NextEra Energy Canada, ULC

# FINAL Project Description Report – Goshen Wind Energy Centre

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60155032

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## Glossary of Terms

ABCA .....Ausable Bayfield Conservation Authority
ANSI.....Area of Natural and Scientific Interest
DFO .....Federal Department of Fisheries and Oceans
GE.....General Electric
kV.....Kilovolt
mbgs .....metres below ground surface
MOE.....Ontario Ministry of the Environment
MNR.....Ontario Ministry of Natural Resources
MTCS.....Ontario Ministry of Tourism, Culture and Sport
MTO .....Ontario Ministry of Transportation
MW.....Megawatt
NextEra .....NextEra Energy Canada, ULC
*O.Reg. 359/09*.....*Ontario Regulation 359/09*
PDR .....Project Description Report
The Project.....Goshen Wind Energy Centre
REA.....Renewable Energy Approval
TC .....Transport Canada
UTRCA.....Upper Thames River Conservation Authority

# 1. General Information

This Project Description Report (PDR) was prepared in accordance with the requirements of the Renewable Energy Approval Process outlined in *Ontario Regulation 359/09* (*O.Reg. 359/09*) and the Technical Guide to Renewable Energy Approvals (Ministry of the Environment (MOE), 2011).

## 1.1 Name of Project and Applicant

Goshen Wind, Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a wind energy project in the Municipalities of Bluewater and South Huron, Huron County, Ontario. The Project is referred to as the Goshen Wind Energy Centre (the "Project"). All turbines will be located on private lands (see **Figure 1-1**).

The Project will be owned and operated by Goshen Wind, Inc., a subsidiary of NextEra. NextEra Energy Canada's indirect parent company is NextEra Energy Resources, LLC, a global leader in wind energy generation with a current operating portfolio of over 90 wind energy projects in North America. In Canada, wind energy centres currently owned and operated by NextEra Energy Canada include: Mount Copper and Mount Miller, (both 54 megawatts (MW)) located in Murdochville, Quebec; Pubnico Point, (31 MW) located near Yarmouth, Nova Scotia; and Ghost Pine (82 MW), located in Kneehill County, Alberta.

## 1.2 Project Study Area

The proposed Project is located in Huron County, within the Municipalities of Bluewater and South Huron (refer to **Figure 1-1**). The Project Study Area consists of the areas being studied for the wind farm components (Wind Energy Centre Study Area), as well as for the interconnection route (i.e., the area being studied for transmission lines to connect the Project to the electrical grid) (Transmission Line Study Area). The Wind Energy Centre Study Area is generally bounded by Klondyke Road to the west, Rogerville Road to the north, Parr Line to the east, and Mount Carmel Drive to the south, in the Municipalities of Bluewater and South Huron. The Transmission Line Study Area is located to the east of the Wind Energy Centre Study Area, and is generally bounded by Parr Line to the west, Thames Road to the north, Perth 164 Road to the east, and Park Road to the south, extending into the Municipality of South Huron.

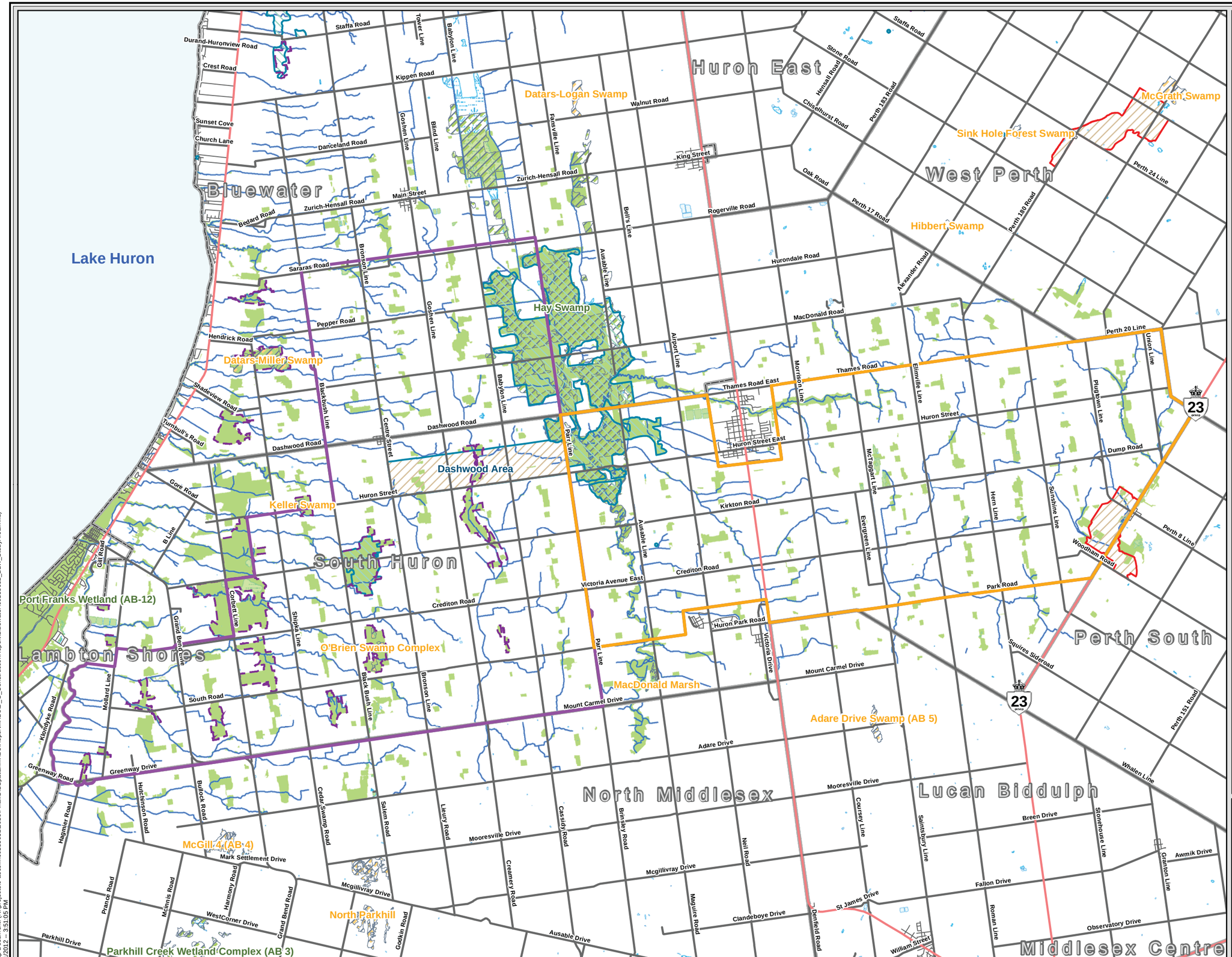
The location of the Project Study Area was defined early in the planning process for the proposed wind energy facility, based on the availability of wind resources, approximate area required for the proposed project, and availability of existing infrastructure for connection to the electrical grid. The Project Study Area was used to facilitate information collection. Please see Appendix A for a legal description of the properties on which project infrastructure will be sited. All properties are privately owned and are under agreement with NextEra.

