

DRAFT

Bornish Wind Energy Centre
Water Body Records Review Report

Prepared for:
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Project No. 1231

Date: July 2012



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

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Water Body Records Review Report**

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in April 2011 by GL Garrad Hassan on behalf of NextEra Energy Canada to conduct a water body assessment in accordance with the Renewable Energy Approval (REA) Regulation. This assessment includes a records review, site investigation, and impact assessment of any water bodies occurring at a proposed 72.9MW wind energy generating facility in North Middlesex, Middlesex County Ontario. The analysis of the water body features is one issue being considered. Other factors, such as natural heritage, land ownership, social impacts, and cultural impacts are also being assessed under separate covers as outlined by the REA Regulation.

The proposed Bornish Wind Energy Centre ('the Project') will be owned and operated by Bornish Wind, LP, a wholly-owned subsidiary of NextEra. The Project is located in northwestern Middlesex County in the Township of North Middlesex, Ontario, more specifically, approximately 3.3km south of the Town of Parkhill, Ontario (Figures 1-3). The project area is bound to the north by Nairn/Elginfield Road, to the south by Townsend Line, and to the east and west by Broken Front/Scout Road and Fort Rose Road, respectively. The Bornish Wind Energy Centre is proposed to consist of up to forty-five GE 1.6-100 (1.62MW) wind energy generating turbines installed for a total installed capacity of 72.9MW. However, locations for forty-eight turbines will be permitted. Associated infrastructure including turbine access roads, overhead and underground electrical collector cabling, interconnection facilities and substations is also proposed. In addition, a transmission line is proposed to run north along Kerwood Road from the substation to Elginfield Road/Nairn Road. This transmission line is then proposed to continue eastward along Nairn Road to an existing 500kV line and interconnection point located west of Petty Street. The general project area was defined early in the planning process for the proposed wind energy facility, based on the availability of wind resources, approximate area required for the proposed project, and availability of existing infrastructure for connection to the electrical grid. The project area was used to facilitate information collection and the records review.

As defined by REA Regulation, the proposed layout of these features is collectively referred to as the 'project location'. This includes turbines and associated infrastructure

