova Scotia, 2011a).

As work will be completed at the intersection of Hwy 7 and the access road, a Working within Right-of-Way permit will be required from Nova Scotia Transportation and Infrastructure Renewal (NSTIR). A Transportation Study and Traffic Management Plan, Sign Permit and a Special Move: Over-Dimension Permit will all be required for the construction of the PLWF from NSTIR or Service Nova Scotia Municipal Relations (SNSMR) and will be obtained as appropriate.

Watts Wind Energy has received a Letter of Authority from NSDNR for the purpose of installing one meteorological (MET) tower and to commence wind testing. Upon approval of the EA document, the Proponent will apply for a Crown Land Lease to install two WTGs.

No other permits or approvals are expected to be required from the province; however, should this change, the Proponent commits to obtaining all requisite approvals prior to work. For more information on consultation with Provincial authorities, refer to Section 5.3.

1.3.3. Municipal

The Project is located within Halifax Regional Municipality, Planning Districts 8 & 9, and the development of wind energy facilities is guided by the corresponding Land Use By-Law, effective October 29, 2011 (Halifax Regional Municipality, 2011). The Proponent secured a preliminary development permit for the installation of a meteorological (MET) tower and a second development permit for the installation of two WTGs. The parcel of land being used for the facility is located in the Rural Wind Zone (RW-2), and the Project must adhere to the following guidelines implemented by HRM:

- A minimum distance of 1000m (3281 feet) from any habitable building on an adjacent property to any WTG;
- A required minimum distance of 1.0 times the tower height from any adjacent property boundary to the base of a WTG.

During the permit application process, documents such as site layouts and WTG descriptions were provided to aid with the application and provide definitive details to the HRM Development Officer. Consultation with the local community is also required as part of the development permit application process by notification with a mailout to landowners within a two kilometer radius of the Project site. The Municipal Development Permit can be found in Appendix 4.

1.3.4. Structure of Document

This report documents the assessment of the environmental effects of the proposed construction, operation and decommissioning of the PLWF. The EA has been completed based on potential for interaction of the proposed Project with the environmental and socio-economic settings. This report has been prepared in accordance with the Proponent's Guide to Wind Power Projects: Guide for Preparing an Environmental Assessment Registration Document (Nova Scotia Environment, 2012).

The document was prepared by EON WindElectric Inc. and Verterra Group Environmental Strategies Ltd. As an experienced environmental consultant with Verterra, Ms. Janis Rod has completed numerous Federal and Provincial EAs in various industries, including renewable energy. Her professional experience on scoping and reviewing the EA supported the expertise of Mr. Paul Pynn, President of EON WindElectric Inc., and Mr. Trent MacDonald, Project Engineer-In-Training with EON WindElectric Inc., who compiled primary and secondary data sources and drafted the majority of the EA document. Other expertise was contracted externally as defined later in this report.

The Project is described in Section 2 in terms of location, wind regime, and the proposed WTGs. In addition, activities in major phases of the Project are described. The potential for accidents and malfunctions are also described in this section. Section 3 presents the scoping and methodology used in the EA. The environmental setting is presented in Section 4 including biophysical and socio-economic aspects. Section 5 describes the consultation program completed to date and ongoing plans within the community in Porters Lake, the Mi'kmaq, and regulators. The analysis of the interaction of the Project and the environmental setting is presented in Section 6 based on valued environmental components (VECs) and socio-economic aspects. Section 7 presents the commitments of Watts Wind Energy Inc. to follow up and monitor the Project while the closure, including signature of the Proponent, is provided in Section 8. Following the bibliography, the appendices contain supporting information as referenced in this document including correspondence and report completed for the Project.

2. Project Description

2.1. Site Layout and Location

The PLWF is located on Crown Land at the location of 44°43'41.07"N, 63°21'14.83"W. The Proponent plans to construct and operate 2 WTG's, totalling 3.2 MW of capacity near Porters Lake, in HRM (Figure 2.1). The nearest communities surrounding the site are Lake Echo (2.5km SE) and Porters Lake (3.0km SW). Setback distances from the nearest receptors (i.e. residential dwellings) are greater than 1000m (specifically 1100m to the closest dwelling). The Project site is approximately 14km from the nearest Mi'kmaq community, i.e., IR30 Cole Harbour which is a satellite community of Millbrook First Nation. Beyond this, the Project site is about 40km away from Sipekne'katik First Nation.