The following co-ordinates define the external boundaries of the Project Study Area:

| Longitude | Latitude |
|---|---|
| **-81.6753290** | 43.4155312 |
| **-81.3011931** | 43.3810955 |
| **-81.3303330** | 43.3036317 |
| **-81.7743607** | 43.2379854 |

## 1.3 Description of Energy Source, Nameplate Capacity and Class of the Facility

The wind turbine technology proposed for this Project is the GE 1.6-100 Wind Turbine and the GE 1.56-100 Wind Turbine. With a total nameplate capacity of 102 MW, the Project is categorized as a Class 4 facility. The technical specifications for these models of turbines are detailed in Section 2.1.1 of this PDR.




Legend

- Wind Energy Centre Study Area
- Transmission Line Study Area
- Municipal Division
- Expressway / Highway
- Major Road
- Local Road

**Natural Features**

- Natural Features (ABCA)
- Regionally Significant Life Science ANSI
- Provincially Significant Earth Science ANSI
- Regionally Significant Earth Science ANSI
- Evaluated Wetland - Provincially Significant Wetland
- Evaluated Wetland - Other
- ESA (ABCA)
- Waterbody Segment
- Wetland Area, Permanent

Basemapping from Ontario Ministry of Natural Resources

N W E S

Kilometers

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UTM Zone 17N, NAD 83



Goshen Wind Energy Centre

## Project Study Area

January 2013
Project 60155032

AECOM

**Figure 1-1**

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## 1.4 Key Contacts

| Project Proponent | Project Consultant |
|---|---|
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## 1.5 Other Approvals Required

In addition to the REA, permits and authorizations will be required from approval agencies before construction can begin. These may include: an Oversize/Overweight Permit from the Ontario Ministry of Transportation (MTO); Archaeological Clearance from the Ontario Ministry of Tourism, Culture and Sport (MTCS); *Fisheries Act* Authorizations from the Federal Department of Fisheries and Oceans (DFO); Aeronautical Obstruction Clearance Request for Work Approval from Transport Canada; a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit from the Ausable Bayfield Conservation Authority (ABCA) and Upper Thames River Conservation Authority (UTRCA); and lastly, other permits or authorizations from the Ontario Ministry of Natural Resources (MNR) and Huron County.

## 1.6 Federal Involvement

A Federal environmental assessment is not anticipated for the Project, as it is not considered a designated project under the *Canadian Environmental Assessment Act, 2012*.

## 1.7 Commitments for Future Studies

NextEra has identified future studies that will need to be carried out before and during the construction, operation, and decommissioning of the Project based on the results of the effects assessment. These studies are listed in **Table 1-1** below.

**Table 1-1 Commitments for Future Studies**

| No. | Timing of Commitment | Location within the Project | REA Commitment | REA Report Reference |
|---|---|---|---|---|
| 1 | Pre-Construction | Disturbance Areas | Undertake surveys to locate all project infrastructure. | Construction Plan; Section 2.2 (Surveying and Geotechnical Study Activities) |
| 2 | Pre-Construction | Turbine Foundation | Conduct geotechnical sampling for all turbine foundation locations. | Construction Plan; Section 2.2 (Surveying and Geotechnical Study Activities) |
| 3 | Pre-Construction | Culvert | Determine specific culvert details and erosion control measures in conjunction with the Ausable Bayfield Conservation Authority (ABCA) & Upper Thames River Conservation Authority (UTRCA). | Construction Plan; Section 2.2 (Land Clearing and Construction of Access Roads) |
| 4 | Pre-Construction | Project Study Area | Develop a Road Use Agreement and Traffic Management Plan and provide to Huron County. | Construction Plan; Section 2.2 (Delivery of Equipment) / 3.6 |

## Table 1-1 Commitments for Future Studies

| No. | Timing of Commitment | Location within the Project | REA Commitment | REA Report Reference |
|---|---|---|---|---|
| 5 | Pre-Construction | Project Study Area | Conduct a Stormwater Pollution Prevention Study to address potential effects of stormwater runoff during construction, operations and decommissioning. | Construction Plan; Section 3.2 Design & Operations; Section 3.8, 6.3.2.1 Decommissioning Plan; Section 2.4 |
| 6 | Pre-Construction | Disturbance Areas | Complete Stage 3 Archaeological Assessment and potentially Stage 4 Archaeological Assessment to avoid displacement or disturbance of any archaeological resources identified in Stage 2 Archaeological Assessment by the construction of Project infrastructure. | Construction Plan; Section 3.1 |
| 7 | Pre-Construction | Candidate Significant Wildlife Habitats | Complete Evaluation of Significance studies for:<br>• Waterfowl stopover and staging areas (terrestrial);<br>• Reptile hibernacula;<br>• Bat maternity colonies;<br>• Colonial Nesting Bird Breeding Habitat (feature CNB-01; Note: this habitat was deemed significant but requires supplemental data collection)<br>• Amphibian woodland breeding habitat; and<br>• Turtle over-wintering habitat. | Natural Heritage Assessment; Section 4.3.4 |
| 8 | Pre-Construction | Disturbance Areas | Develop an erosion and sediment control plan. | Construction Plan; Section 3.2 |
| 9 | Pre-Construction | Disturbance Areas | Develop a Spill Response Plan. | Construction Plan; Section 3.2 Design & Operations; Section 6.2.1/6.3.2.1 |
| 10 | Pre-Construction | Disturbance Areas | Undertake active nest surveys if clearing of vegetation cannot be avoided during breeding season for migratory birds. | Construction Plan; Section 3.2 |
| 11 | Pre-Construction | Disturbance Areas | Prepare a Compensation Plan in consultation with MNR and Conservation Authorities. | Construction Plan; 3.2 Design and Operations; 6.2.1 |
| 12 | Pre- and Post-Construction | Project Study Area | Undertake roads condition survey pre- and post-construction. | Construction Plan; Section 3.6 |
| 13 | Post-Construction | Disturbance Areas | Conduct post-construction monitoring to assess potential negative effects to significant wildlife habitats:<br>• Waterfowl stopover and staging areas (terrestrial);<br>• Bat maternity colonies;<br>• Colonially-nesting bird breeding habitat (tree/shrub);<br>• Amphibian woodland breeding habitat;<br>• Reptile hibernacula; and<br>• Habitat for bird species of conservation concern (Red-headed Woodpecker). | Design and Operations; Section 6.2.1 |
| 14 | Post-Construction | Disturbance Areas | Conduct post construction bird and bat mortality monitoring at specific turbine locations. | Design and Operations; Section 6.2.1 |