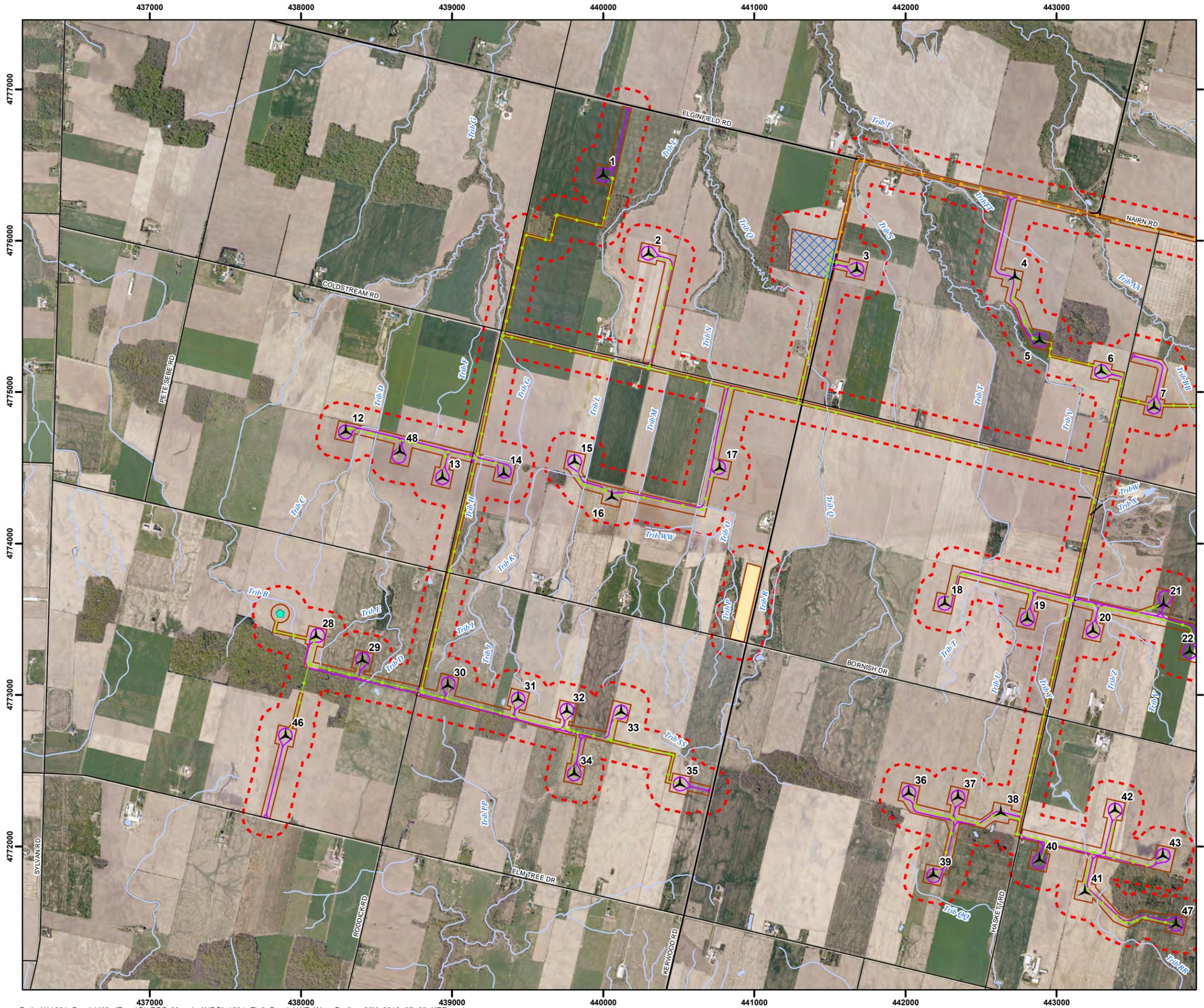
as described above, as well as any areas that may be used temporarily during construction (i.e. staging areas, crane pads, crane walks etc.) For the purposes of this report, NRSI will refer to the areas within 120m of the project location as the 'project area'.

In accordance with the Renewable Energy Approval (REA) Regulation, NRSI has conducted a thorough records review of available background resources to identify any water bodies within 120m, or lake trout (*Salvelinus namaycush*) lakes within 300m, of the project location, as defined by REA Regulation. This assessment includes a detailed review of available background information from a variety of sources, including the Ontario Ministry of Natural Resources (OMNR), the Ausable Bayfield Conservation Authority (ABCA), municipal files, existing studies, and aerial imagery, and other available online and/or published resources.

As part of this project, NRSI has considered all aspects relating to provincially Threatened and Endangered species. However, since these species are addressed as part of the *Endangered Species Act* (2007), they have not been discussed within any of these Water Body reports. These species will be addressed in full detail, including a habitat description and results of field assessments, potential impacts, and recommended mitigation measures, as part of a separate *Approval and Permitting Requirements Document (APRD)* to be submitted to the OMNR under separate cover, where necessary.

Figure 2

Bornish Wind Energy Centre Water Bodies Western Project Area



- Legend**
- Project Area (120m Buffer)
 - Project Location
 - Turbine
 - MET Station
 - Access Road
 - Proposed Transmission Line (Aboveground Cabling)
 - Collector System (Underground Cabling)
 - Staging Area
 - Substation
 - Existing Transmission Line
 - Primary Road
 - Secondary Road
 - Railroad
 - Intermittent Watercourse
 - Permanent Watercourse
 - Waterbody
 - Provincially Significant Wetland (PSW)
 - Other Wetland

