

# Grand Bend Wind Farm

Natural Heritage Assessment, Part IV & V  
Environmental Impact Study Report  
and MNR Confirmation Letter

Grand Bend Wind Limited Partnership  
Northland Power Inc., as agent



**NORTHLAND  
POWER**

**NEEGAN BURNSIDE**

February 2013



**Grand Bend Wind Farm  
Natural Heritage Assessment Part IV & V  
Environmental Impact Study Report  
And MNR Confirmation Letter**

*Prepared By:*

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Grand Bend Wind Limited Partnership  
Northland Power Inc., as agent

February 2013

File No: PIA019991

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Natural Heritage Assessment Part IV  
Environmental Impact Study Report**

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## Record of Revisions

<b>Revision</b>	<b>Date</b>	<b>Description</b>
0	August 14, 2012	Initial Submission to the Ministry of Natural Resources (MNR), Municipalities and First Nations
1	November 30, 2012	Revised Submission to the MNR
2	January 2, 2013	Revised Submission to the MNR
3	January 25, 2013	Final to Submission MNR
3	February 15, 2013	Application for Renewable Energy Approval

## Executive Summary

The Grand Bend Wind Limited Partnership, with Northland Power Inc. (“Northland”) as agent, are proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the Environmental Protection Act. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm (“the Project”) is located in Huron County, spanning the lower-tier municipalities of Bluewater and Huron South. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County.

The basic project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, substation, a parts and storage (office/maintenance) building, a new transmission line within municipal road right-of ways (“ROWS”) along Sararas Road, Rodgerville Road, and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

Under O.Reg. 359/09, a Natural Heritage Assessment (“NHA”) is a required component of a REA Application for a Class 4 Wind Facility. The NHA is to be completed in four stages as follows:

- Stage 1: Records Review;
- Stage 2: Site Investigation;
- Stage 3: Evaluation of Significance; and,
- Stage 4: Environmental Impact Study.

This report presents the findings of the Stage 4, Environmental Impact Study (“EIS”).

Based on the results of the Evaluation of Significance, the features listed in the table below are present within 120 m of the Project Location and meet the criteria for provincial significance or are being treated as significant:

<b>Significant Natural Features Feature Type</b>	<b># of Features</b>	<b>Feature Identifiers</b>
<b>Significant Features</b>		
Provincially Significant Wetlands	2	WE-027, WE-029 (Hay Swamp Complex)
Wetlands Assumed Significant	23	<u>Wetland Complex A</u> WE-008, WE-009, WE-010, WE-011  <u>Wetland Complex B</u> WE-013, WE-014, WE-015, WE-016, WE-017, WE-020, WE-026  <u>Individual Wetlands</u> WE-001, WE-002, WE-012, WE-022, WE-030, WE-031, WE-032, WE-033, WE-034, WE-035, WE-037, WE-038,
Significant Woodlands	32	W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-042, W-053, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-103, W-104, W-118, W-120, W-123, W-127, W-128
Turtle Nesting Areas	1	TNA-002
Deer Yarding Areas	2	DYA-001 DYA-002
Amphibian Breeding Habitat (Woodland)	1	ABH-001
<b>Wildlife Habitat Treated as Significant and Requiring Habitat Use Study Prior to Construction</b>		
Bat Maternity Colonies	12	BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010, BMC-011, BMC-012
Turtle Wintering Areas	1	TWA-003
Habitat for Special Concern and Rare Species	17	SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013, SCC-014, SCC-015, SCC-016, SCC-017
<b>Generalized Candidate Significant Wildlife Habitat</b>		
Generalized Candidate Significant Wildlife Habitat	N/A	GCSWH-WSSA, GCSWH-BMC, GCSWH-TWA, GCSWH-WNA, GCSWH-WRN, GCSWH-TNA, GCSWH-SS, GCSWH-ABH, GCSWH-ABH(WE), GCSWH-WASBB, GCSWH-SESBB, GCSWH-SCC

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The EIS identifies all potential negative environmental effects on the significant natural features as a result of the Project activities.

A number of criteria for each potential negative environmental effect were considered to understand the extent of the effect and to develop appropriate mitigation and monitoring strategies. Key considerations included:

- the magnitude of the effect both in intensity and spatial scale;
- the proximity of the effect in relation to the Project;
- the likelihood of occurrence and reoccurrence of the effect;
- the timing and duration of the effect;
- the permanence or irreversibility of the effect; and,
- the potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.

Mitigation measures were developed to address all potential impacts. Wherever possible, construction, operation and decommissioning scheduling and procedures were developed to avoid occurrence of a potential effect. In cases where avoidance was not possible, an appropriate mitigation strategy was developed to minimize the magnitude, likelihood, duration and permanence of the potential effect. Mitigation strategies were typically developed according to the following approach:

- design project siting to avoid occurrence of the effect;
- develop construction, operation and decommissioning scheduling and procedures to mitigate the effect; and,
- develop rehabilitation measures to restore affected features.

Performance objectives were then developed to provide a benchmark against which to evaluate the success of mitigation strategies. In general, performance objectives are to:

- minimize environmental effects during all phases of the project;
- reduce or eliminate the environmental effects on natural habitats, flora, and fauna;
- avoid accidents and malfunctions;
- avoid levies or sanctions from the corresponding authorities for negligent environmental performance; and,
- comply with all environmental quality standards set by law.

Some mitigation strategies will require environmental monitoring to ensure proper implementation and confirmation that the effect is adequately mitigated. In some cases where the likelihood of a significant negative environmental effect is low, a monitoring

approach has been proposed in lieu of a mitigation strategy. To prepare for an event where environmental monitoring may reveal a negative environmental effect, contingency measures have been developed to achieve the following:

- rehabilitate or correct a negative environmental effect;
- notify the applicable agencies if required; and,
- develop alternative mitigation strategies that could prevent the same negative environmental effect from occurring again.

With the mitigation, performance objectives, monitoring and contingency measures described in this report, it is anticipated that the project will not cause negative environmental effects. Should any unexpected effects occur, they will be identified through ongoing monitoring processes and actions will be undertaken to correct them. As such, the Grand Bend Wind Farm meets all provincial policies and regulations with respect to natural features.



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## Glossary of Terms

<b>ABH</b>	<b>Amphibian Breeding Habitat</b>
<b>BMC</b>	<b>Bat Maternity Colony</b>
<b>CSWH</b>	<b>Candidate Significant Wildlife Habitat</b>
<b>DYA</b>	<b>Deer Yarding Area</b>
<b>EIS</b>	<b>Environmental Impact Study</b>
<b>ELC</b>	<b>Ecological Land Classification</b>
<b>EOS</b>	<b>Evaluation of Significance</b>
<b>GCSWH</b>	<b>Generalized Candidate Significant Wildlife Habitat</b>
<b>MNR</b>	<b>Ministry of Natural Resources</b>
<b>NHA</b>	<b>Natural Heritage Assessment</b>
<b>OWES</b>	<b>Ontario Wetland Evaluation System</b>
<b>PSW</b>	<b>Provincially Significant Wetland</b>
<b>SCC</b>	<b>Species of Conservation Concern</b>
<b>SS</b>	<b>Seeps and Springs</b>
<b>SWH</b>	<b>Significant Wildlife Habitat</b>
<b>TNA</b>	<b>Turtle Nesting Habitat</b>
<b>TWA</b>	<b>Turtle Wintering Area</b>

## 1.0 Introduction

The Grand Bend Wind Limited Partnership, with Northland Power Inc. (“Northland”) as agent, are proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the Environmental Protection Act. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm (“the Project”) is located in Huron County, spanning the lower-tier municipalities of Bluewater and Huron South. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County. The project location and study area is provided in **Appendix A, Figure 1**.

The basic project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, substation, a parts and storage (office/maintenance) building, a new transmission line within municipal road right-of ways (“ROWS”) along Sararas Road, Rodgerville Road, and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

Under O.Reg. 359/09, a Natural Heritage Assessment (“NHA”) is a required component of a REA Application for a Class 4 Wind Facility. The NHA is to be completed in four stages as follows:

- Stage 1: Records Review;
- Stage 2: Site Investigation;
- Stage 3: Evaluation of Significance; and,
- Stage 4: Environmental Impact Study.

This report presents the findings of the Stage 4, Environmental Impact Study (“EIS”) and builds upon the previous Records Review, Site Investigation and Evaluation of Significance (“EOS”). Part V, Section 38 of the REA Regulation requires that an EIS conducted as part of REA be prepared in accordance with the procedures established by MNR. An EIS must assess the construction, installation, use, operation, changing and retiring of the renewable energy facility.

The purpose of the EIS is to:

- Identify and address any potential negative environmental effects that the project may cause to significant or provincially significant natural features, Provincial Parks and Conservation Reserves within 120 m of the Project Location.

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Specifically, the EIS must identify:

- potential negative effects resulting from the project;
- mitigation measures to be used to minimize environmental effects;
- an Environmental Effects Monitoring Plan (“EEMP”), including:
  - performance objectives;
  - mitigation measures planned to achieve performance objectives;
  - monitoring to ensure that mitigation strategies are meeting objectives; and,
  - contingency plans should mitigation measures fail to meet objectives.
- describe how the Construction Plan Report addresses any negative environmental effects.

Additional post-construction monitoring measures are provided in the Environmental Effects Monitoring Plan for Birds and Bats (Neegan Burnside, August 2012). Mitigation measures and the EEMP provided herein are consistent with information provided in the Construction Plan Report and Design and Operations Report.

## 1.1 Project Location

The proposed Project is located in Huron County, spanning the lower-tier municipalities of Bluewater and South Huron as well as a portion of Huron East and the municipality of West Perth in Perth County. The Project Study Area, shown in **Appendix A, Figure 1** is bounded by:

- The Bluewater Highway (Highway 21) to the west;
- Main Street East/Grand Bend Line to the south;
- Blackbush and Shipka Lines with a small section of the study area in the central section of the project extending to Bronson Line and to the east; and,
- Staffa Road to the north; and,
- including two potential transmission line routes, as described below.

Two transmission line routing options were originally studied, a northern route and a southern route, as described in the Records Review Report (Neegan Burnside, June, 2012). The northern route was identified as having fewer natural features as well as social, aesthetic and technical constraints as was thus selected as the preferred route. This route runs from a transformer sub-station on Lot 14, Concession 13, former Hay Township, and follows Sararas/Rodgerville Road to Road 183, connecting to the existing 230 kV Hydro One transmission line just south of the Seaforth Transformer Station (“TS”). The southern route was discarded as an option and was not studied any further.

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O.Reg. 359/09 defines the Project Location as:

*“a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person in engaging in or proposes to engage in the project.”*

For the purposes of this Project, the Project Location includes the footprint of the facility components, plus any temporary work and storage locations. The boundary of the Project Location is used for defining setback and site investigation distances according to O.Reg. 359/09. The buildable area, which includes the footprint of the facility components, plus any temporary work and storage locations, will be staked on private lands. All construction and installation activities will be conducted within these designated areas; this includes construction vehicles and personnel. Similarly, all installation activities related to transmission lines within the municipal road allowance will be contained within the boundaries of the road allowance.

## 2.0 Findings of the Evaluation of Significance

Based on the results of the EOS, the features listed in **Table 2.1** and shown on **Figure 2** in **Appendix A** are present within 120 m of the Project Location and meet the criteria for provincial significance or are being treated as significant.