# 2. Project Information

## 2.1 Facility Components

As shown in **Figure 2-1**, the major components of the Project are proposed to be:

- Up to 71 GE 1.6-100 Wind Turbine generator locations and pad mounted step-up transformers and one GE 1.56-100 Wind Turbine generator location and pad mounted step-up transformer (however, only 63 turbines will be constructed);
- Turbine laydown and storage areas (including temporary staging areas, crane pads and turnaround areas surrounding each wind turbine);
- Construction laydown area for the purposes of providing temporary storage of construction materials and temporary construction offices and ancillary equipment such as electrical service from the electrical distribution line;
- A transformer substation and ancillary equipment;
- 34.5 kV electrical collection lines to connect the turbines to the transformer substation and other ancillary equipment such as above-ground junction boxes;
- 115 kV transmission line to run from the transformer substation to a breaker switch station which will connect the electricity generated by the project to the existing Hydro One 115 kV transmission line;
- Turbine access roads;
- Three permanent meteorological towers; and
- An operations and maintenance building and ancillary equipment such as an electrical service line connected to the local distribution service.

The Project components, in addition to the Disturbance Area, as shown on **Figure 2-1**, occupy approximately 615 hectares (1,519 acres) of land in the Municipalities of Bluewater and South Huron.

### 2.1.1 Turbine Specifications

With a total nameplate capacity of 102 MW, the Project is categorized as a Class 4 facility under *O. Reg. 359/09*. Although NextEra is seeking an REA for up to 72 wind turbines, only 63 are proposed to be constructed for the Project.

The wind turbine technology proposed for this Project is the GE 1.6-100 Wind Turbine and GE 1.56-100 Wind Turbine (one turbine only). The turbines are 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The turbines have a 100 m rotor diameter with a swept area of 7,854 $m^2$; each blade is connected to the main shaft via the hub. The turbine is mounted on an 80 m tubular steel tower which contains an internal ladder provided for maintenance access. The turbine will be constructed on a foundation that is approximately 400 $m^2$. The foundation consists of poured concrete and steel rebar to provide added strength.

The nacelle houses the main components of the wind turbine such as the rotor shaft, gear box, couplings, control panel, bearing brackets and the generator. The nacelle is equipped with sound-proofing, is ventilated and the interior is illuminated with electric lights. Some of the wind turbines will have external lighting in accordance with the requirements of Transport Canada (TC).

**Table 2-1** below provides a summary of the turbine specifications. Please refer to the Wind Turbine Specifications Report (AECOM, 2013) for more detailed information on the wind turbines proposed for the Project, including the octave band spectra.