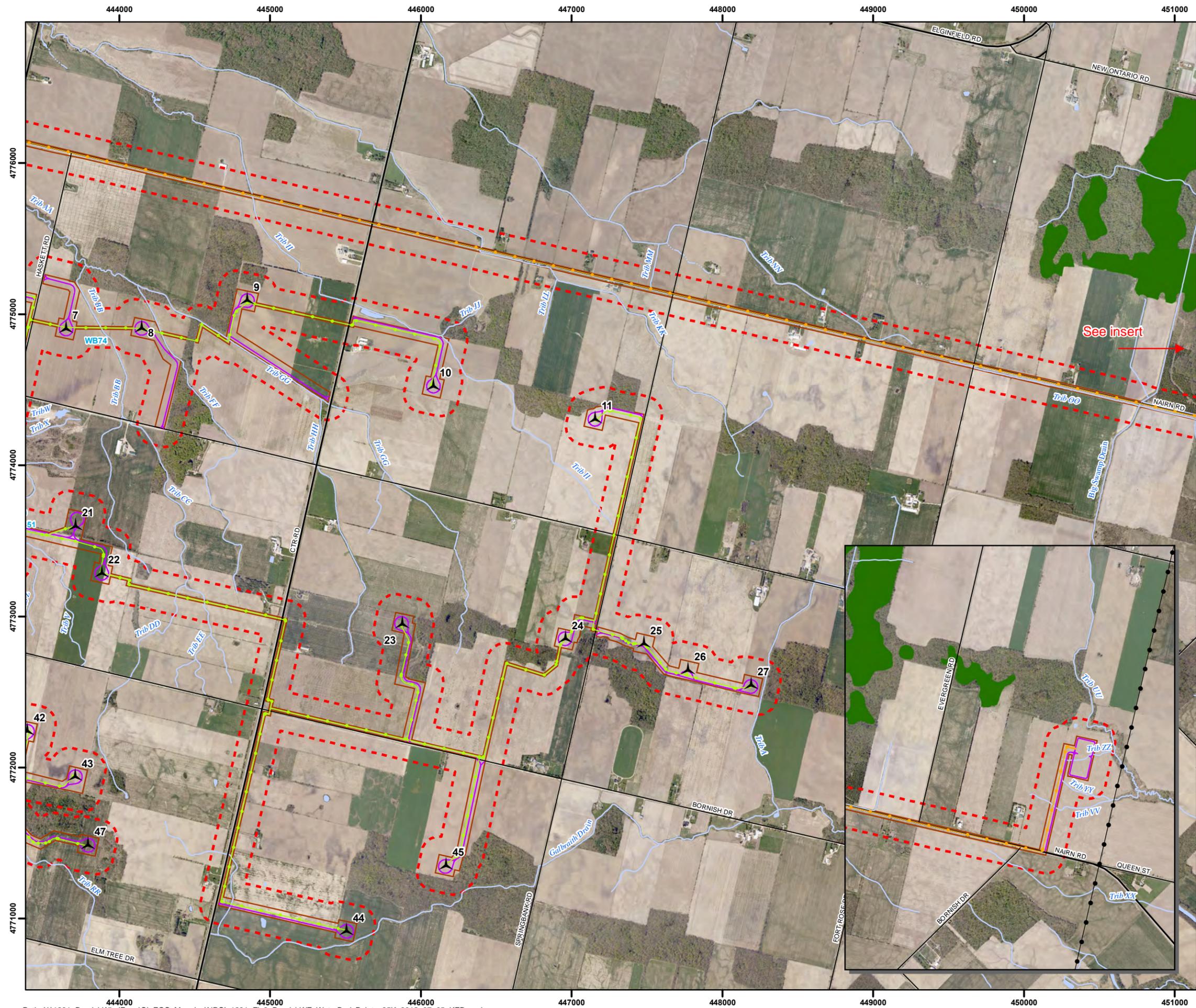


Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Source: Data provided by MNR. Copyright: Queen's Printer Ontario. Airphotos: SWOOP 2006

Project: 1231 Date: July-05-12	NAD83 - UTM Zone 17 Scale: 1:25,000 (11x17")