On November 2, 2012, O.Reg. 359/09 was amended. Under this amendment, valleylands are no longer considered to be a natural feature that must be assessed as part of the Natural Heritage Assessment. As such, this report does not provide a discussion of potential impacts and mitigation for the valleyland feature previously identified. However, this feature is subject to permitting under the *Conservation Authorities Act*. All necessary permitting associated with this feature will be obtained from the Ausable Bayfield Conservation Authority prior to construction.

**Table 2.1 Significant Natural Features**

Feature Type	# of Features	Feature Identifiers
<b>Significant Features</b>		
Provincially Significant Wetlands	2	WE-027, WE-029 (Hay Swamp Complex)
Wetlands Assumed Significant	23	<u>Wetland Complex A</u> WE-008, WE-009, WE-010, WE-011  <u>Wetland Complex B</u> WE-013, WE-014, WE-015, WE-016, WE-017, WE-020, WE-026  <u>Individual Wetlands</u> WE-001, WE-002, WE-012, WE-022, WE-030, WE-031, WE-032, WE-033, WE-034, WE-035, WE-037, WE-038,
Significant Woodlands	32	W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-042, W-053, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-103, W-104, W-118, W-120, W-123, W-127, W-128
Turtle Nesting Areas	1	TNA-002
Deer Yarding Areas	2	DYA-001 DYA-002
Amphibian Breeding Habitat (Woodland)	1	ABH-001
<b>Wildlife Habitat Treated as Significant and Requiring Habitat Use Study Prior to Construction</b>		
Bat Maternity Colonies	12	BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010, BMC-011, BMC-012,
Turtle Wintering Areas	1	TWA-003

Feature Type	# of Features	Feature Identifiers
Habitat for Special Concern and Rare Species	17	SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013, SCC-014, SCC-015, SCC-016, SCC-017
<b>Generalized Candidate Significant Wildlife Habitat</b>		
Generalized Candidate Significant Wildlife Habitat	N/A	GCSWH-WSSA, GCSWH-BMC, GCSWH-TWA, GCSWH-WNA, GCSWH-WRN, GCSWH-TNA, GCSWH-SS, GCSWH-ABH, GCSWH-ABH(WE), GCSWH-WASBB, GCSWH-SESBB, GCSWH-SCC

### 3.0 Environmental Impact Study and EEMP Framework

#### 3.1 Potential Negative Environmental Effects

The EIS identifies all potential negative environmental effects on the significant natural features listed in **Table 2.1** as a result of the Project activities listed in **Table 4.1**.

A number of criteria for each potential negative environmental effect were considered to understand the extent of the effect and to develop appropriate mitigation and monitoring strategies. Key considerations included:

- the magnitude of the effect both in intensity and spatial scale;
- the proximity of the effect in relation to the Project;
- the likelihood of occurrence and reoccurrence of the effect;
- the timing and duration of the effect;
- the permanence or irreversibility of the effect; and,
- the potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.

#### 3.2 Mitigation Strategies

The primary mitigation measure employed to reduce impacts to natural features and functions was avoidance. Micro-siting of Project components has been undertaken with consideration of potential impacts to natural features, wildlife and wildlife habitat. The Project is sited predominately within actively cultivated agricultural land with no encroachment into any significant natural features.



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Wherever possible, construction, operation and decommissioning scheduling and procedures were developed to avoid occurrence of a potential effect. In cases where avoidance was not possible, an appropriate mitigation strategy was developed to minimize the magnitude, likelihood, duration and permanence of the potential effect. Mitigation strategies were typically developed according to the following approach:

- design project siting to avoid occurrence of the effect;
- develop construction, operation and decommissioning scheduling and procedures to mitigate the effect; and,
- develop rehabilitation measures to restore affected features.

Project siting measures were described in the EOS. This report focuses primarily on scheduling and other mitigation and rehabilitation measures. Mitigation will be enacted through a variety of mechanisms, including:

1. Contract Documents. Northland is committed to operating the Project in an environmentally responsible manner and in compliance with all applicable environmental laws, regulations, and guidelines. All of Northland's contractors and subcontractors will be accountable for actions that have an adverse effect on the environment. As such, any contract documents executed by Northland will incorporate appropriate provisions from the REA documents. Additionally, all contractors, subcontractors, and other associates of the Project will follow the guiding principles of the monitoring program. These organizations will also comply with all relevant municipal, provincial, and federal legislation.
2. Management Structures. Northland, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor, will take steps to ensure that they have appropriately skilled personnel to carry out the environmental responsibilities as defined in this Report. All organizations associated with Project development activities will develop responsive reporting systems that clearly assign responsibility and accountability for development actions. As appropriate, Northland will review these reporting documents.
3. Change Management. During the implementation of the Project, change may be required to address unforeseen or unexpected conditions or situations. Northland Power, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor will be responsible for ensuring environmental and safety issues are addressed. Northland Power will affect any significant changes to Project programs, procedures, and plans throughout the life of the Project.
4. Environmental Procedures. Northland, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor will be responsible for

implementing all approved environmental procedures during all phases of the Project. Individual personnel responsibilities will be assigned as necessary to support the full and effective implementation of the environmental procedures. Environmental procedures will address the following issues to prevent environmental contamination:

- Spills and releases: to identify the specific procedures for the prevention, response, and notification of spills. In addition it should establish the general procedures for spill clean-up, personnel training, and material handling and storage to prevent spills.
- Hazardous waste management: to outline the procedures for the proper identification of hazardous waste and its proper storage, handling, transport, and disposal. In addition, the procedures should outline specific requirements for personnel training, emergency response, product review and approval, and record keeping.
- Solid waste management: to establish alternative procedures for the management and disposal of used lubricants, used drums, and general office waste.

These procedures will ensure internal and external risks are fully evaluated and the information communicated to personnel in advance of any accident or malfunction.

5. Operation and Maintenance Training Program. As appropriate Northland and/or the Operation and Maintenance Contractor should develop an operations training program to ensure personnel receive appropriate training in relation to operation and maintenance programs, environmental procedures, and the emergency preparedness and response plan. With respect to the environment and natural features, training may cover the following issues:

- Environmental Protection, including:
  - Important/sensitive environmental features and areas;
  - Incidence reporting (spills, wildlife incidents); and,
  - Materials disposal.
- Facility Safety, including:
  - Accident reporting; and,
  - Chemical and hazardous materials handling.
- Emergency Preparedness, including:
  - Fire preparedness and response;
  - Natural disasters (i.e., extreme weather events); and,
  - Hazardous materials and spill response.

Training should begin as the initial staff complement is hired during the pre-operational mobilization period. There should also be on-going training for personnel as well as specific training sessions for new hires.

### **3.3 Performance Objectives**

Performance objectives were developed to provide a benchmark against which to evaluate the success of mitigation strategies. In general, performance objectives are to:

- minimize environmental effects during all phases of the project;
- reduce or eliminate the environmental effects on natural habitats, flora, and fauna;
- avoid accidents and malfunctions;
- avoid levies or sanctions from the corresponding authorities for negligent environmental performance; and,
- comply with all environmental quality standards set by law.

Performance objectives specific to significant natural features and project activities are listed in Tables 5.25.4 and 7.1 of this report.

### **3.4 Environmental Monitoring and Contingency Plans**

Some mitigation strategies will require environmental monitoring to ensure proper implementation and confirmation that the effect is adequately mitigated. In some cases where the likelihood of a significant negative environmental effect is low, a monitoring approach has been proposed in lieu of a mitigation strategy. To prepare for an event where environmental monitoring may reveal a negative environmental effect, contingency measures have been developed to achieve the following:

- rehabilitate or correct a negative environmental effect;
- notify the applicable agencies if required; and,
- develop alternative mitigation strategies that could prevent the same negative environmental effect from occurring again.

Reporting is an important component of the monitoring program. Specific internal audits (e.g., management team and/or process team), and external audits against the plans, safety and environmental procedures, and other policies and procedures are all part of establishing performance standards necessary to minimize risks on a continuing basis. As appropriate, a formal audit program for the Project with regard to environmental programs should be performed annually.

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In certain instances (e.g., post-construction monitoring for birds and bats), annual monitoring reports are a condition of the Project approval and must be provided to agencies for review. Northland will be responsible for ensuring that all reporting requirements are met.

## 4.0 Description of Project Components and Activities

### 4.1 Construction

Construction activities for the Project generally involve:

- pre-construction works for investigation, design, and layout of Project components;
- site works to prepare the lands and facilitate access for construction;
- civil and mechanical works for the roads and turbines;
- electrical works for electricity generation and transmission; and,
- restoration works to reinstate temporary construction areas to predevelopment conditions.

Construction work areas are presented on **Figures 2a-s and 3a-s, Appendix A**. An area approximately 113 m x 113 m around each turbine has been delineated for turbine construction activities, including truck delivery and turn-around, crane operation and materials storage. Access roads will vary from 5 m to 11 m wide and will be contained, along with all construction works, within a 12 m wide construction corridor. Top soil which will be permanently removed will be spread, as directed by each participating landowner, on agricultural fields. Where the road widens to 11 m to allow the crane to crawl between turbines, construction measures will be used such that the construction corridor will remain no wider than 12 m (e.g., topsoil will be placed in an alternative location rather than being stockpiled directly adjacent to the road). If additional stockpile areas are required, they will be located on agricultural lands as directed by each individual farmer and at least 30m from any significant natural feature.

Underground collector lines on private lands will be installed beneath the access roads, except where shown as a separate line in **Figures 2a-s and 3a-s, Appendix A**. On public lands, collector lines will be installed within the disturbed portion of the municipal road right of way.

The 230 kV transmission line will be designed in further detail as the project progresses. Several options are being considered, including:

- installing the full length of the line below ground;
- constructing the full length of the line overhead on utility poles; or,
- utilizing a combination of overhead line with below ground portions to avoid direct impacts to significant natural features (i.e., wetlands) as well as other sensitive features (e.g., residences, airstrip and graveyards).

The final design will depend on a number of technical, financial and environmental considerations. For the purposes of this EIS, it is assumed that the full underground

option will be selected. If, upon further study, it is found that an overhead line is preferred, an addendum to this report will be issued.

With the below ground transmission line option, cables will be installed in the disturbed municipal road ROW with an open-cut trench. Minimal vegetation at the gravel shoulder/grass interface may be directly impacted. However, it is not anticipated that any associated trenching work will encroach into significant natural features. Activities that may encroach to the ditch line include directional drilling operations (i.e., at watercourse, road, or utility crossings), open-cut trenching around road structures (i.e., culverts/bridges), and road bends that require additional space to accommodate cable bending requirements.

Further detail on potential negative environmental effects and mitigation measures are described in **Tables 5.2, 5.4 and 7.1**.

The minimum distance between natural features and project components listed in **Tables 5.3 and 7.1**, represent the distance between features and work zone boundaries rather than just the component footprint. In the case of the 230 kV transmission line, distances listed assume that the line will be installed underground in the gravel road shoulder. If a different option is selected, distances may vary slightly and will be outlined in an addendum, as required.

Further details of these works are described in the Construction Plan Report, and are summarized in **Table 4.1** below.

## **4.2 Operation/Maintenance**

Operations and maintenance activities for the Project generally involve:

- wind turbine operation and monitoring;
- transmission line maintenance;
- planned/scheduled maintenance of Project components;
- unscheduled maintenance of Project components;
- waste management;
- sewage management; and,
- water taking.

Further details of these works are described in the Design and Operations Report, and are summarized in **Table 4.1** below.

### 4.3 Decommissioning

Decommissioning activities for the Project generally involve:

- reinstating construction access roads to remove Project components;
- turbine disassembly and disposal;
- transmission line removal;
- removal and disposal of all other Project components; and,
- site restoration.