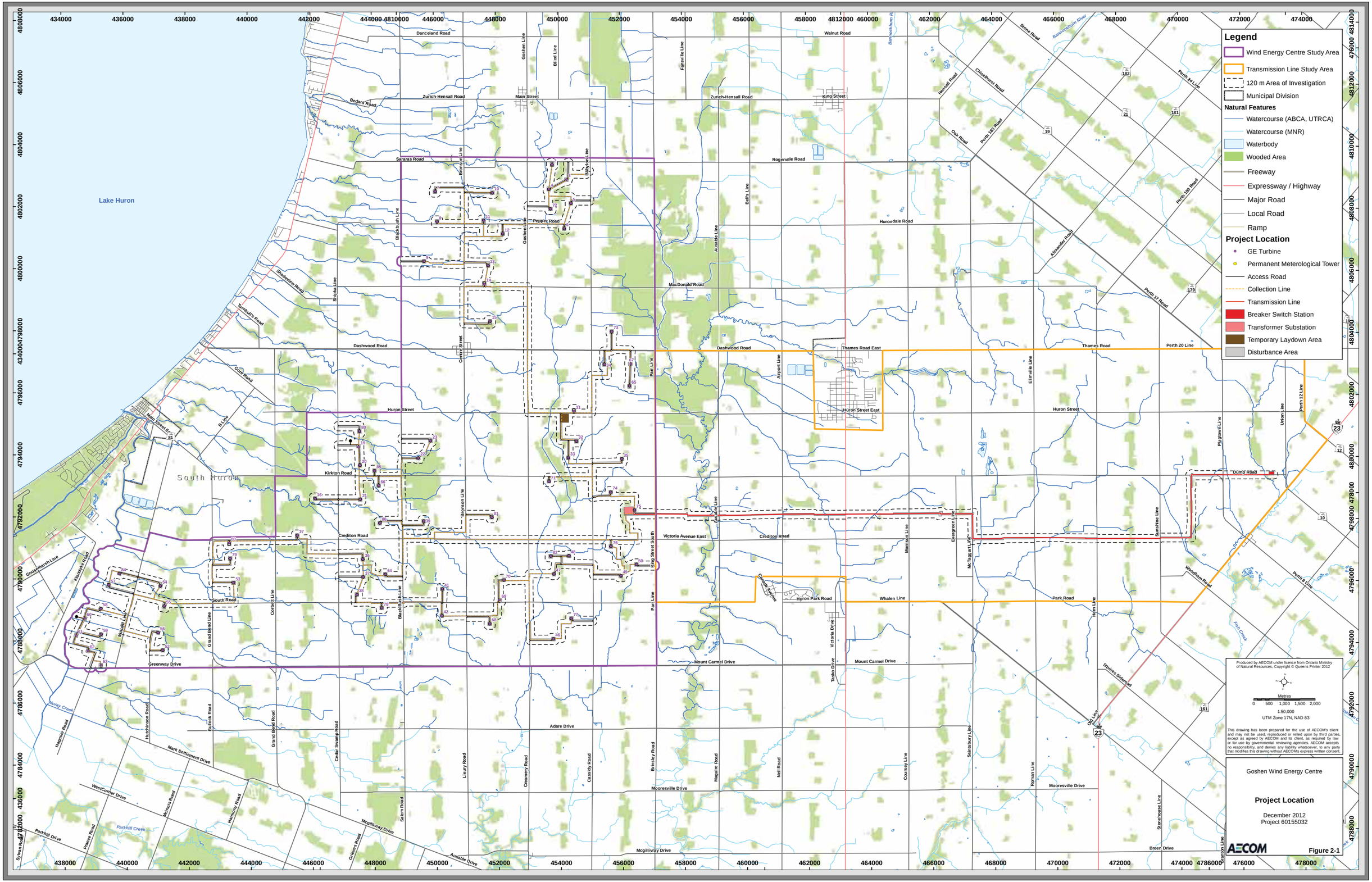


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**Table 2-1 Summary of Technical Specifications**

| Specification | GE 1.6-100 Wind Turbine | GE 1.56-100 Wind Turbine |
|---|---|---|
| **Make** | General Electric | General Electric |
| **Model** | 1.6-100 | 1.56-100 |
| **Name Plate Capacity** | 1.62 MW | 1.56 MW |
| **Hub Height** | 80 m | 80 m |
| **Rotor Diameter** | 100 m | 100 m |
| **Minimum Rotational Speed** | 9.75 rpm | 9.75 rpm |
| **Maximum Rotational Speed** | 15.33 rpm | 16.2 rpm |

### 2.1.2 Laydown and Storage Areas

A temporary laydown and storage area will be constructed on privately owned land for the purpose of staging and storing equipment during the construction phase. A temporary electrical service line will be connected to the local distribution line for the purpose of providing electrical power to the construction offices. Activities on this site will include materials storage, equipment refuelling, and construction offices. The area will be approximately 4 hectares (10 acres) in area.

### 2.1.3 Turbine Laydown and Storage Areas

A 122 m by 122 m square around each wind turbine will be established for the laydown and assembly of the wind turbine components. The construction trailers will receive electrical power through a temporary electrical service line connected to the local distribution line.

### 2.1.4 Collection Lines

The system that connects each turbine to the transformer substation will consist of 34.5 kV electrical collection lines that will be buried 1 m below grade on private property or within the municipal road right of way. There may be occasional locations where the collection lines are placed above ground on wood, concrete or steel poles for technical reasons. Above ground electrical junction boxes will be used to connect sections of underground collection lines.

### 2.1.5 Transformer Substation and Breaker Switch Station

Approximately two to three hectares in size, the transformer substation will either be located on privately held lands through a lease agreement or on land purchased by Goshen Wind, Inc. The electricity collected via the 34.5 kV underground collection lines will converge at the transformer substation where the electricity will be “stepped-up” to 115 kV for transmission and then routed to a breaker switch station. The breaker switch station will occupy less than 0.4 hectares (1 acre) of land and is the connection point with the existing Hydro One 115 kV transmission line. The substation equipment will include an isolation switch, a circuit breaker, a step-up transformer, transmission switch gear, instrument transformers, grounding and metering equipment. All substation grounding equipment will meet the Ontario Electrical Safety Code. The substation will be connected to the existing electrical distribution line to supply power for the control housing lighting and equipment.

### 2.1.6 Electrical Transmission

A 115 kV electrical transmission line from the step-up transformer substation to the connection point with the Provincial electricity grid is proposed to be located on private property, or within existing road right-of-ways. It is anticipated that the transmission line will be mounted on new transmission line poles. There may be occasional places where the line is placed underground for technical reasons. The poles are proposed to be constructed of wood, concrete or steel and will be between 18 and 30 m tall.

The interconnection plan for any wind energy centre is subject to study, design and engineering by the Independent Electricity System Operator which manages the province's electricity grid, Hydro One and the Ontario Energy Board, which regulates the industry through the Transmission System Code and the Distribution System Code.

### 2.1.7 Access Roads

On-site access roads to each turbine will be constructed to provide an access point to the properties for equipment transport during the construction phase and for maintenance activities during operation. Typically the access roads will be 11 m wide during the construction phase to accommodate the large cranes (with an additional 2 m clearance on each side for travel), and may be reduced in width at the landowner's request following construction. Roads will be wider where they intersect with existing municipal roads to accommodate the turning radii needed for wind turbine component delivery.

### 2.1.8 Operations and Maintenance Building

An operations building, approximately 30 m by 15 m in size, will be constructed on privately held lands (on or near the same parcel as the substation for the Project) for the purpose of monitoring the day-to-day operations of the wind energy centre and supporting maintenance efforts. A small parking lot will be constructed to accommodate staff vehicles. Prior to the construction phase, a Stormwater Pollution Prevention Study will be conducted to address any potential effects associated with stormwater runoff.

Potable water will be supplied by a well or through the municipal water system and a septic bed will be constructed for the disposal of sewage. The septic bed will be constructed to the minimum size required for the size of the operation and maintenance building. It is the Project owner's responsibility to ensure proper maintenance of the septic system. The operations and maintenance building, septic system and water supply will be constructed in accordance with applicable municipal and provincial standards.