Figure 3

Bornish Wind Energy Centre Water Bodies Eastern Project Area



Legend

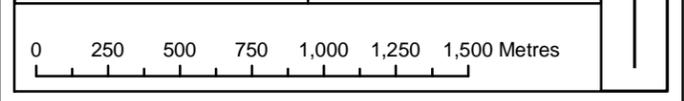
- Project Area (120m Buffer)
- Project Location
- Turbine
- MET Station
- Access Road
- Proposed Transmission Line
- Collector System
- Staging Area
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- Existing Transmission Line
- Primary Road
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- Railroad
- Intermittent Watercourse
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- Waterbody
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See insert



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2.0 REA Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals* under *Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act (EPA)* identifies the requirements for the development of renewable energy projects in Ontario. In accordance with REA Regulation, the Bornish Wind Energy Centre, classified as a Class 4 wind facility, is required to complete a REA submission.

Section 29 of the REA Regulation requires proponents of Class 4 wind projects to undertake a water assessment which involves a records review in order to identify whether the project location is:

1. in a water body;
2. within 120 meters of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity;
3. within 300 meters of the average annual high water mark of a lake trout lake that is at or above development capacity;
4. within 120 meters of the average annual high water mark of a permanent or intermittent stream; or
5. within 120 meters of a seepage area.

Section 1.1 of the REA Regulations defines a “water body” as a lake, a permanent stream, an intermittent stream and a seepage area but does not include:

- a) grassed waterways;
- b) temporary channels for surface drainage, such as furrows or shallow channels that can be tilled and driven through;
- c) rock chutes and spillways;
- d) roadside ditches that do not contain a permanent or intermittent stream;
- e) temporary ponded areas that are normally farmed;
- f) dugout ponds; and
- g) artificial bodies of water intended for storage, treatment or recirculation of runoff from animal yards, manure storage facilities and sites and outdoor confinement areas.

Subsection 2 of Section 30 of the REA Regulation requires the proponent to prepare a report “setting out a summary of the records searched and the results of the analysis” (O. Reg. 359/09). This *Water Body Records Review Report* has been prepared for the Bornish Wind Energy Centre to meet these requirements.

3.0 Records Review Sources

In accordance with the REA Regulation, NRSI biologists consulted several information sources and agencies for the purposes of assessing water bodies within 120m (and 300m) of the project location. The results of this consultation process have been documented throughout the following report, and have been summarized in Table 1 below.

Table 1. Summary of Information Sources Consulted for the Bornish Wind Energy Centre

Information Source	Consultation Date(s)	Type of Records Obtained
Ministry of Natural Resources, Aylmer District	August 30, 2011	Fish data collection records
Middlesex County	August 9, 2011	No applicable information received
Ausable Bayfield Conservation Authority (ABCA)	November 3, 2011	Fish Habitat Management Plan (Veliz 2011) Watershed Report Cards (Lower Parkhill) (ABCA 2007)
Ministry of Natural Resources, NHIC and Biodiversity Explorer (OMNR 2011a)	August 9, 2011	Species of Conservation Concern records
Ministry of Natural Resources Land Information Ontario (LIO) (OMNR 2011b)	September 6, 2011	Water body mapping Surficial geology mapping

All water body features initially located within the project area were identified using OMNR watercourse mapping and digital air photos. These features are shown in Figures 1-3.

4.0 Records Review Findings

For the purposes of the records review reporting, NRSI has examined available background information to identify any lakes, intermittent or permanent watercourses, and seepage areas within 120m of the project location as well as Lake Trout Lakes within 300m of the project location. Information obtained relating to identified water bodies is provided in Sections 4.1 through to 4.5.

4.1 Lakes

4.1.1 Lake Trout Lakes

No Lake Trout lakes are present within 300m of the project location.

4.1.2 Other Lakes

No lakes are present within the project area.