Further details of these works are described in the Decommissioning Plan Report, and are summarized in **Table 4.1** below.

### 4.4 Summary of Project Activities

Activities associated with project construction, operation, maintenance and decommissioning are summarized in **Table 4.1**.

**Table 4.1 Summary of Construction, Operation/Maintenance and Decommissioning Activities**

Phase	Activity	Description of Activity
Construction	Site Preparation	<ul style="list-style-type: none"> <li>• Site survey including installing survey stakes for layout of Project components;</li> <li>• Geotechnical investigation including borehole and test pit sampling of subsurface soils;</li> <li>• Installation of Erosion and Sediment Control measures;</li> <li>• Installation of construction site safety measures; and,</li> <li>• Clearing and grubbing of lands required for construction.</li> </ul>
	Tile Drain Modifications	<ul style="list-style-type: none"> <li>• Installation of new headers and modifications to existing tile drains.</li> </ul>
	Local Road Improvements	<ul style="list-style-type: none"> <li>• Temporary culvert extensions at intersections; and,</li> <li>• Placement, grading, and compacting of additional aggregate at intersections.</li> </ul>
	Access Roads	<ul style="list-style-type: none"> <li>• Stripping and stockpiling of topsoil and subsoil separately;</li> <li>• Rough-grading;</li> <li>• Trench excavation and installation of 36 kV collector line and fiber optic cable;</li> <li>• Backfilling and compacting trench;</li> <li>• Installation of geotextile if required to reinforce subsoil; and,</li> <li>• Placing, fine-grading and compacting granular sub-base and base materials.</li> </ul>
	Watercourse Crossings	<ul style="list-style-type: none"> <li>• Culvert installations;</li> <li>• High-Pressure Directional Drilling;</li> <li>• Punch and Bore; and,</li> <li>• Overhead Line Construction.</li> </ul>
	Turbine	<ul style="list-style-type: none"> <li>• Stripping and stockpiling of topsoil and subsoil separately;</li> </ul>

Phase	Activity	Description of Activity
	Assembly	<ul style="list-style-type: none"> <li>• Foundation excavation;</li> <li>• Ground wiring, formwork, and rebar assembly;</li> <li>• Concrete pouring;</li> <li>• Tower erection;</li> <li>• Nacelle installation; and,</li> <li>• Rotor assembly and installation.</li> </ul>
	36 kV Collection System	<ul style="list-style-type: none"> <li>• For work within private land, refer to access road construction; and,</li> <li>• For work within public Right-of-Way, the 36 kV collector line will be installed underground in the gravel shoulder.</li> </ul>
	230 kV Transmission Line	<ul style="list-style-type: none"> <li>• Installation of the 230 kV buried cable.</li> </ul>
	Communication Lines	<ul style="list-style-type: none"> <li>• Installation of fiber optic communication lines in conjunction with 36 kV collection system and 230 kV transmission line.</li> </ul>
	Transformer Sub-station and Switchyard	<ul style="list-style-type: none"> <li>• Stripping and stockpiling of topsoil and subsoil separately;</li> <li>• Electrical connections and ground wiring;</li> <li>• Placement, fine-grading, and compacting of aggregate foundation;</li> <li>• Installation of electrical equipment; and,</li> <li>• Installation of safety features.</li> </ul>
	Parts and Storage Building	<ul style="list-style-type: none"> <li>• Stripping and stockpiling of topsoil and subsoil separately;</li> <li>• Placement, fine-grading, and compacting of aggregate building pad;</li> <li>• Construction of reinforced concrete foundation;</li> <li>• Erection of framing, siding, and roofing; and,</li> <li>• Construction of well and septic system.</li> </ul>
	Site Restoration	<ul style="list-style-type: none"> <li>• All private and public lands temporarily used for construction will be restored to pre-development conditions (restoration of local roads, vegetation, agricultural land, etc.).</li> </ul>
Operation	Wind Turbine Operation	<ul style="list-style-type: none"> <li>• Full-time monitoring of wind turbine operation based out of Parts and Storage building.</li> </ul>
	Planned / Scheduled Maintenance	<ul style="list-style-type: none"> <li>• Bi-annual inspections and maintenance of Project components, including transmission line.</li> </ul>
	Unscheduled Maintenance	<ul style="list-style-type: none"> <li>• Unscheduled maintenance of Project components.</li> </ul>
	Waste Management	<ul style="list-style-type: none"> <li>• Proper storage, transportation, application and disposal of oil and grease.</li> </ul>
	Sewage Management	<ul style="list-style-type: none"> <li>• Maintenance of Parts and Storage Building septic system.</li> </ul>
	Water Taking	<ul style="list-style-type: none"> <li>• Maintenance of Parts and Storage Building well and potential treatment and storage systems.</li> </ul>
Decommissioning	Reinstatement of Construction Access Roads	<ul style="list-style-type: none"> <li>• Widening of site entrances and access road turns to transport Project components off-site. Refer to Access Roads during the Construction phase for procedure.</li> </ul>
	Turbine Disassembly	<ul style="list-style-type: none"> <li>• Reverse engineering of turbines with use of a crane; and,</li> <li>• Transportation of turbine equipment off-site for re-use,</li> </ul>



Phase	Activity	Description of Activity
		salvage, or disposal.
	Removal of Electrical Equipment (i.e. Switchyard, Transformer Sub-station, Turbine step-up transformers)	<ul style="list-style-type: none"> <li>• Electrical decommissioning / de-energizing;</li> <li>• Proper removal and disposal of oil from transformers; and,</li> <li>• Transportation of electrical equipment off-site for re-use, salvage, or disposal.</li> </ul>
	Removal of Access Roads	<ul style="list-style-type: none"> <li>• Removal of granular access roads off-site;</li> <li>• Replacement with topsoil as applicable.</li> </ul>
	Removal of Foundations	<ul style="list-style-type: none"> <li>• Breaking-up concrete turbine foundations to an appropriate depth, and disposal off-site.</li> </ul>
	36 kV Collection System	<ul style="list-style-type: none"> <li>• If requested by the owner of the lands, leave in place, or,</li> <li>• Removal of underground cable and disposal off-site for re-use, salvage, or disposal; and,</li> <li>• Replacement of affected areas with topsoil as applicable.</li> </ul>
	230 kV Transmission Line	<ul style="list-style-type: none"> <li>• If requested by the landowner, leave in place, or,</li> <li>• Removal of transmission line and utility poles for re-use, salvage, or disposal off-site; and,</li> <li>• Re-vegetation as applicable.</li> </ul>
	Site Restoration	<ul style="list-style-type: none"> <li>• Removal and disposal of all waste from site; and,</li> <li>• Restoration of Project area to pre-development conditions (i.e. topsoil and vegetation replacement as applicable).</li> </ul>

## 5.0 Identification of Potential Negative Environmental Effects and Mitigation Measures

This section of the EIS is organized according to the type of features present, including features identified as:

- Generalized Significant Wildlife Habitat; and,
- Significant Natural Features.

Significant Natural Features include wetlands treated as significant and, other features treated as significant and requiring a habitat use study to confirm significance prior to construction.

For Generalized Significant Wildlife Habitat a number of standard construction mitigation measures are identified. These measures will also be applied to all other significant natural features; however, rather than reiterating them for each feature, reference is simply made back to Section 5.1. Mitigation for other types of features includes all standard measures as well as the additional measures described in each respective section.

For each type of feature, potential environmental effects, mitigation, performance objectives, monitoring and contingency measures are identified.

Potential effects and mitigation for watercourses are described in the [Water Assessment and Water Body Report](#) under a separate cover.

### 5.1 Generalized Significant Wildlife Habitat

The types of habitats identified as Generalized Significant Wildlife Habitat (“GCSWH”) are present in **Table 5.1**. These types of habitats are identified as generalized because their location relative to various project components means that negative effects are predictable, short-term in duration and can be mitigated using standard construction mitigation. The location of these features is shown on **Figures 2a-h** in **Appendix A**.

**Table 5.1 Generalized Significant Wildlife Habitat within 120 m of the Project Location**

ID	Habitat Type
GCSWH-WSSA	Waterfowl Stopover and Staging Areas (Aquatic)
GCSWH-BMC	Bat Maternity Colonies
GCSWH-TWA	Turtle Wintering Areas
GCSWH-WNA	Waterfowl Nesting Areas
GCSWH-WRN	Woodland Raptor Nesting
GCSWH-TNA	Turtle Nesting Areas

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ID	Habitat Type
GCSWH-SS	Seeps and Springs
GCSWH-ABH	Amphibian Breeding Habitat (Woodland)
GCSWH-ABH(WE)	Amphibian Breeding Habitat (Wetland)
GCSWH-WASBB	Woodland Area-sensitive Bird Breeding Habitat
GCSWH-SESBB	Shrub/Early Successional Bird Breeding Habitat
GCSWH-SCC	Habitat for Species of Conservation Concern

No work will occur within these features; however some construction activities may occur adjacent to these features. Potential effects on these features include:

- accidental encroachment into features;
- mortality of wildlife inadvertently moving through construction zones;
- introduction of invasive species into the environment;
- sediment and erosion impacts associated with:
  - open cuts/trenching for installation of the turbines, access roads, underground collector lines, parts storage building, transformer sub-station and utility poles;
  - directional drilling and/or punch and bore installation of select portions of the underground collector lines and transmission line;
- effects on seepage areas due to dewatering for construction of the turbine foundations;
- spills from equipment fueling or oiling/greasing of project components;
- impacts of noise on wildlife; and,
- dust effects.

General mitigation measures, performance objectives, monitoring and contingency plans are summarized in **Table 5.2**. A detailed description of each project activity is provided in **Table 4.1**.

**Table 5.2 General Construction and Decommissioning Effects, Mitigation, Performance Objectives, Monitoring and Contingency Plans**

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
<p>Installation and removal of 36kV collector lines, 230 kV transmission line, communication lines</p>	<ul style="list-style-type: none"> <li>Sediment and erosion impacts associated with open cut trenching and directional drilling/punch and bore activities (I).</li> </ul>	<ul style="list-style-type: none"> <li>All work zones should be clearly marked to indicate that no work should occur outside the work zone.</li> <li>To ensure that work zones are not within significant natural features, the boundaries of significant natural features are to be delineated in the field by a qualified environmental technician based on the following definitions:                             <ul style="list-style-type: none"> <li>Wetlands: OWES methodology (50% wetland vegetation rule);</li> <li>Woodlands: Edge of the drip line; and,</li> <li>SWH: As per criteria detailed in the EOS report.</li> </ul> </li> <li>Implementation of the erosion and sediment control measures will conform to industry best management practices and recognized standard specifications such as Ontario Provincial Standards Specifications (OPSS).</li> <li>Sediment and erosion control measures will be implemented prior to construction and maintained during the construction phase in accordance with the erosion and sediment control plan developed during detailed design.</li> <li>All sediment and erosion control measures will be inspected prior to construction and maintained during the construction phase to prevent entry of sediment into natural features.</li> <li>If the sediment and erosion control measures are not functioning properly, no further work in the affected areas will occur until the sediment and/or erosion problem is addressed.</li> <li>All disturbed areas of the construction site will be stabilized and re-vegetated as soon as conditions allow.</li> <li>Sediment and erosion control measures will be left in place until all areas of the construction site have been stabilized.</li> <li>Trenching along straight sections will be within the disturbed portion of the municipal road ROW.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No erosion and sediment impacts on natural features including wildlife habitats.</li> </ul>	<ul style="list-style-type: none"> <li>A plan for addressing impacts associated with “frac-out” during directional drilling will be prepared in accordance with the Operational Statement.</li> <li>Erosion and sediment control measures will be regularly inspected to ensure they are functioning and are maintained as required.</li> <li>If erosion and sediment control measures are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.</li> </ul>