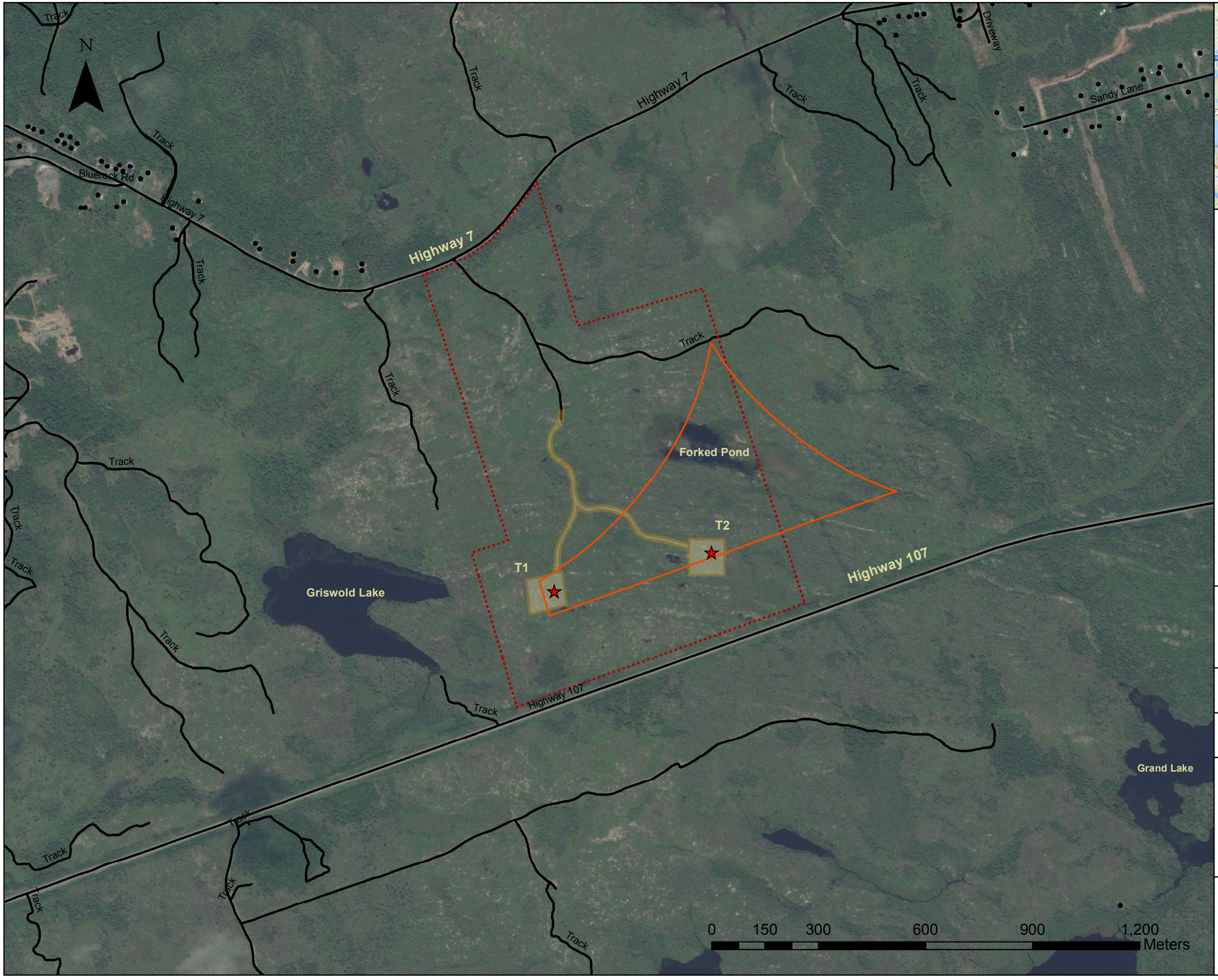
The land under option agreement encompasses an area of 212.76 ha with little tree growth due to the Porters Lake Fire of 2008. The property is considered a Rural Wind Zone (RW-2) and allows for the installation of a Large Facility, having a total rated capacity of over 300kW. The site is located approximately 9 kilometers north of the Atlantic Ocean.

Wetlands and watercourses have been identified in the areas of the Project; no watercourses will be directly impacted by PLWF. The majority of wetlands in the Project area are classified as shrub and treed swamps and bogs. Swamps are generally forested wetlands, often found near rivers or lakes and contain poorly drained, mineral soils. Bogs are traditionally mossy wetlands and in particular, sphagnum moss dominates the bogs in the Project area. The defining factor between swamps and bogs is how water travels throughout each wetland; bogs are fed predominately by precipitation and impermeable bedrock contains the water, swamps receive water through precipitation and surface water (i.e., streams, ponds).

The access road will be constructed off of Highway 7, upgrading 550m of existing road and building 875m of new road, and appropriate permits will be obtained from NSTIR prior to construction. The distribution power line will run alongside the new and existing access road. The proposed area of disturbance, which refers to turbine laydown areas, turbine foundations and crane pad construction, will equate to approximately 0.8ha per turbine (Figure 2.2). Total area of disturbance is approximately 5ha that includes access roads and utility routing.

The PLWF will be connected to the distribution grid on Hwy 7, which feeds the nearby Porters Lake substation via a 12.5 kilovolt (kV) distribution feeder emanating from the substation along Hwy 7. The Project components include the WTGs (nacelle, blades, and tower sections), access roads, laydown areas, concrete foundations, and pad mount transformers. The PLWF will not require the construction of a substation as it will connect to the pre-existing distribution substation (i.e., 126H in Porters Lake).