4.2 Permanent or Intermittent Watercourses

NRSI biologists have used available resources, including agency consultation and a variety of available mapping layers (satellite imagery, air photos, drainage classification mapping and OMNR Land Information Ontario watercourse mapping) to identify the presence of potential intermittent/permanent watercourse features within the Bornish Wind Energy Centre project area. Findings of this review indicated a number of 'water bodies' (permanent or intermittent watercourses) are located within the project area. These watercourses have been divided and discussed based on their respective drainage areas which include the Ptsebe Creek (a tributary of Parkhill Creek), Ausable River, Big Swamp Drain and Galbraith Drain.

All watercourse features within the project area are situated within the Ausable River watershed and are the jurisdictional area of the ABCA and the OMNR, Aylmer District. The majority these features have been identified as headwater tributaries and based on air photo interpretation are expected to be highly influenced by historic and present agricultural activities (i.e. channelization).

The Wyoming Moraine is the most dominant physiographic land feature present within the project area. Due to the presence of this feature, the area is dominated by silty-clay till plains with poor to very poor infiltration (Veliz 2001). Therefore, the ratio of runoff to infiltration is high, and results in variable discharge rates with short periods of high flows and long periods of low to no base flow (Veliz 2001). This condition is likely exacerbated by tile drainage, which efficiently removes water that has infiltrated the upper soil layers within agricultural fields and conducts it quickly to a drainage outlet. All of which results in what can be described as 'flashy' systems. The project area's land use is dominated by active agricultural activities. A narrow littoral-foreshore deposit has been identified within the project area that extends through the middle of the Wyoming moraine from the middle of the project area and up through its northeast limit. This relatively narrow deposit contains sandy soils (Veliz 2001), and therefore may facilitate groundwater recharge and discharge to support baseflow in tributaries of Ptsebe Creek.

Both shallow (former glacial Lakes Warren, Algonquin and Nippissing Shoreline aquifers) and bedrock aquifers are found in the project area (ABCA 2007). The shallow aquifers are a source of the flow in Parkhill Creek north of the project area (ABCA 2007). It is uncertain if the drainage features in the project area intercept any of the above aquifers, which would provide a source of water to support base flow. Groundwater indicators (i.e. springs, seeps, specific plant species etc.) will be one of the components inventoried during the site investigation.

Although fish collection data records were provided by local OMNR, none of the record locations correspond with the potential water body locations within the project area, and are therefore not specifically relevant to this report. General thermal and fish community designations for watercourses within the project area were provided in the *Fish Habitat Management Plan* which indicates that all water body features are managed as warmwater baitfish habitat (Veliz 2001). No flow regime designations were available from the ABCA, although general descriptions of flow are provided in the *Fish Habitat Management Plan* (Veliz 2001), which will be consulted when determining water bodies from non-water bodies.

Water quality within the associated water bodies is currently influenced by the existing agricultural land use with noted elevations in Total Phosphorus and *E.coli* (ABCA 2007). Benthic invertebrate communities within the watercourses also indicate moderately degraded water quality (ABCA 2007).

More information, specific to each of the drainage areas, is provided in the following sections.

4.2.1 Ptsebe Creek

Ptsebe Creek is part of the larger Ausable River watershed. Ptsebe Creek and its associated tributaries generally flow in a northerly direction draining into Parkhill Creek, northwest of the town of Parkhill. Parkhill Creek then flows westerly where it meets with the Ausable River. Ptsebe Creek originates from runoff and tile drainage outlets from the top of the Wyoming moraine. These features consolidate as they move downslope eventually forming larger and more defined intermittent and permanent water bodies as they approach Coldstream Road.

This records review has identified a total of 43 unnamed tributaries associated with Ptsebe Creek within the project area. For the purpose of this report unnamed watercourse features have been designated an alphabetical identifier (i.e. Tributary A). The tributaries associated with the Ptsebe Creek include those identified as B to Z, and AA to OO, SS, TT and WW. All of these features are designated as warmwater (Veliz 2001) with warmwater baitfish species (ABCA 2007), and are shown on Figures 1 through 3.