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"> <li>Directional drilling and/or punch and bore options will be undertaken in accordance with the Department of Fisheries and Oceans' Operational Statement.</li> <li>Horizontal directional drilling and/or punch and bore operations will be designed with launching and receiving pits that will minimize tree loss and disturbance of natural vegetation wherever possible.</li> <li>Launch and receiving pits will be designed by the drilling contractor in accordance with the operational statement, and will not extend beyond the disturbed portion of the municipal road ROW. To the extent possible, pits will be located at least 30m from significant natural features as delineated by a qualified Environmental Inspector. In some instances, pits may need to be less than 30m (but no less than 5m) from a natural feature. This will be determined during detailed design and will be documented in the sediment and erosion control plan.</li> </ul>			
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Accidental encroachment of equipment, stockpiles etc. into natural areas (I).</li> </ul>	<ul style="list-style-type: none"> <li>All work zones (as detailed in Figures 2,3 and 4a-s in Appendix A) should be clearly marked to indicate that no work should occur outside the work zone.</li> <li>Silt fencing will be installed in accordance with an erosion and sediment control plan which will be prepared during detailed design to further protect significant natural features adjacent to work areas.</li> <li>To ensure that work zones are not within significant natural features, the boundaries of significant natural features are to be delineated in the field by a qualified environmental technician based on the following definitions:                         <ul style="list-style-type: none"> <li>Wetlands: OWES methodology (50% wetland vegetation rule);</li> <li>Woodlands: Edge of the drip line; and,</li> <li>SWH: As per criteria detailed in the EOS report.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No disturbance to natural areas.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented and all silt fencing is maintained and functioning properly. If they are not functional, they should be repaired immediately.</li> <li>If accidental encroachment occurs the offending material or equipment will be immediately removed and restoration of the area conducted as needed.</li> </ul>

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Potential soil compaction (D).</li> </ul>	<ul style="list-style-type: none"> <li>Heavy equipment and material stockpiles will be limited to marked construction areas.</li> <li>To ensure that work zones are not within significant natural features, the boundaries of significant natural features are to be delineated in the field by a qualified environmental technician based on the following definitions:                             <ul style="list-style-type: none"> <li>Wetlands: OWES methodology (50% wetland vegetation rule);</li> <li>Woodlands: Edge of the drip line; and,</li> <li>SWH: As per criteria detailed in the EOS report.</li> </ul> </li> <li>Temporary construction staging areas and construction roads which have been compacted will be rehabilitated upon completion of construction.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize the geographical extent of soil compaction to the extent possible.</li> <li>Rehabilitate any compacted soils within temporary construction areas.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will perform regular inspection to ensure that equipment and stockpiles do not extend beyond construction areas.</li> <li>Northland and the contractor will work with participating landowners to ensure that soils in construction areas are rehabilitated to restore agricultural uses..</li> </ul>
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Mortality of wildlife inadvertently moving through construction zones (I).</li> </ul>	<ul style="list-style-type: none"> <li>Silt fencing will be properly installed and maintained in accordance with the erosion and sediment control plan to keep wildlife out of work areas.</li> <li>Speed limit signage will be posted along construction travel routes to ensure that construction vehicles respect appropriate speeds.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No wildlife mortality.</li> </ul>	<ul style="list-style-type: none"> <li>An environmental inspector will regularly monitor fenced areas to ensure that fencing is properly keyed/toed in to the ground to ensure that wildlife cannot gain access under fenced area.</li> <li>If wildlife inadvertently moves into a construction area, the Environmental Inspector will move the species outside of the work area, if possible, using gloves and a bucket or plastic tub, as appropriate.</li> <li>If any species at risk are encountered that are not identified on relevant permits, all work will cease within the immediate work area and the Ministry of Natural Resources will be contacted.</li> </ul>
Site Restoration	<ul style="list-style-type: none"> <li>Introduction of invasive species into natural areas (I).</li> </ul>	<ul style="list-style-type: none"> <li>All disturbed areas of the construction site will be re-vegetated as soon as conditions allow.</li> <li>Where re-vegetation is required in the municipal road allowance, as a result of transmission line installation, standard roadside seed mixes, which do not contain invasive species, will be used.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No introduction of invasive species.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented.</li> <li>If extensive invasion of non-native species is identified as a result of the Project, contingency measures may include an applicable herbicide application. An herbicide application plan will be developed as required.</li> </ul>
Turbine assembly	<ul style="list-style-type: none"> <li>Effects on groundwater levels/seepage areas and wetlands due to dewatering for construction of turbine foundations (I).</li> </ul>	<ul style="list-style-type: none"> <li>Any discharge from dewatering will be outlet to a vegetated or agricultural area at least 30m from a significant natural feature or watercourse utilizing a sediment filter bag.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No effect on groundwater levels.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector should be on-site during any dewatering within 120m of natural features. The Monitor should ensure that the filter bag is working appropriately and ensure that no sediment is entering significant natural features or watercourse.</li> <li>In the event of sediment discharge, all operations should stop immediately until the problem can be</li> </ul>

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
					resolved. <ul style="list-style-type: none"> <li>If significant changes in water levels/seepage areas are noted, operations should cease until water levels recover.</li> </ul>
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Spills from equipment fueling, oiling, greasing of project components (I).</li> </ul>	<ul style="list-style-type: none"> <li>All materials and equipment used for the purpose of site preparation and project construction shall be operated and stored in a manner that prevents any deleterious substances (petroleum products, silt, etc.) from entering natural features.</li> <li>Any stockpiled materials will be stored away from the feature.</li> <li>Refueling and maintenance of construction equipment should occur a minimum of 30 m from a natural feature.</li> <li>Hazardous material transportation and application will occur in designated areas according to operational procedures. Proper spill containment equipment will be used and maintained on site.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize potential for indirect effects from accidental spills.</li> </ul>	<ul style="list-style-type: none"> <li>As appropriate, spills will be reported to the MOE Spills Action Centre.</li> </ul>
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Impacts of construction noise on wildlife (I).</li> </ul>	<ul style="list-style-type: none"> <li>Environmental noise will be reduced through the standard operating practices. A traffic plan will be developed and implemented by the Construction Contractor.</li> <li>Work within 120 m of Amphibian Breeding Habitats (GCSWH-ABH &amp; GCSWH-ABH(WE)) will not occur after dusk during the breeding season (April, May and June).</li> <li>Work within 120m of bird habitats (GCSWH-WRN, GCSWH-WASBB, GCSWH-WNA, GCSWH-WSSA, GCSWH-SESBB, GCSWH-SCC) will not occur in the early morning hours (between dawn and 1.5 hours after dawn) during the breeding season (May 15 to July 30).</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize effects of noise.</li> </ul>	<ul style="list-style-type: none"> <li>The Environmental Inspector will ensure that all operational plans and construction timing associated with noise reduction are being followed.</li> <li>If work must occur in these areas during the noted time periods due to an emergency or critical phase of construction, work may be permitted if conditions for amphibian breeding are not ideal. Specifically, work may occur if temperatures are below 6°C, there has been no rain in the previous 24 hours or wind speeds are higher than 3 on the Beaufort Scale. The Environmental Inspector will track weather conditions and determine if suitable amphibian breeding conditions are or are not present.</li> <li>Similarly, emergency work may occur in the vicinity of bird habitats if conditions are not suitable for bird breeding (i.e. if temperatures are below 10°C, if there is rain or fog or if winds are greater than 3 on the Beaufort Scale). The Environmental Inspector will track weather conditions and determine if suitable bird breeding conditions are or are not present.</li> </ul>
All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Dust effects on wildlife habitat (I).</li> </ul>	<ul style="list-style-type: none"> <li>As appropriate, dust from the work areas will be controlled through suppressants (e.g., water).</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize effects from dust on wildlife habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Dust emissions will be monitored daily during construction to ensure dust control watering frequency and rates are adequate.</li> </ul>

## 5.2 Significant Natural Features

Features within 120 m of the Project Location which are significant (i.e., previously identified as significant, evaluated as significant during the EOS, treated as significant and treated as significant until habitats use surveys confirm significance) are summarized in **Table 5.3** and shown on **Figures 3a-h** and **4a-h** in **Appendix A**.

If wildlife habitats that are treated as significant are found to be non-significant based on habitat use studies detailed in Section 6.0, these measures outlined herein will not be required.



**Table 5.3 Significant Natural Features**

Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m	
Provincially Significant Wetland (Hay Swamp)	WE-027	Flood attenuation; Water quality improvement; groundwater recharge; and, Deer yarding habitat (DYA-001).	6 m (230 kV transmission line)*	
	WE-029	Flood attenuation; Water quality improvement; groundwater recharge; and, Deer yarding habitat (DYA-002).	26 m (230 kV transmission line) *	
Wetlands Assumed Significant	WE-001	Flood attenuation; Water quality improvement; and, Groundwater recharge.	69 m (access road: construction only); and, 96 m (access road). 97 m (assembly site area boundary).	
	WE-002	Flood attenuation; Water quality improvement; and, Groundwater recharge.	2 m (underground collector line); 39 m to 74 m (access road: construction only); 47 m to 65 m (turbine); 103 m (access road and underground collector line); and, 44 m to 65 m (assembly site area boundary).	
	Wetland Complex A	WE-008	Flood attenuation; Water quality improvement; Groundwater recharge; and, Moderate erosion control on shore of open water area. Amphibian Breeding Habitat (ABH-001)	38 m (underground collector line); 67 m (assembly site area boundary); 86 m (turbine); and, 83 m to 95 m (access road: construction only).
		WE-009		>120m to any project component.
		WE-010		51 m to 116 m (assembly site area boundary); 73 m to 89 m (turbine); 74 m to 98 m (access road: construction only); 95 m (underground collector line).
		WE-011		33 m to 52 m (assembly site area boundary); 47 m to 75 m (turbines); 44 m (access road: construction only); 102 m (access road); and, 103 m (access road and underground collector line).
	WE-012	Flood attenuation; Water quality improvement; and, Groundwater recharge.	2 m (underground collector line); and, 71 m (access road: construction only).	
	Wetland Complex B	WE-013	Flood attenuation;	2 m (230 kV transmission line)*
		WE-014	Water quality improvement; and,	2 m (230 kV transmission line)*
		WE-015	Groundwater recharge.	2 m (230 kV transmission line)*

Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
	WE-016		62 m (230 kV transmission line)*
	WE-017		2 m (230 kV transmission line)*
	WE-020		14 m (230 kV transmission line)*
	WE-026		3 m (230 kV transmission line)*
	WE-022	Flood attenuation; Water quality improvement; and, Groundwater recharge.	18 m (230 kV transmission line)*.
	WE-030	Flood attenuation; Water quality improvement; and, Groundwater recharge.	19 m (230 kV transmission line)*.
	WE-031	Flood attenuation; Water quality improvement; and, Groundwater recharge.	2 m (230 kV transmission line)*.
	WE-032	Flood attenuation; Water quality improvement; Groundwater recharge; and, Low erosion control function due to lack of surrounding vegetation.	19 m (230 kV transmission line)*.
	WE-033	Flood attenuation; Water quality improvement; and, Groundwater recharge.	19 m (230 kV transmission line)*.
	WE-034	Flood attenuation; Water quality improvement; Groundwater recharge; and, Moderate erosion control on shore of open water area.	41 m (230 kV transmission line)*.
WE-035	Flood attenuation; Water quality improvement; Groundwater recharge; and, Low erosion control due to nature of slopes.	23 m (230 kV transmission line)*.	
WE-037	Flood attenuation; Water quality improvement; and, Groundwater recharge.	2 m (230 kV transmission line)*.	
WE-038	Flood attenuation; Water quality improvement; and, Groundwater recharge.	2 m (230 kV transmission line)*.	
Significant Woodlands	W-004	Provides candidate habitat for bats and species of conservation concern (BMC-001,	34 m (turbine); 30 m (assembly site area boundary);