Beginning with the 2008 RFP contract award, the Proponent has gained extensive expertise in the prospecting and development of community-owned, distribution level wind energy projects across



Legend

- WTG Location
- Residential Building
- Roads
- WTG Setback Constraint
- Project Footprint
- Developable Area

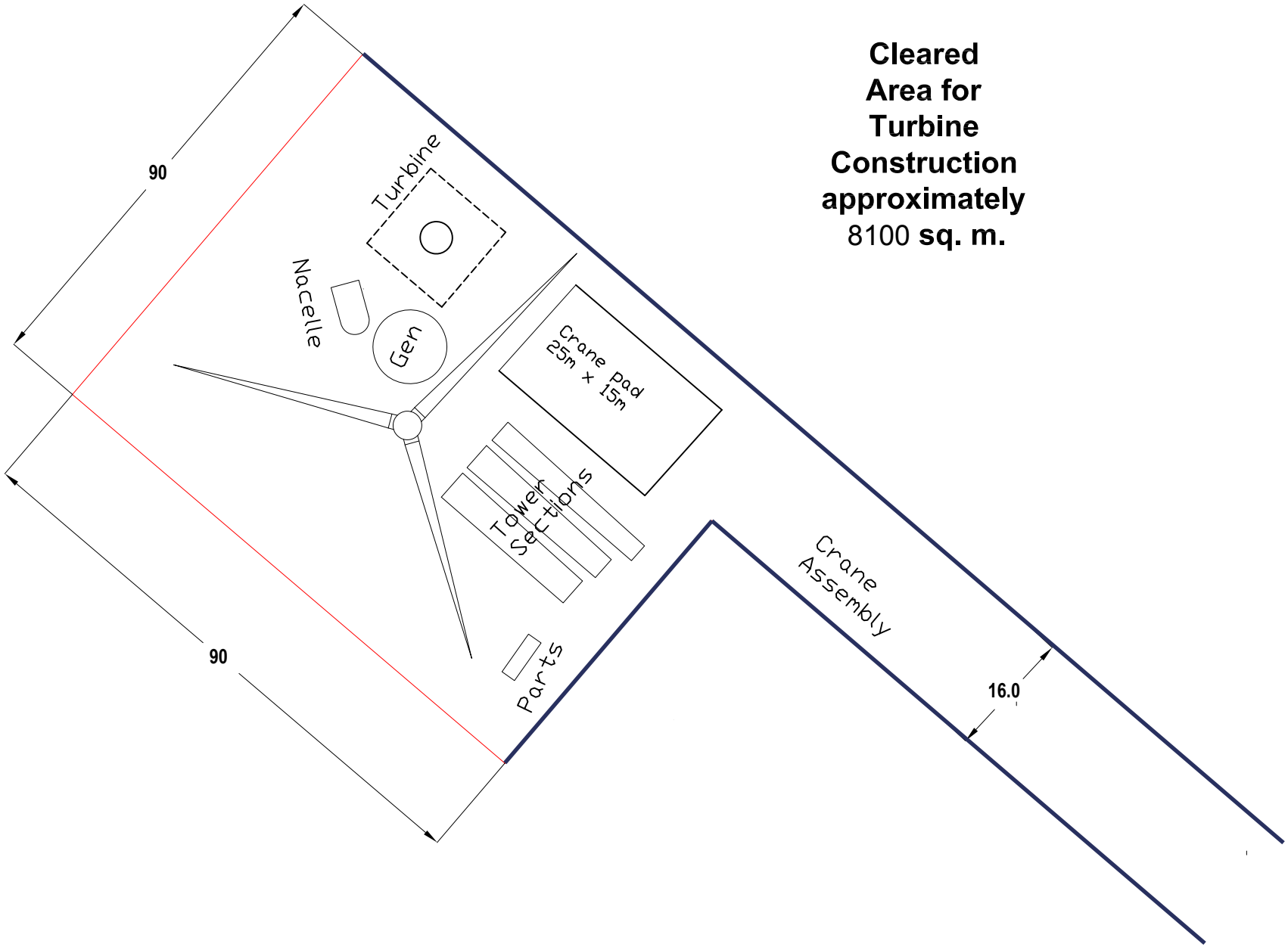
Figure 2.1

PLWF Site Layout

Drawn by: TAM	Date: 2014/10/30
Project #: 080	Scale @ 11"x17"

EON WindElectric

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



All dimensions in Meters

Figure 2.2
Watts Wind Farm
Typical Turbine Laydown

Project Manager	Owner
EON WindElectric	Watts Wind Energy

Date:	November, 2014
Scale:	Not to Scale
Revision:	1A
Drawing No:	1 of 1

Nova Scotia. The COMFIT program allows community entities to connect projects with a total capacity less than the minimum load on the local distribution substation. Numerous constraints limit the areas suitable for the development of a distribution level COMFIT project; these include NSPI infrastructure in the surrounding area, wind regime, socio-economic factors (i.e., property setbacks, regional park areas, etc.) and ecological concerns. Consideration of these key factors have led the Proponent to consider the PLWF site as the best alternative given the regulatory, socio-economical, ecological and technical considerations.