### 2.1.9 Permanent Meteorological Towers

Permanent meteorological towers are an operational requirement of the Independent Electricity System Operator (IESO) as an electricity market participant (this includes all generators of electricity) and allow the IESO to operate the system reliably and safely.

Three permanent meteorological towers will be installed at the Project. The towers are typically up to 80 m in height. No significant soil or vegetation disturbance is anticipated. The use of meteorological data is key to the safe and efficient operation of a wind energy centre. Some operational decisions made using meteorological data include:

- Cut-in wind speed;
- Cut-out wind speed;
- Turbine shut down during potential icing conditions; and,
- Turbine shut down during extreme weather events.

### 2.1.10 Water Crossings

To the extent possible, Project infrastructure has been sited to minimize the number of water crossings. The Water Assessment and Water Body Report (AECOM, 2013), which has been developed as part of the REA, describes all water crossings and associated mitigation measures.

## 2.2 Project Activities

The following sections outline the anticipated activities for the Construction, Operation and Decommissioning phases of the Project.

### 2.2.1 Project Timing

Subject to the receipt of the necessary permits and approvals, site work for the Goshen Wind Energy Centre is expected to begin in 2013 and last for approximately 6-12 months. **Table 2-2** presents the currently anticipated construction schedule and approximate order of construction activities for the proposed Project.

**Table 2-2 Construction Schedule**

| Activity | | Probable Timing of Activity | Probable Duration |
|---|---|---|---|
| **Surveying** | | Prior to construction – preference is winter months | Less than one day per turbine location |
| **Geotechnical Sampling** | | Prior to construction – preference is winter months | One to two hours per turbine location |
| **Land Clearing and Construction of Access Roads** | | Late spring or summer – preference is to conduct during drier months | One to three days per access road to each turbine |
| **Installation of Culverts** | | Late spring or summer – preference is to conduct during drier months | One to two days per culvert |
| **Construction Laydown Area** | | Late spring or summer – preference is to conduct during drier months | One week |
| **Turbine Site and Crane Pad Construction** | | Late spring or summer – preference is to conduct during drier months | Two to four days per turbine location |
| **Delivery of Equipment** | | Throughout construction phase as needed, and in compliance with Traffic Management Plan | As needed throughout construction phase |
| **Turbine Foundations** | | Late spring or summer – preference is to conduct during drier months | Three to four days (excluding curing) |
| **Wind Turbine Assembly and Installation** | | Late spring or summer – preference is to conduct during drier months | Four to five days per turbine location |
| **Electrical Collector System** | **Pad Mount Transformers** | Late spring or summer – preference is to conduct during drier months | Four to six days |
| | **Collection Lines** | Late spring or summer – preference is to conduct during drier months | Dependent upon the required length of the lines; however, between 4 and 8 km of collector lines can be installed in a week. |
| **Transformer Substation and Breaker Switch Station** | | Late spring or summer – preference is to conduct during drier months | 15 – 20 weeks |
| **Operations Building** | | Late spring or summer – preference is to conduct during drier months | Eight weeks |
| **Clean-up and Reclamation** | | Following turbine construction | Will be conducted as site is constructed |
| **Turbine Commissioning** | | Late spring or summer – preference is to conduct during drier months | One to three days per turbine |

### 2.2.2 Construction

#### *2.2.2.1 Surveying and Geotechnical Study Activities*

Existing buried infrastructure located on public property will be identified using the Ontario One Call service and buried infrastructure located on private property will be identified by private contractors prior to construction and updated throughout construction, as required.

Geotechnical sampling will be required for turbine foundation locations. Typically, a truck-mounted drill rig visits the sampling locations, drills the borehole and collects geotechnical information. This operation typically uses two operators and requires one to two hours per turbine location.

Equipment will include, at a minimum, trucks, a truck mounted drill rig, and possibly a track-mounted drill rig. The trucks will be driven to the site via existing municipal roads. No materials will be brought on site for these activities and any waste generated would be comprised of drill cuttings which will be scattered in the vicinity of the boreholes. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling for all construction activities will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.2 Land Clearing and Construction of Access Roads*

Access roads will be constructed to transport equipment to the construction sites. There will be a 60 m wide area for construction of the access roads. The access road will be sited within this area of disturbance in consultation with the landowner and taking into consideration potential environmental effects. Typically, the access roads will be between 11 m wide during the construction phase to accommodate the large cranes (with an additional 2 m clearance on each side for travel).

The construction of the access road will typically require clearing and grubbing of any vegetation, excavation of the topsoil layer and adding a layer of compacted material to a typical thickness of 300 to 600 mm, depending upon site specific geotechnical conditions. Clean granular material (typically “A” or “B” gravel) will be brought to the site as needed and will not be stockpiled onsite. The topsoil will be kept and re-used on site. The access road to each turbine will typically require one to three days of construction time. Depending on the length of the access roads, construction may require approximately 25 trucks of gravel.

New culverts may be required to maintain drainage in ditches at junctions with roadways and these will be constructed to support the construction equipment and delivery trucks. The exact details of culverts and their installation in addition to erosion control measures will be determined in conjunction with the Ausable Bayfield Conservation Authority (ABCA) and the Upper Thames River Conservation Authority (UTRCA) as part of their permitting process. The culverts are proposed to be open bottom and left in place following the operation phase.

Equipment will include, at a minimum, trucks, graders, and bulldozers. Municipal and provincial roads will also be used for transporting equipment. Any road damages associated with the Project will be repaired prior to the completion of the construction phase. A Road Use Agreement will be developed in consultation with the municipalities. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.3 Construction of Laydown Areas*

A 4 hectare (10 acre) site will be constructed for the temporary storage of construction material and as a site for the construction office trailers. Following clearing and grubbing of any vegetation, the topsoil at the temporary laydown area will be removed and approximately 600 mm of clean compacted crushed gravel will be imported as needed. The excavated topsoil will be re-used on site as feasible. A temporary electrical service line will be connected to the existing distribution line adjacent to the laydown area for the purpose of providing power to the construction office trailers. Construction activities are expected to last approximately one week and will require approximately 100 loads of gravel, and a crew of six people. Following the construction phase, the gravel will be removed from the site or re-used, to be determined in consultation with the landowner. The temporary electrical service line and poles will be removed. The stockpiled topsoil will then be redistributed throughout the temporary laydown area.