4.2.2 Ausable River

Tributaries associated directly with the Ausable River are located in the southern portion of the project area and flow south to the Ausable River. The Ausable River flows west then north where it ultimately drains into Lake Huron.

This records review has identified a total of 8 unnamed tributaries of the Ausable River within the project area. These tributaries have been identified as tributaries PP, QQ, RR, UU, VV,XX, YY and ZZ for the purpose of this report, and are shown on Figures 1

through 3. All features are designated as warmwater with warmwater baitfish species (ABCA 2007).

4.2.3 Big Swamp Drain

Big Swamp Drain is part of the larger Ausable River watershed. The drain is located in the eastern portion of the project area. It flows in a southerly direction from the Big Swamp Wetland, ultimately draining into the Ausable River.

This records review has identified a total of one potential water body, Big Swamp Drain itself, which is associated with the Big Swamp Drain drainage within the project area. Although the Galbraith Drain flows into this feature, it is discussed separately below in Section 4.2.4. Big Swamp Drain is shown in Figure 3, and is designated as warmwater with warmwater baitfish species (ABCA 2007).

4.2.4 Galbraith Drain

Galbraith Drain is part of the larger Ausable River watershed. The Galbraith Drain is located in the south-east corner of the project area. It flows in an easterly direction towards Big Swamp Drain, ultimately draining into the Ausable River.

This records review has identified a total of two watercourses associated with the Galbraith drainage area within the project area. These features include the Galbraith Drain itself as well as an unnamed tributary of the main drain. This tributary has been identified as tributary A for the purpose of this report, and both features are shown on Figures 1 through 3. All features are designated as warmwater with warmwater baitfish species (ABCA 2007).

4.3 Seepage Areas

NRSI biologists reviewed a variety of available background resources, including review of online resources, surficial geology mapping, elevation data, and digital aerial photography. No seepage areas were identified in the project area through the comprehensive records review of the Bornish Wind Energy Centre.

4.4 Species of Conservation Concern

Species of conservation concern include all species that have been designated as a species of Special Concern according to the provincial Species At Risk in Ontario (SARO) and/or the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC), have been given a provincial S-Rank of S1-S3, or have been designated by COSEWIC as Threatened or Endangered but have not been designated as either Endangered or Threatened within Ontario.

Records review findings have identified no species of conservation concern within or near the Bornish Wind Energy Centre project area.

5.0 Summary of Records Review

In accordance with the REA Regulation, NRSI has completed a comprehensive records review for the proposed Bornish Wind Energy Centre project area. The project area was examined to ensure all water body features in the vicinity of the proposed wind energy generating facility were considered. This records review included correspondence with provincial agency staff, and a review of available online and published resources. The results of this records review have been summarized in Table 2 below.

Table 2. Summary of Water Bodies Records Review of the Bornish Wind Energy Centre Project Area

Criteria	Associated Water Body Features
i. In a water body	<p>The records review has identified 33 water bodies, including 28 within the Ptsebe Creek drainage area, 1 in each in the Galbraith Drain and Big Swamp Drain drainage areas and 3 in the Ausable River drainage area to be overlapping the project location.</p> <p>These overlaps typically represent proposed crossing locations for access roads, transmission line or cabling. All of these water bodies represent potential permanent or intermittent watercourses. All of which are designated as warmwater fisheries containing warmwater baitfish species.</p> <p>Each of these potential water bodies will be examined in more detail during the site investigation phase of this project.</p>
ii. Within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity	None
iii. Within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity	None
iv. Within 120 m of the average annual high water mark of a permanent or intermittent stream	<p>The records review has identified 54 water bodies, including 43 within the Ptsebe Creek drainage area, 2 within the Galbraith Drain drainage area, 1 within the Big Swamp Drain drainage area and 8 within the Ausable River drainage area to be within 120m of the project location. All of these water bodies represent potential permanent or intermittent watercourses, and all are designated as warmwater fisheries containing warmwater baitfish species.</p>
iv. Within 120 m of a seepage area	None

6.0 References

Publications

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