2.2. Wind Turbine Generator

Selection of the WTG make and model is ongoing for the Project. The Proponent will select WTGs based on, but not limited to:

- performance of the WTG with site wind regime;
- economic considerations; and
- sound power level (SPL) at turbine hub height.

Final turbine selection will be made after the completion of supplier due diligence and additional technical studies. A maximum of two WTG's will be constructed at the PLWF, and tower heights will range from 80m to 100m. Total height (i.e. base to tip of turbine blade) will range from 120m to 165m. Lighting of wind turbines will conform to Transport Canada Standard 621. Correspondence on aviation approvals can be found in Appendix 2. Turbine color will be industry standard white or light coloring. An effort will be made by the Proponent to source WTG components (blades, towers, generators) domestically under commercially reasonable terms.

Each turbine will produce 60Hz, 3 phase power, and will be isolated and protected via a low voltage breaker located within the turbine. The turbine will be connected to the grid by low voltage cables that are connected to the system with a transformer either located outside of the turbine, or located in the basement of the foundation. A final pole mounted re-closer switch located on NSPI owned poles will further help to isolate and protect the turbine.

The Proponent will ensure final WTG selection and site layout will comply with Municipal setback regulations, and do not exceed 40dBA SPL at the nearest dwellings from Project operation. 40dBA is considered an acceptable noise level from community sources to protect sleep (e.g., Health Canada, Ontario provincial regulations, etc.); hence, it has been adopted by NSE as a guideline. Noise studies have been conducted using the turbines with the highest sound power levels in order to ensure conservative analysis results. Refer to Section 4.2.4 for a detailed description of the noise evaluation completed for the Proponent.

2.3. Wind Regime

A detailed wind resource assessment at the PLWF site commenced in November 2013 with the installation of a 60m meteorological tower. Wind direction, wind speed, atmospheric pressure and temperature are recorded and monitored on a daily basis. The wind turbine selected for the site

will be based on International Electrotechnical Commission (IEC) standard 61400-1 for wind turbines among other technical and economic constraints listed in Section 2.2. The IEC 61400-1 is a set of international standards that are based on three wind regime characteristics which guide the selection process for wind turbines. The three characteristics of the wind regime are the 50 year gusts, turbulence intensity and annual average wind speeds. Meteorological tower data, correlated with nearby long term weather stations, will be used to determine the parameters outlined by IEC 61400-1, which will help guide the turbine selection process.

2.4. Planning and Design

Many of the impacts associated with projects of this relatively small size (i.e., total altered area of approximately 5ha) can be avoided at the planning and design stage rather than relying on mitigation implemented only during construction and operational phases. In terms of the PLWF, the site itself is an excellent candidate to locate WTGs due to its excellent wind resource, distance from residents, suitability of electrical connection, and minimal ecological sensitivities, especially given the widespread fire of 2008.

As part of work completed to plan and design the Project, a review of the site was completed from ecological and socio-economic perspectives. The selection of locations considered the distance from residential dwellings and visual impact. The siting of the WTGs also strived to avoid wetland and watercourses. While wetland studies have determined that avoidance of all wetlands is not feasible, the Proponent has engaged and is committed to continue working with NSE and NSDNR to minimize impacts and compensate as required. These types of considerations were combined with the assessment of wind resource to optimize the selected Project site.