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Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
		SCC-001). To be confirmed prior to construction. Also GCSWH-BMC.	31 m to 83 m (access road: construction only); and, 71 m to 107 m (access road and underground collector line).
	W-012	Provides candidate habitat species of conservation concern (SCC-003). To be confirmed prior to construction. Also provides GCSWH (WRN, WASBB, BMC).	69 m (access road: construction only); 96 m (access road); 97 m (assembly site area boundary)
	W-013	Provides candidate habitat for bats and species of conservation concern (BMC-002). Not accessible. To be treated as significant.. Also provides GCSWH (SCC).	11 m (underground collector line); 68 m (assembly site area boundary); 73 m (turbine); and, 70 m to 82 m (access road: construction only).
	W-014	Provides candidate habitat for bats and species of conservation concern (BMC-003, SCC-002). To be confirmed prior to construction.	6 m to 102 m (underground collector line); 45 m (turbine); 44 m (assembly site area boundary); 36 m to 98 m (access road: construction only); and, 98 m (access road).
	W-020	Provides Significant habitat for turtles (TNA-002) and candidate habitat for bats and species of conservation concern (BMC-004, SCC-004). To be confirmed prior to construction.	2 m to 117 m (access road: construction only); 7 m to 47 m (access road and underground collector line); 20 m (underground collector line); 113 m (turbine); and, 20 m to 112 m (assembly site area boundary).
	W-021	Provides candidate habitat for bats and species of conservation concern (BMC-005, SCC-005). To be confirmed prior to construction.	5 m (underground collector lines); 2 m, to 50 m (access road: construction only); 8 m to 42 m (assembly site area boundary); 39 m to 58 m (turbine); 60 m to 87 m (access road and underground collector line).
	W-023	Provides candidate habitat for bats and species of conservation concern (BMC-006, SCC-006). To be confirmed prior to construction, subject to accessibility. Also provides forest interior habitat (GCSWH-WASBB.	2 m (underground collector line); 39 m to 74 m (access road: construction only); 47 m to 65 m (turbine); 103 m (access road and underground collector line); and, 44 m to 65 m (assembly site area boundary).

Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
	W-026	Provides candidate habitat for bats and species of conservation concern (BMC-007, SCC-007). To be confirmed prior to construction.	7 m to 96 m (access road and underground collector line); 2 m to 49 m (access road: construction only); 22 m to 25 m (underground collector line); 39 m to 63 m (assembly site area boundary); and, 40 m to 86 m (turbine).
	W-029	Provides candidate habitat for species of conservation concern (SCC-008). To be confirmed prior to construction. Also provides GCSWH (SCC).	2 m (underground collector line); 47 m (access road and underground collector line); 33 m to 68 m (access road: construction only); 43 m to 95 m (assembly site area boundary); and, 61m to 95 m (turbine).
	W-030	Provides GCSWH (WRN, WASBB, BMC, SCC)	20 m (underground collector line).
	W-031	Provides GCSWH (BMC, SCC)	7 m (underground collector line).
	W-034	Provides GCSWH (WNA, BMC, SCC)	2 m (underground collector line).
	W-036	Provides candidate habitat for bats and species of conservation concern (BMC-008, SCC-009). To be confirmed prior to construction.	8 m to 117 m (access road and underground collector line); 2 m to 80 m (access road: construction only); 6 m (access road); 24 m to 48 m (assembly site area boundary); 34 m to 71 m (turbine).
	W-037	Provides candidate habitat for bats and species of conservation concern (BMC-009, SCC-010, SCC-017). To be confirmed prior to construction. Also provides GCSWH (SS, SCC).	2 m to 67 m (underground collector line); 5 m to 66 m (access road: construction only); 21 m to 98 m (turbine); 20 m to 85 m (assembly site area boundary); and, 78 m to 114 m (access road and underground collector line).
	W-039	Provides candidate habitat for species of conservation concern (SCC-014). To be confirmed prior to construction. Also provides GCSWH (ABH, BMC, SCC, WNA)	2 m (230 kV transmission line)*
	W-042	Provides candidate habitat for bats and species of conservation concern (BMC-011, SCC-011). To be confirmed prior to construction. Portions also include GCSWH-	2 m (underground collector line); 2 m to 78 m, (access road and underground collector line); 2 m to 95 m (access road: construction only);

Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
		SCC.	67 m to 119 m (turbine); and, 66 m to 116 m (assembly site area boundary).
	W-053	Provides candidate habitat for species of conservation concern (SCC-013). To be confirmed prior to construction. Also provides GCSWH-BMC.	2 m to 52 m (access road and underground collector line); and, 2 m to 11 m (access road: construction only).
	W-079	Provides GCSWH (ABH, SCC, WNA)	14 m (230 kV transmission line)*
	W-081	Provides GCSWH (ABH, SCC)	18 m (230 kV transmission line)*.
	W-086	Provides GCSWH (ABH, SCC, WNA) V-001	3 m (230 kV transmission line)*
	W-088	Provides significant habitat for deer (DYA-001). Also provides GCSWH (ABH, SCC)	6 m (230 kV transmission line)*
	W-093	Provides GCSWH (BMC, SCC)	120 m (230 kV transmission line)*.
	W-094	Provides significant habitat for deer (DYA-002). Also provides GCSWH (ABH, SCC)	26 m (230 kV transmission line)*.
	W-099	Provides GCSWH (BMC, SCC)	28 m (230 kV transmission line)*.
	W-102	Provides GCSWH (BMC, SCC, WNA, ABH, SCC)	2 m (230 kV transmission line)*.
	W-103	Provides GCSWH (ABH, SCC)	19 m (230 kV transmission line)*.
	W-104	Provides GCSWH (BMC)	46 m (230 kV transmission line)*.
	W-118	Provides GCSWH (BMC, SCC)	5 m (230 kV transmission line)*.
	W-120	Provides GCSWH (ABH, SCC)	2 m (230 kV transmission line)*.
	W-123	Provides GCSWH (BMC, SCC)	18 m (230 kV transmission line)*.
	W-127	Provides GCSWH (BMC, SCC)	92 m (230 kV transmission line)*.
	W-128	Provides GCSWH (ABH, BMC, SCC)	2 m (230 kV transmission line)*.
Bat Maternity Colonies*	BMC-001**	Possible candidate habitat for bat maternity roosting.	34 m (turbine); 30 m (assembly site area boundary); 31 m to 83 m (access road: construction only); and, 71 m to 107 m (access road and underground collector line).

Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
	BMC-002**	Candidate habitat for bat maternity roosting.	11 m (underground collector line); 68 m (assembly site area boundary); 73 m (turbine); and, 70 m to 82 m (access road: construction only).
	BMC-003**	Candidate habitat for bat maternity roosting.	6 m to 102 m (underground collector line); 45 m (turbine); 44 m (assembly site area boundary); 36 m to 98 m (access road: construction only); and, 98 m (access road).
	BMC-004**	Possible candidate habitat for bat maternity roosting.	2 m to 117 m (access road: construction only); 7 m to 47 m (access road and underground collector line); 20 m (underground collector line); 113 m (turbine); and, 20 m to 112 m (assembly site area boundary).
	BMC-005**	Candidate habitat for bat maternity roosting.	5 m (underground collector lines); 2 m, to 50 m (access road: construction only); 8 m to 42 m (assembly site area boundary); 39 m to 58 m (turbine); 60 m to 87 m (access road and underground collector line).
	BMC-006**	Possible candidate habitat for bat maternity roosting.	2 m to 95 (underground collector line); 64 m (access road: construction only); 119 m (turbine); 117 m (assembly site area boundary); and, 2 m to 95 m (underground collector line).
	BMC-007**	Possible candidate habitat for bat maternity roosting.	7 m to 96 m (access road and underground collector line); 17 m to 95 m (access road: construction only); 22 m to 25 m (underground collector line); 39 m to 63 m (assembly site area boundary); and, 40 m to 86 m (turbine).
	BMC-008**	Possible candidate habitat for bat maternity roosting.	27 m to 78 m (access road and underground collector line); 17 m to 85 m (access road: construction only); 25 m to 78 m (access road); 89 m to 116 m (assembly site area boundary); 101 m to 119 m (turbine).
	BMC-009**	Candidate habitat for bat maternity roosting.	2 m to 67 m (underground collector line);

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Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
			5 m to 66 m (access road: construction only); 21 m to 98 m (turbine); 20 m to 85 m (assembly site area boundary); and, 78 m to 114 m (access road and underground collector line).
	BMC-010**	Possible candidate habitat for bat maternity roosting.	103 m, (access road and underground collector line); 43 m to 83 m (access road: construction only); 100 m (access road); 46 m (turbine); and, 32 m (assembly site area boundary).
	BMC-011**	Possible candidate habitat for bat maternity roosting.	95 m (access road: construction only); 86 m to 119 m (turbine); and, 86 m (assembly site area boundary).
	BMC-012**	Possible candidate habitat for bat maternity roosting.	92 m (assembly site area boundary); 92 m (turbine).
Turtle Wintering Area*	TWA-003**	Candidate Turtle Wintering Habitat; pool created along drain where dam under Turnbull's Road backs up water.	2m (underground collector line).
Deer Yarding Areas	DYA-001	Stratum II Deer Yard.	6 m (230 kV transmission line)*.
	DYA-002	Stratum II Deer Yard.	26 m (230 kV transmission line)*.
Turtle Nesting Areas	TNA-002	Snapping turtle nest and egg shells present.	7 m to 20 m (underground collector lines); 2 m (access road and underground utility line); and, 113 m (turbine).