Equipment will include, at a minimum, trucks, graders, and bulldozers. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.4 Construction of Turbine Site and Crane Pads*

Prior to construction, the construction area will be cleared and grubbed. In order to provide sufficient area for the laydown of the wind turbine components and its assembly, a 122 m by 122 m square around the wind turbine must be cleared, levelled, and be accessible during the construction phase. The topsoil is typically removed and some soil stabilizing material (i.e. crushed gravel or clean back fill) may need to be added depending upon site specific geotechnical conditions. Where the site laydown areas are close to watercourses, erosion control measures will be implemented, as outlined in Section 3.

Crane pads will be constructed at the same time as the road and will be located adjacent to the turbine locations. The crane pads will typically be 15 m by 35 m in area. The topsoil at the crane pad will be removed and approximately 600 mm of clean compacted crushed gravel will be imported as needed. The excavated topsoil will be re-used on site as feasible. The construction crew is anticipated to require four to six people and construction activities are expected to last for approximately one to two days per turbine site.

Equipment will include, at a minimum, trucks, graders, and bulldozers. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.5 Delivery of Equipment*

Equipment will be delivered by truck and trailer throughout the construction phase and stored at the temporary lay-down sites surrounding each turbine. A Road Use Agreement and Traffic Management Plan will be developed in consultation with the municipalities. Alternative traffic routes will be prepared to address traffic congestion, as needed. To the extent necessary, modifications to public roads will be addressed in the Road Use Agreement.

#### *2.2.2.6 Construction of Turbine Foundations*

A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 $m^2$, will be constructed of poured concrete and reinforced with steel rebar to provide strength. The construction timeframe for turbine foundations is three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding roads will be disposed of as hazardous waste by a licensed contractor.

Typical construction equipment, on a per turbine basis, will include:

- Excavator for removing material;
- Flatbed trucks (four to six) for delivery of rebar, turbine mounting assembly and forms;

- Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms;
- Concrete trucks for delivery of concrete (30-40 loads);
- Construction trucks (three to four vehicles with multiple visits); and,
- Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials.

The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.7 Wind Turbine Assembly and Installation*

Turbine components will arrive on-site using flat bed and other trucks and will be temporarily stored on-site in the immediate vicinity of the base prior to assembly. Typically two cranes will be used to install the turbines. The larger crane is usually a crawler type with a capacity of 400 tonnes or larger, and is used for the higher lifts.

Clearing and grubbing will be required for the erection area. The erection cranes and crew will follow the foundation crew and erect the wind turbines once the foundations are completed and the concrete has set. This will typically be in five lifts (three for the towers, one for the nacelle and one for the rotor) over a period of two to three days. The lower tower sections may be installed several days before the upper tower sections and the turbine to optimize installation sequence. The lower tower section will also include electrical and communications equipment. Total turbine assembly and installation will typically require four to five days for each turbine. Fifteen to twenty people may be required at the site during the turbine installation; they will be transported using light duty vehicles.

Packing frames for the turbine components are returned to the turbine vendor. Following commissioning, the surrounding area will be returned to its original use.

Equipment will include, at a minimum, trucks, two cranes, graders, and bulldozers. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The larger track mounted crane can move from turbine site to turbine site; however, it will need to be disassembled to move it along roadways and from the Project site. Alternatively, cranes may be moved between turbine sites without disassembly along crane paths. In such instances, no additional infrastructure is required to support the crane movement. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.8 Construction of Electrical Collector System*

The electrical collector system will consist of pad mounted transformers, underground cabling for use on private property, above ground junction boxes and a buried collection system running along turbine access roads or municipal road right-of-ways. These components are described below.

- **Pad Mount Transformers:** A concrete transformer pad, approximately 2.2 m by 2.5 m in size, will be installed adjacent to each turbine at the same time as the turbine base installation. The construction will consist of excavation, soil storage, installation of the buried electrical grounding grid, installation of the concrete pad, installation of the transformer, and electrical connections. Transformer installation and cabling between the turbine and transformer is expected to take three days per turbine. Equipment will include flatbed trucks to transport the equipment to site, and a truck-mounted crane for the installation. These activities will likely require four to six trucks, a work force of two people per vehicle per day, and will last between four to six days.

- **Collection Lines:** Cables and fibre optics lines (for communications) from each turbine to the transformer substation will be buried and will be located on private property or within municipal road right of ways. There may be occasional locations where the collection lines are placed above ground on wood, concrete or steel poles. Above ground junction boxes will be installed to connect sections of underground cabling. There will be a 20 m wide area for construction of the collection lines. The collection lines will be sited within this area of disturbance in consultation with the landowner and taking into consideration potential environmental effects. The excavated soil will be stored temporarily and then reused as backfill. Power conductors will be approximately 0.9 m below grade and the location will be marked. Equipment will include trenchers or diggers (depending on soil type) and construction will require a crew of six people. The construction timeframe is dependent upon the required length of the lines.
- **Horizontal Directional Drilling:** Electrical cables may need to be installed using horizontal directional drilling to minimize effects to woodlots or watercourses. Erosion control devices will be installed at the drill location and drill cuttings will be collected and removed from the site for disposal in an approved and appropriate manner. An entrance and exit pit will be excavated on either side of the feature to be bored under. The directional drilling equipment will be set up at the entrance pit and a drill bit attached to rod segments is advanced until it reaches the exit pit. A slurry of bentonite and/or polymer mixed with water will be injected into the hole while drilling to help stabilize the bore hole and reduce friction. Once the drill bit has reached the exit pit the drill bit will be removed and a "reamer" attached and pulled back through the hole to enlarge the bore. The electrical cable will then be installed through the hole. Equipment will include a directional drilling rig and two to three support trucks to carry drilling rods, drilling supplies and cable.