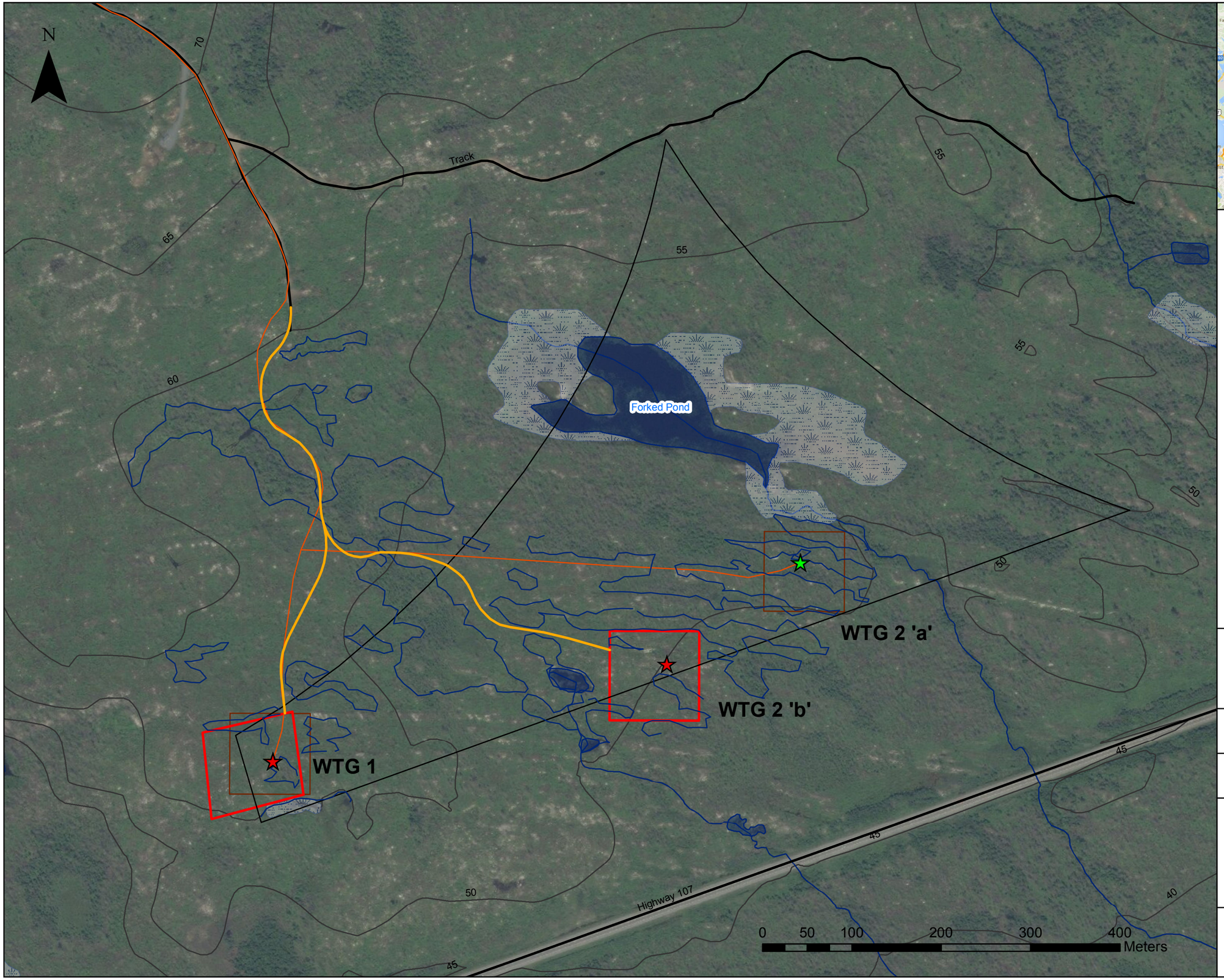
A meeting on October 8th, 2014 between the Proponent, Mark Elderkin (NSDNR) and Bridget Tutty (NSE) was designed to discuss the environmental challenges of the PLWF site, wetlands, rare plant and avian surveys in particular. Following the meeting, the Proponent re-evaluated the layout on the wind farm and procured East Coast Aquatics to complete additional delineation southwest of Forked Pond.

Following the additional delineation, the laydown area around WTG 1was rotated to minimize impact to the surrounding wetlands. The rotation of the laydown is shown in Figure 2.3. The resulting wetland impact is noted in Table 2.1 below.

Table 2.1 Impact of Rotating WTG1 Laydown Area

	Original T1 Laydown	**Rotated T1 Laydown**
T1 Laydown Area Wetland Impact	1747 m^2	1310 m^2

WTG 2 was identified by NSDNR as being too close to Forked Pond. NSDNR proposed a minimum setback of 150m from the fen connected to Forked Pond, as shown by the NSDNR database and



Legend

- Original WTG Location
- Revised WTG Location
- Original Laydown Area
- Revised Laydown Area
- Original Access Road
- Revised Access Road
- Contour Lines
- Existing Road
- ECA Wetland Delineation
- Watercourse
- Waterbody
- NSDNR Wetland
- WTG Setback Constraint

Figure 2.3

Turbine Micrositing

Drawn by: TAM	Date: 2014/11/13
Project #: 080	1 : 4 000

EON WindElectric

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

located to the south of Forked Pond. A proposed relocation of WTG 2 provided an opportunity to greatly reduce wetland impact. Table 2.2 below is a summary of revisions depicting the positives in changing the WTG 2 location and the reduction of impacts to wetlands taking laydown and roads into account. The proposed changes in WTG 2 and resulting access road routing is shown in Figure 2.3.

Table 2.2 Impact of Changing WTG 2 Location

	Turbine 2 a Location (preliminary)	**Turbine 2 b Location (final)**
Distance from Forked Pond Fen	50 m	192 m
Access Road Wetland Impact	680 m^2	760 m^2
T2 Laydown Area Wetland Impact	4158 m^2	1420 m^2

Based on the rotation of WTG 1 laydown area, relocation of WTG 2, and resulting routing of access roads, there has been more than 45% reduction in proposed shrub and treed bog disturbance (as shown in Table 2.3), as well as an increase in separation distance to the fen adjacent Forked Pond.

Table 2.3 Impact of Redesign of PLWF

	Turbine 2 a Location	**Turbine 2 b Location**
Overall Wetland Impact (T1&2 and roads)	6585 m^2	3500 m^2
Percent Wetland Impact Reduction	> 45%	

The Proponent is continuing to access ecological and technical considerations as Project planning proceeds. Should either WTG location or access road routing change as a result of this continuous design, the Proponent will advise NSE and NSDNR as well as other stakeholders.