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Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
Amphibian Breeding Habitat (Woodland)	ABH-001	Open water and marsh area supporting concentrations of spring peeper and grey tree frog.	38 m (underground collector line); 103 m (access road and underground collector line); 102 m (access road); 33 m to 116 m (assembly site area boundary); 47 m to 89 m (turbine); and, 44 m to 99 m (access road: construction only).
Habitat for Special Concern and Rare Species*	SCC-001**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	34 m (turbine); 30 m (assembly site area boundary); 31 m to 83 m (access road: construction only); and, 71 m to 107 m (access road and underground collector line).
	SCC-002**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	6 m to 102 m (underground collector line); 45 m (turbine); 44 m (assembly site area boundary); 36 m to 98 m (access road: construction only); and, 98 m (access road).
	SCC-003**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	69 m (access road: construction only); 96 m (access road); 97 m (assembly site area boundary)
	SCC-004**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m to 117 m (access road: construction only); 7 m to 47 m (access road and underground collector line); 20 m (underground collector line); 113 m (turbine); and, 20 m to 112 m (assembly site area boundary).
	SCC-005**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	5 m (underground collector lines); 2 m, to 50 m (access road: construction only); 8 m to 42 m (assembly site area boundary); 39 m to 58 m (turbine); 60 m to 87 m (access road and underground collector line).
	SCC-006**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m (underground collector line); 39 m to 74 m (access road: construction only); 47 m to 65 m (turbine); 103 m (access road and underground collector line); and, 44 m to 65 m (assembly site area boundary).
	SCC-007**	Candidate habitat for vegetation designated	7 m to 96 m (access road and underground collector line);



Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
		as Special Concern or rare in the province.	17 m to 95 m (access road: construction only); 22 m to 25 m (underground collector line); 39 m to 63 m (assembly site area boundary); and, 40 m to 86 m (turbine).
	SCC-008**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m (underground collector line); 47 m (access road and underground collector line); 33 m to 68 m (access road: construction only); 43 m to 95 m (assembly site area boundary); and, 61m to 95 m (turbine).
	SCC-009**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	8 m to 117 m (access road and underground collector line); 2 m to 80 m (access road: construction only); 6 m (access road); 24 m to 48 m (assembly site area boundary); 34 m to 71 m (turbine).
	SCC-010**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m to 67 m (underground collector line); 5 m to 66 m (access road: construction only); 21 m to 98 m (turbine); 20 m to 85 m (assembly site area boundary); and, 78 m to 114 m (access road and underground collector line).
	SCC-011**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	27 m to 78 m (access road and underground collector line); 17 m to 95 m (access road: construction only); 25 m to 78 m (access road); 72 m to 116 m (assembly site area boundary); 86 m to 119 m (turbine).
	SCC-012**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	103 m, (access road and underground collector line); 43 m to 83 m (access road: construction only); 100 m (access road); 46 m (turbine); and, 32 m (assembly site area boundary).
	SCC-013**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m to 52 m (access road and underground collector line); and, 2 m to 11 m (access road: construction only).
	SCC-014**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m (230 kV transmission line)*

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Feature	Feature ID	Feature Attributes and Functions	Distance Between Feature and All Project Components Within 120 m
	SCC-015**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m to 95 (underground collector line); 64 m (access road: construction only); 119 m (turbine); 117 m (assembly site area boundary); and, 2 m to 95 m (underground collector line).
	SCC-016**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	38 m (underground collector line); 103 m (access road and underground collector line); 102 m (access road); 33 m to 116 m (assembly site area boundary); 47 m to 89 m (turbine); and, 44 m to 99 m (access road: construction only).
	SCC-017**	Candidate habitat for vegetation designated as Special Concern or rare in the province.	2 m (underground collector line); and, 71 m (access road: construction only).

\*Assumes installation within gravel road shoulder with corner sections install using directional drilling or punch and bore techniques.

\*\* Wildlife habitat treated as significant. These are features which may be significant and which are being treated as such until habitat use study can confirm the relative use of each habitat. If it is found that wildlife are not using the habitat in significant numbers, then the mitigation identified below will not be required.

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No turbines, access roads, transformer station, underground collector lines or transmission lines will be located within any of the features listed in **Table 5.3**. Some activities will occur adjacent to these features, including:

- construction of access roads, transformer sub-station, parts and storage building;
- installation of overhead and below ground collector lines, transmission lines and communication lines;
- construction of turbines;
- operation of the wind facility; and,
- decommissioning of the facility.

As such, there is potential for these features to be affected during construction, operation and decommissioning phases of the project.

Mitigation measures are described in **Table 5.4**.

All of the general construction mitigation described in **Table 5.2** will apply to activities occurring in and around all significant natural features. In addition to general mitigation, several specific measures, performance objectives, monitoring and contingency plans have been identified for these features, above and beyond those previously described. These additional measures are summarized in **Table 5.4**.

If wildlife habitats that are treated as significant are found to be non-significant based on habitat use studies detailed in Section 6.0, these measures outlined herein will not be required.

**Table 5.4 Summary of Potential Negative Effects and Proposed Mitigation Measures for Significant Features**

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
<b>CONSTRUCTION AND DECOMMISSIONING</b>						
All Significant Features	<ul style="list-style-type: none"> <li>All Construction and Decommissioning Activities</li> </ul>	<ul style="list-style-type: none"> <li>General construction and decommissioning effects.</li> <li>Refer to effects listed under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to mitigation listed under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Residual Effects listed under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.</li> </ul>
<p>Significant Woodlands, Provincially Significant Wetlands, Wetlands Assumed Significant, Deer Yarding Areas</p> <p>W-038, W-039, W-079, W-081, W-086, W-088, W-094, W-102, W-103, W-123, W-128</p> <p>Wetland Complex B WE-013, WE-014, WE-015, WE-017, WE-020, WE-026</p> <p>Individual Wetlands WE-022, WE-027, WE-029, WE-030, WE-031, WE-033, WE-034, WE-038</p> <p>DYA-001, DYA-002</p>	<ul style="list-style-type: none"> <li>Installation and removal of 36 kV and 230 kV transmission line and communication lines along straight road sections.</li> </ul>	<ul style="list-style-type: none"> <li>Inadvertent loss of, or disturbance to, vegetation within the wetlands/deer yards through encroachment of equipment or stockpiles (I).</li> <li>Movement of exposed sediment into the features (I).</li> <li>The effects identified above could have minor effect on the size of woodlands and wetlands and on the function of the wetland as surface water storage.</li> </ul>	<ul style="list-style-type: none"> <li>Cables will be installed using open trenching methods within the disturbed municipal road ROW.</li> <li>Significant features will be clearly marked with sediment and/or tree protection fencing to ensure the equipment and material stockpiles do not encroach into any significant woodlands, wetlands or deer yards adjacent to the ROW.</li> <li>The boundaries of the features are to be delineated in the field by a qualified environmental technician based on the following definitions:                             <ul style="list-style-type: none"> <li>Woodlands: Edge of the drip line</li> <li>Wetlands: OWES methodology (50% wetland vegetation rule)</li> </ul> </li> <li>Silt and/or tree protection fencing will be installed along the boundaries of significant features.</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No vegetation loss or disturbance associated with sediment and erosion on woodlands or wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into significant natural features.</li> </ul>
<p>Significant Woodlands, Provincially Significant Wetlands, Wetlands Assumed Significant, Deer Yarding Areas</p> <p>W-038, W-039, W-079, W-081, W-086, W-088, W-094, W-102, W-103, W-123, W-128</p> <p>Wetland Complex B WE-013, WE-014, WE-015, WE-017, WE-020, WE-026</p> <p>Individual Wetlands WE-022, WE-027, WE-029, WE-030, WE-031, WE-033,</p>	<ul style="list-style-type: none"> <li>Installation and removal of 230 kV transmission line and communication lines at watercourse and bridge crossings and road bends.</li> </ul>	<ul style="list-style-type: none"> <li>Inadvertent loss of, or disturbance to, vegetation within the wetlands/deer yards through encroachment of launch or receiving pits into or adjacent to significant features D).</li> <li>Movement of exposed sediment into the features (I).</li> <li>The effects identified above could have minor effect on the size of woodlands and wetlands and on the function of the wetland as surface water storage.</li> </ul>	<ul style="list-style-type: none"> <li>Lines will be installed using directional drilling, punch and bore, or open-cut techniques at watercourse, bridge, road, and utility crossings.</li> <li>Significant woodlands and wetlands will be clearly demarcated with sediment and/or tree protection fencing to ensure the equipment and material stockpiles do not encroach into the features.</li> <li>The boundaries of the features are to be delineated in the field by a qualified environmental technician based on the following definitions:                             <ul style="list-style-type: none"> <li>Wetlands: OWES methodology (50% wetland vegetation rule)</li> <li>Woodlands: Edge of the drip line</li> <li>SWH: As per criteria detailed in the EOS report</li> </ul> </li> <li>Silt and/or tree protection fencing will be installed along the boundaries of the natural features.</li> <li>Vegetated buffers will be left in place to the extent</li> </ul>	<ul style="list-style-type: none"> <li>Duration is expected to be moderate (10 to 15 years until replacement trees have matured); however magnitude, frequency and geographic scope are very limited.</li> <li>No residual effect anticipated. May also be residual effect associated with frac-out during directional drilling; likelihood is low, limited duration,</li> </ul>	<ul style="list-style-type: none"> <li>No vegetation loss or disturbance associated with sediment and erosion on woodlands or wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into wetland areas.</li> <li>If directional drilling is used, an Environmental Inspector will be on-site during drilling activities.</li> <li>Erosion and sediment control measures will be regularly inspected to ensure they are functioning and are maintained as required.</li> <li>If erosion and sediment control measures are not</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
WE-034, WE-038  DYA-001, DYA-002			<p>possible.</p> <ul style="list-style-type: none"> <li>Any cleared areas adjacent to significant features will be re-vegetated using a native seed mix and/or native shrub and tree plantings</li> <li>Trenching along straight sections will be within the disturbed portion of the municipal road ROW.</li> <li>Directional drilling and/or punch and bore options will be undertaken in accordance with the Department of Fisheries and Oceans' Operational Statement.</li> <li>Horizontal directional drilling and/or punch and bore operations will be designed with launching and receiving pits that will minimize tree loss and disturbance of natural vegetation wherever possible.</li> <li>Launch and receiving pits will be designed by the drilling contractor in accordance with the operational statement, and will not extend beyond the disturbed portion of the municipal road ROW. To the extent possible, pits will be located at least 30 m from significant natural features as delineated by a qualified Environmental Inspector. In some instances, pits may need to be less than 30 m (but no less than 5 m) from a natural feature. This will be determined during detailed design and will be documented in the sediment and erosion control plan.</li> </ul>	frequency and geographic extent.		<p>functioning properly, alternative measures will be implemented and prioritized above other construction activities.</p> <ul style="list-style-type: none"> <li>An emergency frac-out plan will be prepared and implemented by the Contractor. The Environmental Inspector will hold the Contractor accountable to implementation of the emergency frac-out plan.</li> <li>Undertake monthly site inspections during the Site Preparation stage to ensure that trees are not damaged during construction activities.</li> </ul>
Significant Wetlands  Wetland Complex A WE-008, WE-009, WE-010, WE-011  Individual Wetlands WE-001, WE-002,	Turbine Assembly	<ul style="list-style-type: none"> <li>Localized effects on wetland water levels due to dewatering for construction of turbine foundations (I).</li> <li>Water from the dewatering process could be outlet into a wetland causing scour within the wetland and deposition of sediment from the pumped water (I).</li> <li>The effects identified above could affect habitat for aquatic species if standing water is drawn down.</li> <li>Sedimentation could affect wetland functions associated with surface water storage and flood control.</li> </ul>	<ul style="list-style-type: none"> <li>Dewatering will be minimized to the extent possible.</li> <li>Any discharge from dewatering will be outlet to an agricultural or vegetated area at least 30m from a significant natural feature or watercourse utilizing a sediment filter bag.</li> <li>Significant natural features boundaries are to be delineated in the field by a qualified environmental technician based on the following definitions: <ul style="list-style-type: none"> <li>Wetlands: OWES methodology (50% wetland vegetation rule)</li> <li>Woodlands: Edge of the drip line</li> <li>SWH: As per criteria detailed in the EOS report.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No effect on wetland water levels.</li> <li>No sediment discharge into wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Monitor should be on-site during any dewatering within 120m of wetlands. The Monitor should ensure that the filter bag is working appropriately.</li> <li>In the event of sediment discharge, all operations in the affected area should stop immediately until the problem can be resolved.</li> <li>Although no effects on water levels is anticipated, the Environmental Monitor should also monitor water levels in the vicinity of dewatering activities during</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
						the dewatering process. If significant changes in water levels are noted, operations should cease until water levels recover.
Significant Woodlands  W-04, W-020, W-21, W-23, W-026, W-29, W-30, W-31, W-34, W-036, W-37, W-042, W-053,	<ul style="list-style-type: none"> <li>• Construction and removal of access roads adjacent to the following woodlands:                             <ul style="list-style-type: none"> <li>– W-053 (access road to T-16);</li> <li>– W-042 (access road to T-18);</li> <li>– W-036 (access road to T-25 and T-28);</li> <li>– W-026 (access road to T-31);</li> <li>and,</li> <li>– W-020 (access road to T-40).</li> </ul> </li> <li>• Installation of 36kV collector lines adjacent to the following woodlands:                             <ul style="list-style-type: none"> <li>– W-04 and W-037 (collector line along Sararas Road);</li> <li>– W-029, W-030, W-034, W-031 (collector line along Shipka Road);</li> <li>– W-023 and W-026 along Schadeview Road;</li> <li>– W-020 along Turnbull's Road; and,</li> <li>– W-021 along the</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Inadvertent loss of, or disturbance to, vegetation along the edge of woodlands during construction of adjacent access roads and below ground collector lines (I).</li> <li>• The effects identified above could have minor effect on the size of woodlands and their function in providing edge habitat for a variety of species including Red-headed woodpecker (Special Concern species).</li> </ul>	<ul style="list-style-type: none"> <li>• Construction areas are to correspond to those areas detailed on <b>Figures 3a-s, Appendix A</b></li> <li>• Access road and collector lines will be no closer than the dripline of each significant woodland edge.</li> <li>• The significant woodland edge should be demarcated by a silt fence and/or tree protection fencing.</li> <li>• Below ground collector lines will be located within the access road allowance and will not extend into wooded areas.</li> <li>• Additional, taller tree protection fencing (tree hoarding) should be installed in these areas to protect tree limbs from equipment in adjacent areas.</li> <li>• Any tree roots which extend into the construction area should be cut and re-packed into soil to avoid desiccation.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited duration, frequency, geographic extent.</li> <li>• No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>• No disturbance to woodlots.</li> </ul>	<ul style="list-style-type: none"> <li>• Silt fencing and/or tree protection fencing will be installed as per the construction areas detailed in <b>Figures 3a-s, Appendix A</b>. Further to this silt fencing and/or tree protection fencing will be installed no closer than the dripline and monitored regularly by an Environmental Inspector to ensure they are functioning and are maintained as required.</li> <li>• If the silt fencing and tree hoarding are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
	field edge between T-37 and T-39.					
Turtle Nesting Area, Turtle Overwintering Habitat* and Amphibian Breeding Habitat  ABH-001 TNA-002 TWA-003*	All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Accidental mortality due to wildlife moving through the construction zone (I).</li> <li>The effect identified above may affect individual animals but unlikely to affect population health or resiliency. No effect on habitat functionality.</li> </ul>	<ul style="list-style-type: none"> <li>During construction wildlife fencing (sediment fencing) will be installed around all work areas within 120m of these habitats prior to any earth movement, stockpiling or other activities on the site. Fencing must be keyed in correctly and monitored for proper installation and maintenance by the contractor.</li> <li>The boundary of the construction compound will be fenced to limit the ability for wildlife to enter the area.</li> <li>Construction areas are to correspond to those areas detailed on <b>Figures 4a-s, Appendix A.</b></li> <li>Work within 120 m of Amphibian Breeding Habitats (ABH-001) will not occur after dusk during the breeding season (April, May and June).</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No accidental mortality.</li> <li>No reduced amphibian breeding due to noise impacts.</li> </ul>	<ul style="list-style-type: none"> <li>The contractor will be responsible for ensuring fencing is maintained and inspected regularly for signs of wildlife in the work zone while work is occurring these areas.</li> <li>The Environmental Inspector will be on-site as required to ensure proper maintenance of wildlife fencing.</li> <li>If any turtles are found within the TNA-002 and TWA-003 adjacent work zones, the Environmental Inspector should relocate them to the nearest habitat area outside of the work zone. When relocating snapping turtles, care should be taken to avoid injury by wearing gloves and placing turtles into a bucket or large plastic tub for relocation.</li> <li>Sediment/wildlife fencing within 120 m of Amphibian Breeding Habitat (ABH-001) should also be inspected by the Environmental Inspector at least once a week during the breeding season (April, May and June) to ensure they are functioning and are maintained as required.</li> <li>If the sediment/wildlife fencing is not functioning properly, alternative measures will be implemented and prioritized</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
						above other construction activities. <ul style="list-style-type: none"> <li>Contractor and Environmental Inspector to monitor work schedules to ensure that no work occurs within the restricted timing window.</li> </ul>
Amphibian Breeding Habitat  ABH-001	Construction of turbines T-21, T-22, T-23, T-24 and T-25, their access roads and all associated components	<ul style="list-style-type: none"> <li>Inhibition of amphibian breeding patterns and reproductive success due to disruptions of breeding calling patterns from turbine construction noise (I).</li> <li>The effect identified above could affect the size and diversity of the amphibian population in this pond.</li> </ul>	<ul style="list-style-type: none"> <li>Construction of turbines T-21, T-22, T-23, T-24 and T-25, their access roads and all associated components should not occur after dusk during the breeding season (April, May and June).</li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No significant decrease in amphibian populations.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor and Environmental Inspector to monitor work schedules to ensure that no work occurs within the restricted timing window.</li> <li>If work must occur in these areas during the noted time periods due to an emergency or critical phase of construction, work may be permitted if conditions for amphibian breeding are not ideal. Specifically, work may occur if temperatures are below 6°C, there has been no rain in the previous 24 hours or wind speeds are higher than 3 on the Beaufort Scale. The Environmental Inspector will track weather conditions and determine if suitable amphibian breeding conditions are or are not present.</li> </ul>
Species of Conservation Concern*  SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013, SCC-014, SCC-015, SCC-016, SCC-017	Site Preparation  All Decommissioning Activities	<ul style="list-style-type: none"> <li>Inadvertent loss of, or disturbance to, vegetation within significant habitat areas as a result of unauthorized encroachment into the habitat (I).</li> <li>Movement of exposed sediment into the habitat (I).</li> <li>The effects identified above could have minor effect on the size of habitat and could affect individuals</li> </ul>	<ul style="list-style-type: none"> <li>Significant habitats will be clearly demarcated with sediment and/or tree protection fencing to ensure the equipment and material stockpiles do not encroach into any features.</li> <li>Significant habitats to be demarcated by a qualified Environmental Inspector based on the boundary of the finest applicable ELC unit.</li> <li>Construction areas are to correspond to those areas detailed on <b>Figures 4a-s, Appendix A.</b></li> </ul>	<ul style="list-style-type: none"> <li>Limited duration, frequency, geographic extent.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No disturbance to significant habitat areas.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented and all silt fencing and/or tree protection fencing is maintained and functioning properly. If they are not functional, they should be repaired immediately.</li> </ul>



Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
		if sediment washes out or buries vegetation.				<ul style="list-style-type: none"> <li>If accidental encroachment occurs the offending material or equipment will be immediately removed and restoration of the area conducted as needed.</li> </ul>
Bat Maternity Colonies*  BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010, BMC-011, BMC-012,	All Construction and Decommissioning Activities	<ul style="list-style-type: none"> <li>Disturbance due to construction activity and noise could result in bats avoiding habitat (I).</li> <li>Inadvertent loss of, or disturbance to, vegetation within significant habitat areas as a result of unauthorized encroachment into the habitat (I).</li> <li>The effect could impact the use of the habitat by bats.</li> </ul>	<ul style="list-style-type: none"> <li>No construction will occur immediately adjacent to significant bat maternity colony habitats within the timing window of May 1 to July 30.</li> <li>Significant habitats will be clearly demarcated with sediment and/or tree protection fencing to ensure the equipment and material stockpiles do not encroach into any features.</li> <li>Significant habitats to be demarcated by a qualified Environmental Inspector based on the boundary of the finest applicable ELC unit.</li> <li>Construction areas are to correspond to those areas detailed on <b>Figures 4a-s, Appendix A.</b></li> </ul>	<ul style="list-style-type: none"> <li>Limited duration and magnitude.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No disturbance to significant bat maternity colonies.</li> </ul>	<ul style="list-style-type: none"> <li>An Environmental Inspector will perform regular inspection to ensure that work does not occur within specified timing windows.</li> <li>An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented and all silt fencing and/or tree protection fencing is maintained and functioning properly. If they are not functional, they should be repaired immediately.</li> <li>If accidental encroachment occurs the offending material or equipment will be immediately removed and restoration of the area conducted as needed.</li> </ul>
<b>OPERATION</b>						
Bat Maternity Colonies*  BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010, BMC-011, BMC-012,	Wind Turbine Operation	<ul style="list-style-type: none"> <li>Bats may avoid habitat areas once turbines are operational (I).</li> <li>The effect noted above could reduce the available habitat for bats and could therefore reduce populations in the area.</li> </ul>	<ul style="list-style-type: none"> <li>Develop contingency measures as required.</li> </ul>	<ul style="list-style-type: none"> <li>Duration of the effect could be experienced throughout entire operating period of the turbines.</li> <li>Effect most significant during spring season.</li> <li>Potential for residual effects exists.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize impacts to Bat Maternity Colony habitat. No significant reduction in use by bats.</li> </ul>	<ul style="list-style-type: none"> <li>Contingency measures may include additional monitoring to determine cause of decline, possible turbine shut-down or blade feathering during breeding season.</li> <li>Contingency measures will be developed and confirmed with the MNR as required, subject to the level of effect identified.</li> <li>Additional three years of monitoring if mitigation is applied.</li> <li>Refer to EEMP for more</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
						information.
Amphibian Breeding Habitat  ABH-001	Wind Turbine Operation	<ul style="list-style-type: none"> <li>Inhibition of amphibian breeding patterns and reproductive success due to disruptions of breeding calling patterns from turbine noise (I).</li> <li>The effect identified above could affect the size and diversity of the amphibian population in this pond.</li> </ul>	<ul style="list-style-type: none"> <li>Post-construction monitoring will be undertaken and contingency measures developed as required.</li> </ul>	<ul style="list-style-type: none"> <li>Duration of the effect could be experienced throughout entire operating period of the turbines.</li> <li>Effect most significant during spring breeding season.</li> <li>Potential for residual effects exists.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize impacts to amphibian breeding. Baseline amphibian calling index to be maintained at 3 for both spring peeper and grey tree frog.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct an Amphibian Monitoring Program for two years following construction of the wind farm. Amphibian surveys to be undertaken in accordance with Marsh Monitoring Program Manual (Bird Studies Canada, 1994). Surveys will be conducted between one-half hour after sunset and midnight during each of the following three periods:                             <ul style="list-style-type: none"> <li>April 15-30;</li> <li>May 15-30; and,</li> <li>June 15-30.</li> </ul> </li> <li>Contingency measures will be developed and confirmed with the MNR as required, subject to the level of mortality identified.</li> <li>Additional two years of monitoring if significant effects are observed.</li> <li>Refer to EEMP for more information.</li> </ul>
Turtle Nesting Area and Turtle Overwintering Habitat*  TNA-002 TWA-003*	Planned and Unplanned Maintenance	<ul style="list-style-type: none"> <li>Maintenance vehicles may collide with migrating turtles crossing Turnbull's Road or the turbine access road to T-40 (D).</li> </ul>	Turtle crossing signs will be erected along Turnbull's Road to remind drivers to be mindful of turtles in the area.	<ul style="list-style-type: none"> <li>Effect most significant during spring and fall migration periods.</li> <li>Potential for residual effects exists.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize turtle/vehicle collisions.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance crews will report any turtle collisions to Northland and/or their consultant. Findings will be reported to the MNR for the first two years of operation.</li> <li>Contingency measures will be developed with the MNR as required, subject to the level of mortality identified.</li> <li>Refer to EEMP for more information</li> </ul>