The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment, and the polymer used for directional drilling. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.9 Construction of Electrical Transmission Line*

Holes for new transmission line poles are typically augured in the ground using a truck mounted auger device. The poles will then be inserted using special cranes to a typical depth of 2 m to 3 m below grade. The poles are typically "dressed" (made ready to accept conductors) on the ground prior to installation. In locations where the transmission line makes a turn, guy wires may be used to anchor the corner pole in place. At times, when guy wires cannot be used at corner poles, the steel poles may be mounted on concrete pier foundations. Typically, one crew will install the poles and one crew will dress them. Approximately six construction vehicles (including trucks and a pole loader) and a crew of 12 to 15 people are anticipated for construction of the transmission lines. A maximum of twelve to sixteen poles can be installed and dressed in one day. Once the poles are in place and dressed, cables will be strung in place using boom trucks and special cable reel trucks. Finally, any pre-existing poles that are no longer in use will be removed.

The transmission line will be directionally drilled in one location to avoid affecting a Provincially Significant Wetland. Construction will follow the same process described in Section 2.2.2.8 for directionally drilling the collector system.

Some packing-material waste may be generated from construction. All recyclable materials will be separated from non-recyclable materials and both streams will be removed from the site and disposed of at an approved and licenced facility.

Equipment will include, at a minimum, a truck mounted crane, a drill rig, flatbed trailers and a truck mounted auger. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. A lubricant is likely to be used when the cables are pulled in through the conduit. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.10 Construction of Transformer Substation and Breaker Switch Station*

During construction of the substation and breaker, topsoil and subsoils will be stripped and stockpiled separately. Stripped topsoil and subsoil will be placed in the temporary storage facility area and topsoil stripped from the substation area will be distributed on other Project properties. An electrical service line will connect to the existing distribution line adjacent to the substation for the purpose of providing house service power to the substation control building. The construction crew will consist of approximately 25 to 40 people and construction is expected to last for about four months. Some packing-material waste may be generated. All recyclable materials will be separated from non-recyclable materials and both streams will be removed from the site and disposed of at an approved and licensed facility.

Construction equipment will include small trenchers, a small crane, a backhoe, forklifts, concrete trucks, auger truck and a bulldozer. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment and transformer oil. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.11 Construction of Operations and Maintenance Building*

Construction of the operations and maintenance building may take up to three months to complete and will require a crew of approximately 10 to 15 people.

Equipment will include, at a minimum, forklifts, concrete trucks and smaller crew trucks. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

#### *2.2.2.12 Construction of Permanent Meteorological Towers*

The towers will be erected using winches and secured with guy wires tied off to anchors or a monopole foundation. No significant soil or vegetation disturbance is anticipated. Construction of each meteorological tower will take approximately two days and require a crew of six people.

#### *2.2.2.13 Clean-up and Reclamation*

Site clean-up will occur throughout the construction phase and site reclamation will occur after construction has been completed. Waste and debris generated during the construction activities will be collected by a licensed operator and disposed of at an approved facility. All reasonable efforts will be made to minimize waste generated and to recycle materials including returning packaging material to suppliers for reuse/recycling.

Stripped soil will be replaced and re-contoured in the construction areas and disturbed areas will be re-seeded, as appropriate. Erosion control equipment will be removed once inspections have determined that the threat of erosion has diminished to the original land use level or lower. High voltage warning signs will be installed at the transformer substation and elsewhere, as appropriate. At the conclusion of construction vehicles and construction equipment will be removed from the site.

#### *2.2.2.14 Turbine Commissioning*

Turbine commissioning will occur once the wind turbines and substation are fully installed and Hydro One is ready to accept grid interconnection. The commissioning activities will consist of testing and inspection of electrical, mechanical and communications systems. Some packing-material waste may be generated. All recyclable materials will be separated from non-recyclable materials and both streams will be removed from the site and disposed of at an approved and licenced facility.

Temporary portable generator sets may be used to electrically commission the turbines prior to connection to the grid. The generators will be required for approximately one day per turbine. Following the commissioning phase, the portable generators will be removed from the site and returned to the owners.

Equipment will include support trucks which will be driven to the construction site. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment and portable generators, gearbox oil, and lubricants. Fuel-handling will be conducted in compliance with the mitigation measures outlined in the Construction Plan Report (AECOM, 2013).

### 2.2.3 Operation

#### *2.2.3.1 Wind Turbine Operation*

The wind energy centre will require full time technical and administrative staff to maintain and operate the facility. The primary workers will be wind technicians (i.e., technicians who carry out maintenance on the turbines) along with a site supervisor. The Project will be operated by a staff of five to eight people who will work out of the operations and maintenance building.

The wind turbines will be operating (i.e., in “Run” mode and generating electricity) when the wind speed is within the operating range for the turbine and there are no component malfunctions. Each turbine has a comprehensive control system that monitors the subsystems within the turbine and the local wind conditions to determine whether the conditions are suitable for operation. If an event occurs which is considered to be outside the normal operating range of the turbine (such as low hydraulic pressures, unusual vibrations or high generator temperatures), the wind turbine will immediately take itself out of service and report the condition to the Operations Centre, located in the operations and maintenance building. A communication line connects each turbine to the Operations Centre, which closely monitors and, as required, controls the operation of each turbine. The wind turbine system will be integrated with the electric interconnection Supervisory Control and Data Acquisition (SCADA) to ensure that the Project critical controls, alarms and functions are properly co-ordinated for safe, secure and reliable operation. The wind turbine will also report to NextEra’s Central Operations Facility during non-working hours.

#### *2.2.3.2 Routine Turbine Maintenance*

Routine preventative maintenance activities will be scheduled at six month intervals with specific maintenance tasks scheduled for each interval. Maintenance will be done by removing the turbine from service and having two to three technicians climb the tower to spend a full day carrying out maintenance activities.

Consumables such as the various greases used to keep the mechanical components operating and oil filters for gearboxes and hydraulic systems will be used for routine maintenance tasks. Following all maintenance work on the turbine, the area will be cleaned up. All surplus lubricants and grease-soaked rags will be removed and disposed of as required by applicable regulations. All maintenance activities will adhere to the same spill prevention protocols undertaken during the construction phase.

#### *2.2.3.3 Unplanned Turbine Maintenance*

Modern wind turbines are very reliable and the major components are designed to operate for at least 30 years. However, there is a possibility that component failure may occur despite the high reliability of the turbines fleet-wide. Most commonly, the failure of small components such as switches, fans, or sensors will take the turbine out of service until the faulty component is replaced. These repairs can usually be carried out by a single crew visiting the turbine for several hours.