The 3.2MW wind energy capacity will provide approximately 40 000 gigajoules (GJ) of renewable energy that will satisfy the energy needs of approximately 1000 Nova Scotia homes, according to Statistics Canada data on electricity consumption (Statistics Canada, 2007). As a community energy project, it provides the renewable energy locally, i.e., via the distribution grid, which also reduces the losses of electricity that occurs in transmission lines. In addition, community members will be given the opportunity to share ownership of the Project as investors in the CEDIF.

In summary, this is a small, community-based facility that will provide distributed renewable energy to the grid and local economic benefit. The Project and its design have been located in consideration of technical, financial, social and ecological issues. Practical and mitigative measures

have been included in the Project design to minimize the potential for ongoing environmental effects.

2.5. Construction

The construction phases is deemed to be the most relevant to the EA process. Table 2.4 outlines the proposed work schedule for the PLWF. The schedule is subject to change and proper notification will be given to the regulators and other stakeholders as appropriate. This schedule is based on EA approval and release from conditions by the first quarter of 2015.

Table 2.4 Construction Project Schedule

Site Activity	**Start Date (mm/yyyy)**	**Duration**
Geotechnical Investigation - Site Survey	12/2014	2 Weeks
Engineering Design and Procurement	12/2014	2 Months
Clearing and Grubbing	04/2015	1 Months
Civil/Electrical BOP Construction	07/2015	3 to 4 Months
Turbine Installation	10/2015	1 to 2 Months
Commissioning	11/2015	1 Month
Commercial Operation Date	12/2015	N/A
Follow-Up and Monitoring	12/2015	As Required

The site development phase incorporates the activities required to complete the design and tendering aspects of the PLWF, as well as additional field work and final design of the Project. The major components of this phase include:

- completion of land surveys for placement of roads and foundation pads;
- completion of geotechnical and engineering studies for foundation;
- road and electrical design;
- implementation of sediment and erosion control; and
- Site clearing and grubbing.

The site development stage will require the use of light duty trucks, excavators and backhoes, forestry harvesting equipment and drill rigs.

The construction phase activities include upgrading an existing access road off Hwy 7, new construction of access road to turbine pads, laydown area and crane pad construction, turbine delivery and assembly related activities, electrical infrastructure construction, temporary work structure installations, site restoration and remediation, and commissioning of site and turbines.

Environmental protection is a key part of construction. A draft Environmental Protection Plan (EPP) has been developed to communicate these protection mechanisms to the contractor, sub-contractors and site personnel (Appendix 3). This will be finalized based upon regular comments, subsequent field work and final design of the Project. Archaeological studies have indicated there is a low likelihood for the presence of pre-Contact or European artifacts on site. Construction crews and site managers will be on alert for the presence of old foundations or artifacts with apparent archaeological significance. Erosion and sediment transport will be followed according to the current version of the Province of NS Erosion and Sediment Control Handbook for Construction Sites (1988). Standard hazardous material protocols will be followed during the project.

Turbine sites typically require construction of a level laydown area (typically 90m by 90m) for storage of turbine components and to create a safe and level working area. A crane pad (level, structurally sound area) typically 8m by 10m will be required at each turbine location within the laydown area as an operating platform for the main turbine erection crane. It is typically constructed using structural fill (surge and/or gravel).

The access roads will be upgraded and built to accommodate the size requirements of the crane and the load specifications to support the delivery of approximately 35 flatbed truck loads of turbine and crane components. The roads will be approximately 6m to 8m wide with ditches and culverts added where required to allow for proper drainage. Total length of access roads will be based on final road routing and turbine micro-siting. Refer to Figure 2.4 for a typical road cross section drawing. At present, approximately 875m of new road is estimated to be required. Road routing based on a two WTG layout is shown in Figure 2.1.

Following the completion of a wind resource assessment and geotechnical investigations (i.e., test pits or boreholes and core samples), turbine foundations will be designed and constructed. The activities associated with turbine foundation construction include: site clearing and grubbing, blasting of rock (if required), excavation of soils, building of forms and pouring of concrete pads, placement and compacting of backfill material to grade, and trenching for electrical and communication conduit. Sediment control precautions and procedures will be implemented for the duration of foundation and crane pad construction. Turbine foundations will typically require approximately 300 m^3 of concrete which will be supplied from a redi-mix plant off site. Blasting Safety Regulations of Nova Scotia (2008) will be adhered to for any blasting required on site including the requirement for a pre-blast survey for water wells within 800m of the point of blast.