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
All Significant Features	Planned and Unplanned Maintenance	<ul style="list-style-type: none"> <li>Maintenance activities may have impacts associated with spills and the accidental release of hazardous materials.</li> <li>General effects such as those described under listed under Generalized Significant Wildlife Habitat may occur if earth movement is required.</li> <li>Refer to effects listed under Generalized Significant Wildlife Habitat.</li> <li>Maintenance activities are not anticipated to affect size, diversity, health, connectivity or function of natural features.</li> </ul>	<ul style="list-style-type: none"> <li>Procedures will be in place for the handling of hazardous materials, disposal of waste and management of dust and noise.</li> <li>Any maintenance requiring earth movement will use the same mitigation measures described under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Residual Effects listed under Generalized Significant Wildlife Habitat.</li> <li>No residual effect anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.</li> </ul>
Individual Birds and Bats	Wind Turbine Operation	<ul style="list-style-type: none"> <li>Impacts due to collisions with turbines or mortality due to pressure variations during operation (D).</li> <li>The effect identified above has the potential to affect the population size and health if mortality exceeds limits set out by the province.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to mitigation provided in the separate EEMP for birds and bats.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to the separate EEMP for birds and bats.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to the separate EEMP for birds and bats.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to the separate EEMP for birds and bats.</li> </ul>

\* Wildlife habitat treated as significant. These are features which may be significant and which are being treated as such until habitat use study can confirm the relative use of each habitat. If it is found that wildlife are not using the habitat in significant numbers, then the mitigation identified will not be required.

## 6.0 Habitat Use Studies

Habitat use studies will be completed prior to construction adjacent to Bat Maternity Colony, Turtle Wintering and Species of Conservation Concern habitats. Studies will be completed according to the schedule listed in **Table 6.1**. All will be completed prior to the start of any construction activities. Findings will be documented in supplemental reports and will be submitted to the MNR for review prior to construction. Reports will also be available for public review on the project website<sup>1</sup>.

**Table 6.1 Schedule for Pre-Construction Surveys**

Survey	Anticipated Schedule*
Bat Maternity Colony Follow-up Candidate Habitat Surveys	During the leaf-off period between November 2012 and March 2013
Bat Maternity Colony Exit Surveys	June 2013
Turtle Wintering Area Surveys	March- May 2013
Habitat for Special Concern and Rare Species	April- September 2013 (see Appendix C for species-specific dates)

\*Schedule may be delayed by a year at Northland's discretion but seasonality will be followed.

Surveys will be completed in accordance with the following documents:

- Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011);
- Bats and Bat Habitats: Guidelines for Wind Power Projects (MNR, 2011); and,
- Significant Wildlife Habitat Technical Guide (MNR, 2000) and draft Significant Wildlife Habitat Criteria Schedule Appendices (MNR, 2012).

Detailed methodologies are provided in **Appendices B, C and D**.

<sup>1</sup> <http://grandbend.northlandpower.ca/>

## 7.0 Environmental Effects Monitoring Plan

The Environmental Effects Monitoring Plan (“EEMP”) addresses potential impacts to significant features that may be affected during the operational phase of the project.

There may be operational impacts on Amphibian Breeding Habitat and Bat Maternity Colonies due to noise and/or disturbance which limit each respective species’ ability to continue to use the habitat. These potential effects are addressed in the EEMP in **Table 7.1**.

Operation of the wind farm will have little effect on Turtle Nesting and Overwintering Habitats. Operations will not occur within turtle habitats; however, turtles may cross Turnbull’s Road between TNA-002 and TWA-003. They may also cross the access road to T-40. This makes them vulnerable to collisions with maintenance vehicles and other vehicles using these roads. Potential effects are addressed in **Table 7.1**.

Habitats for Special Concern and Rare plants, if any are found during pre-construction surveys, will not be affected by turbine operations. No vegetation clearing or disturbance is anticipated during the operational phase. As such, no operational mitigation or monitoring is required.

A separate EEMP for birds and bats has also been prepared (Neegan Burnside, August 2012). Information from both reports has been brought forward into the Design and Operations Report (Neegan Burnside, August, 2012) which provides an inclusive and comprehensive EEMP for all aspects of the project.

**Table 7.1 Summary of the Environmental Effects Monitoring Plan for Significant/Provincially Significant Natural Features in and Within 120 m of the Project Location Where an Operational Impact has the Potential to Occur**

Feature(s)	Distance to Project Locations (components)	Potential Negative Environmental Effects	Mitigation Strategy	Performance Objective	Environmental Effects Monitoring Plan					Contingency Measure
					Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
BMC-001* BMC-002* BMC-003* BMC-004* BMC-005* BMC-006* BMC-007* BMC-008* BMC-009* BMC-010* BMC-011* BMC-012*	2 m to 119 m	Habitat displacement or avoidance  Note: Post-construction mortality of bats and detailed monitoring plan is addressed in the Environmental Effects Monitoring Plan as part of the Design and Operations Report.	Infrastructure sited outside of the significant wildlife habitat feature	Continued use of the habitat by the species (Little brown bat, Eastern Small-footed bat, Northern Long-eared bat or Tricolored Bat, Silver-haired Bat) that currently inhabits the feature. White nose syndrome may have an impact on the abundance of bats, specifically Northern long-eared and Little Brown bats.	Apply same methodology followed during pre-construction monitoring (exit count surveys coupled with acoustic monitoring using broadband bat detector to identify species).  See Appendix B for detailed survey methods.	At snags/tree cavities to be identified and monitored during pre-construction surveys.	Pre-construction Survey (baseline): June 2013  Post-construction Survey: <ul style="list-style-type: none"><li>June 2015</li><li>June 2016</li><li>June 2017</li></ul>	Determine if there is a displacement or avoidance effect caused by turbines located in proximity to bat maternity colonies	Annual Reports submitted to MNR. Estimated Report Submission Dates: <ul style="list-style-type: none"><li>Summer 2013 (preconstruction data)</li><li>Summer 2015 (yr 1 post-construction)</li><li>Summer 2016 (yr 2 post-construction)</li><li>Summer 2017 (yr 3 post-construction)</li></ul>	Upon submission of annual post-construction monitoring reports to MNR it will be determined in consultation with MNR whether contingency measures are required and the contingency measures to be undertaken.
ABH-001	33 m to 103 m	Habitat displacement or avoidance.	Strategy to site turbines outside of habitat.	Minimize impacts to amphibian breeding. Baseline amphibian calling index to be maintained at 3 for both spring peeper and grey tree frog.	Conduct an Amphibian Monitoring Program for two years following construction of the wind farm. Amphibian surveys to be undertaken in accordance with Marsh Monitoring Program Manual (Bird Studies Canada, 1994). See Appendix E for detailed survey methods	At survey station monitored during EOS surveys in ABH-001.  See Figure E in Appendix E.	Surveys will be conducted between one-half hour after sunset and midnight during each of the following three periods in 2015 and 2016: <ul style="list-style-type: none"><li>April 15-30;</li><li>..... May 15-30; and,</li><li>..... June 15-30.</li></ul>	Determine if there is a displacement or avoidance effect caused by turbines located in proximity to amphibian breeding habitat.	Annual Reports submitted to MNR. Estimated Report Submission Dates: <ul style="list-style-type: none"><li>Summer 2015 (yr 1 post-construction)</li><li>Summer 2016 (yr 2 post-construction).</li></ul>	Upon submission of annual post-construction reports to MNR it will be determined in consultation with MNR whether contingency measures are required.  Contingency measures may include additional monitoring to determine cause of decline, possible turbine shut-down or blade feathering during breeding season.  Additional two years of monitoring if significant effects are observed.

Feature(s)	Distance to Project Locations (components)	Potential Negative Environmental Effects	Mitigation Strategy	Performance Objective	Environmental Effects Monitoring Plan					Contingency Measure
					Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
TNA-002 TWA-003*	2 m to 113	Collisions between turtles and maintenance vehicles.	Vehicle drivers will be given training and awareness related to this location and will be told to monitor speeds and driving conditions in this area. Drivers will be given a log book with which to enter information about any collisions with turtles or other wildlife. Signage will be erected to notify drivers of turtle crossing area.	Minimize vehicle/turtle collisions.	<p>Drivers will record any turtle or other wildlife collisions in log book.</p> <p>Conduct turtle nesting and overwintering monitoring for two years following construction of the wind farm.</p> <p>See Appendix C for detailed survey methods.</p>	<p>Records will be kept of any collision on any roadway in the vicinity of the Project Location.</p> <p>Signage will be posted in close proximity to TNA-003 and TWA-002 on Turnbull's Road.</p> <p>Two-year monitoring at TNA-002 and TWA-003* survey stations.</p> <p>See Figure E in Appendix C.</p>	<ul style="list-style-type: none"> <li>Records of collisions will be kept only if collisions occur.</li> </ul> <p>Two years of habitat monitoring will be conducted on three separate occasions in late March, mid-April and early-May on days without rain or fog.</p>	<p>Determine if there is significant mortality related to turtle/vehicle collisions during first two years of operations.</p> <p>Determine if there is any change in the use of the habitat.</p>	<p>Annual summary of logs submitted to MNR. Estimated Report Submission Dates:</p> <ul style="list-style-type: none"> <li>Summer 2015 (yr 1 post-construction)</li> <li>Summer 2016 (yr 2 post-construction).</li> </ul>	<p>Upon submission of annual post-construction monitoring reports to MNR it will be determined in consultation with MNR whether contingency measures are required and the contingency measures to be undertaken.</p>

\*pre-construction survey required to verify significance of this feature. If significant the following mitigation measures, monitoring plan and contingency measures will be implemented

## 8.0 Other Relevant Reports

Under O.Reg. 359/09, a Construction Plan Report must be prepared as part of the Renewable Energy Approval application package. Activities related to the construction of the Project as well as associated potential negative environmental effects are described within the Construction Plan Report. All impacts and mitigation related to natural features described in this report have also been carried forward to the Construction Plan Report and Design and Operations Report(Neegan Burnside, 2013). Impacts and mitigation associated with waterbodies are described in the Water Assessment and Water Body Report (Neegan Burnside, 2013). This EIS and all other REA reports thus address natural features in a consistent manner.



## 9.0 Conclusions


The Grand Bend Wind Farm is located within the vicinity of several natural features, including features which are significant, which are treated as significant and which may be significant subject to a habitat use study prior to construction.

The project layout was designed to avoid impacts to these features. Performance objectives have been set with the goal of avoiding impacts to all significant natural features. With the mitigation, monitoring and contingency measures described in this report, it is anticipated that performance objectives can be met.


Respectfully submitted,

**Neegan Burnside Ltd.**

### Written by:


Signature  \_\_\_\_\_ Date February 2013  
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### Reviewed by:

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Natural Heritage Assessment Environmental Impact Study  
February 2013

**Approved by:**

Signature  Date February 2013  
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Manager, Environment, Health and Safety  
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## 10.0 References

Ministry of Natural Resources. 2011, Bats and Bat Habitat. Guidelines for Wind Power Projects. First Edition. Queen's Printer for Ontario.

Ministry of Natural Resources. 2011b. Natural Heritage Assessment Guide for Renewable Energy Projects. First Edition. Queen's Printer for Ontario.