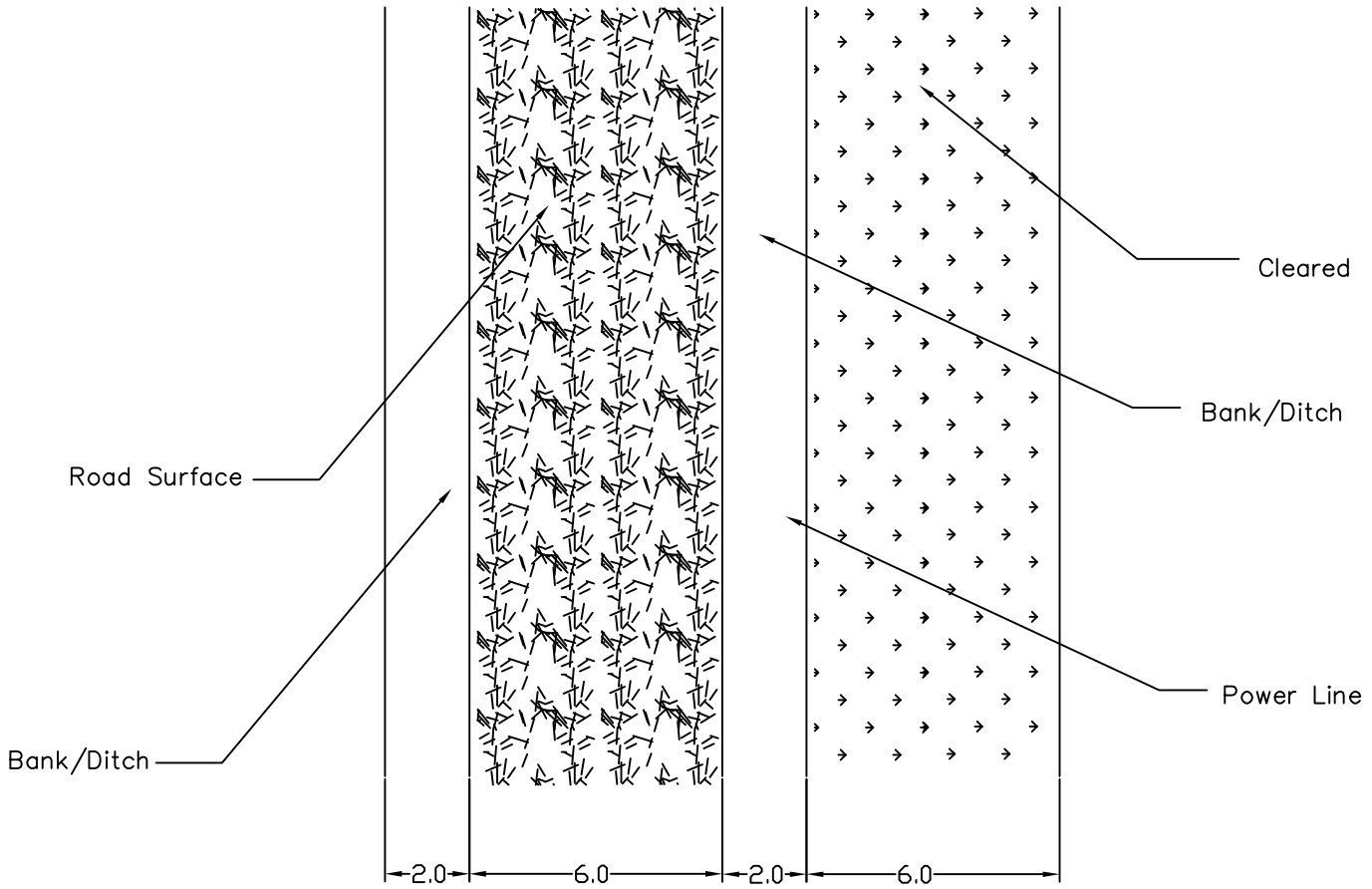
Electrical BOP construction will take place in conjunction with the civil BOP construction phase. The PLWF is a distribution-connected wind power project, connecting to the local distribution infrastructure. Three phase, 12.5kV power lines will be constructed along the access route. Substation construction will not be required for this project as it is connecting to the 12.5kV distribution system.

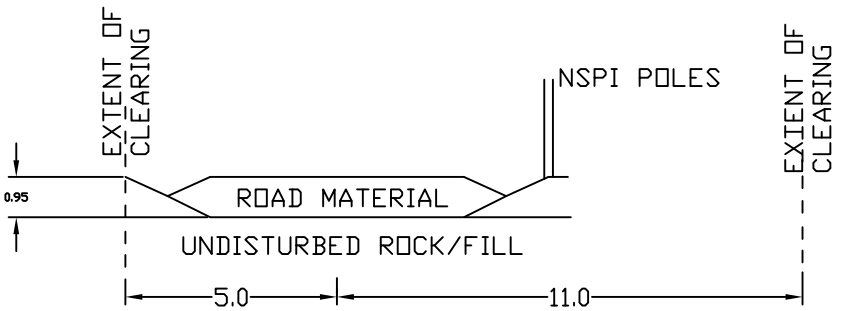
Wind turbine delivery will involve flatbed trucks and specialized trailers for delivery of the turbine towers, blades and nacelle. Access to the Project site for the construction of the WTGs will be via

Notes:

1. All dimensions in meters (m)
2. All dimensions are approximate
3. Widths will vary on turns
4. Thicknesses will vary depending on grade

Key:





Title:
Figure 2.4
Typical Road Design

Project:
Porters Lake Wind Farm

Client:
Watts Wind Energy Inc.

Date: **November, 2014**

Scale: **N/A**

Revision: **1A**

Drawing No: **1 of 1**

EON WindElectric

Highway 7. NSTIR imposed spring weight restrictions will be incorporated by the Proponent when coordinating delivery of large and heavy components to the project site. The Proponent is aware of these delivery constraints and will engage NSTIR to co-ordinate requirements. Turbine components will be delivered after civil and electrical BOP has been completed.

Crane and lifting contractors will build the WTGs. Tower components will be placed sequentially on the turbine foundation with the use of a large crane (up to about 120m). Assembly of the WTG components should take between 4-10 days depending on wind conditions.

Equipment used during the construction, delivery and assembly of the WTGs include dump trucks, excavators, concrete trucks, small, medium and large cranes, graders, rollers, bulldozers, flatbed trucks and specialized trailers, crushers (if material cannot be sourced locally), and light trucks. Local residents will be made aware of Project schedule and major construction activities (e.g., blasting, if required, turbine deliveries, etc.). During high traffic periods (e.g., concrete delivery during foundation pours), the Proponent will employ dust mitigation techniques, such as use of a water truck, as appropriate depending on weather.

Site restoration after completion of construction activities will include dispersing or removal of unused gravel and soil, grading of all areas, installation of permanent sediment and erosion controls, including stabilization, and removing construction materials from the site. Temporary shelters will be dismantled and removed from site. A gate will be installed at the entrance of the access road. Proper signage will be installed to notify wind turbine technicians and the general public of safety concerns onsite.

2.6. Operations and Maintenance

Operation and maintenance of the Porters Lake Wind Farm involves the following distinct activities:

- ensuring compliance with environmental obligations and conditions;
- ensuring compliance with utility contracts and landowner commitments;
- monitoring of wind turbine performance;
- monitoring of grid or WTG faults;
- balance of plant (BOP) maintenance (road maintenance and clearing, pad mount transformer inspection, site security); and
- dispatching of turbine technicians for scheduled and unscheduled maintenance.

The maintenance regime for the PLWF will include the following activities:

- performance of regular maintenance; and
- performance of unscheduled service.

The Proponent will ensure their technicians handling of hazardous waste (i.e., oils and lubricants) conform to applicable legislation and best practices throughout the maintenance life of the PLWF. The Watts Wind Energy Inc. PLWF EPP outlines how the Proponent will deal with the hazardous material handling onsite.

2.7. Decommissioning

The design life of a wind turbine is typically 20 to 30 years; capital improvements and replacement programs can extend safe and efficient operations well beyond 40 years. Decommissioning of both the WTGs and the site, when it is necessary or desirable, will be undertaken in accordance with the regulatory regime in place at the time.

At the end of their useful life, the WTGs will be decommissioned and all equipment will be dismantled and disposed of in a manner that meets all regulatory requirements. Such activities would likely involve the preparation of the site, e.g., the establishment of access for construction equipment and the mobilization of that equipment including cranes. The sections of the towers would be taken apart and would be reused, recycled or disposed of in accordance with regulatory requirements. After the towers had been dismantled and removed from the site, the site itself would be restored to a state similar to that which currently exists through re-grading and re-vegetation. Foundation pedestals may be removed or reduced and re-filled with local soils.

2.8. Accidents and Malfunctions

Malfunctions and accidents that pose a risk to human health, safety and to the environment can occur during any activity. As such, the Proponent is committed to ensuring that protocols are in place to minimize the risk to human health, safety and the environment during both construction and operation.

These protocols are identified in the EPP; they will ensure the application of environmental protection measures and good management practices through construction (draft EPP can be found in Appendix 3).The EPP includes an emergency response plan to address responses in the unlikely event of an accident during either construction or operation (e.g., key contact information, etc.).

The construction and operation of wind turbines employs techniques and technologies that are familiar to the construction industry. The likelihood of serious malfunctions or accidents associated with their development and operation that would pose a risk to human health and safety, or the environment, are substantially less than those associated with many other forms of power generation. Further, the Proponent is very experienced in construction and operation of wind turbines.

2.9. Future Project Phases

The PLWF has been approved from the NS Department of Energy's COMFIT program for a total of 3.2MW. The Proponent does not have the ability to increase the capacity of the PLWF due to the limitations on the local distribution network.

2.10. Other Projects in Area

At this time only one known wind project is in operation or proposed within a 25km radius of the proposed site, a single 2.3MW WTG located in Gaetz Brook. In addition to this, there are three known proposed wind facilities within 40km of the PLWF, combining for a total of 16MW. No other wind energy projects are known of or in operation at this time. Near the Project site, there is rural residential development and Highway 107 and Highway 7. These developments are not expected to interact significantly with the PLWF; however, cumulative effects will be discussed in the EA in Section 6.