Events involving the replacement of a major component such as a gearbox or rotor are rare. If they do occur, the use of large equipment, sometimes as large as that used to install the turbines, may be required.

It is possible that an access road, built for construction and returned to farmland when the construction phase is completed, would need to be rebuilt to carry out repairs to a damaged turbine. Typically only a small percentage of turbines would need to be accessed with large equipment during their operating life.

#### *2.2.3.4 Electrical System Maintenance*

The collection lines and substation will require periodic preventative maintenance activities. Routine maintenance will include condition assessment for above-ground infrastructure and protective relay maintenance of the substation, in addition to monitoring of the secondary containment system for traces of oil. Finally, vegetation control will be required around the transmission line to prevent any damage to the line and ensure safe operation. Any vegetation that has the potential to grow to more than 4.3 m above grade will be cleared. The vegetation is typically cleared by mechanized equipment (e.g., chainsaw / hydro axe).

#### *2.2.3.5 Waste Management*

Waste generated during the operations phase will be removed from the operations and maintenance building by a licensed operator and disposed of at an approved facility. Any lubricants or oils resulting from turbine maintenance will be drummed on site and disposed of in accordance with applicable Provincial regulations. All reasonable efforts will be made to minimize waste generated and to recycle materials including returning packaging material to suppliers for reuse/recycling. The spill prevention protocols followed during construction will continue to be observed throughout the facility's operations and maintenance activities.

### 2.2.4 Decommissioning

#### *2.2.4.1 Procedures for Decommissioning*

Decommissioning procedures will be similar to the construction phase. More detailed information on decommissioning will be available in the Decommissioning Plan Report (AECOM, 2013). The procedures, which will be finalized prior to decommissioning in accordance with REA requirements, are anticipated to include:

1. The creation of temporary work areas. In order to provide sufficient area for the lay-down of the disassembled wind turbine components and loading onto trucks, a 122 m by 122 m square must be cleared, levelled and made accessible to trucks. The topsoil will be removed and some material may need to be added.

2. The creation of crane pads. The crane pads will typically be 15 m x 35 m in size and will be located within the temporary work area around each wind turbine. The topsoil at the crane pad will be removed and approximately 600 mm of compacted crushed gravel will be added. Once the turbine disassembly is complete, the gravel area around each turbine will be removed and the area will be restored to prior use using stockpiled topsoil.
3. The use of cranes to remove the blades, hub and tower segments.
4. The use of trucks for the removal of turbines, towers and associated equipment.
5. The removal of the top 1 m of the turbine foundations and replacement with clean fill and stockpiled topsoil. The fill and topsoil will be contoured to allow cultivation in the case of agricultural lands.
6. Road bedding material will be removed and replaced with clean subsoil and topsoil for reuse by the landowner for agricultural purposes. It is proposed to leave culverts in place following the operations phase.
7. Cutting underground electrical lines, burying the ends to 1 m below grade, and leaving the lines in place with the consent of the landowner. Above-ground lines and poles that are not shared with another Transmission/Distribution Operator will be removed and the holes will be filled with clean fill.
8. The demolition of the substation, breaker switch station and operations and maintenance building. These will be decommissioned in a manner appropriate to and in accordance with the standards of the day. All materials will be recycled, where possible, or disposed off-site at an approved and appropriate facility.

#### *2.2.4.2 Land Restoration Activities*

Once all of the turbines and ancillary facilities are removed, the remaining decommissioning work will consist of shaping and grading the areas to, as near as practicable, the original contours prior to construction of the wind turbines and access roads. Existing agricultural capacity will be restored and the land graded to maintain proper drainage. All areas, including the access roads, transformer pads and crane pads, will be restored to, as near as practical, their original condition with native soils and seeding. If there is insufficient material onsite, topsoil and/or subsoil will be imported from a source acceptable to the landowner.

Although strict spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. The soil conditions of the turbine areas will be surveyed to determine if any effects have occurred. Should soil effects be noted, the affected soils will be identified, excavated, and removed to the applicable standards from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled subsoil and topsoil, if available. If none are available, clean fill and topsoil will be imported.

Decommissioning may temporarily affect the agricultural practices directly around the access roads, substation and turbine locations, but only during their removal. Similar to the construction phase, decommissioning will follow a stormwater protection plan that will ensure proper steps are followed to mitigate erosion and silt/sediment runoff.

As with the Project's construction, noise levels around the decommissioning work will be higher than average. Proper steps will be followed to minimize this disturbance, such as avoiding work outside of daylight hours. All decommissioning project activities will conform to applicable local municipal noise by-laws. Also, as with the Project's construction, road traffic in the area will increase temporarily due to crews and heavy equipment movements. If required, a traffic management plan will be prepared to mitigate the effects of increased road traffic, in consultation with the local municipality.

#### *2.2.4.3 Procedures for Managing Waste Generated*

As discussed above, the waste generated by the decommissioning of the Project is minimal, and there are anticipated to be no toxic residues. Any waste generated will be disposed of according to the applicable standards with the emphasis on recycling materials whenever possible.

The major components of the wind turbines (tower, nacelle, blades) are modular items that allow for ease of construction and disassembly of the wind turbines during replacement or decommissioning. Dismantled wind turbines have a high salvage value due to the steel and copper components. These components are easily recyclable and there is a ready market for scrap metals. Transformers and transmission lines are designed for a 50 year lifespan so these items could be refurbished and sold for reuse.

Based on the construction details for the GE wind turbines and associated tower and components, it is assumed that both the tower and nacelle will yield approximately 80% salvageable materials. Since the hub assembly and bedplate is manufactured steel, it is anticipated that the hub will yield 100% salvageable metallic materials. Copper salvage estimates were derived by assuming 5% of the total tower and nacelle weight consists of salvageable copper bearing materials. Since the rotor/blades are constructed of predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibres), no salvage for the rotor or blades is currently assumed.

It is assumed that 75% of the aggregate material from the decommissioning of the crane pads can be salvaged for future use as aggregate base course. The remaining materials would be viable for general fill on non-structural fill areas. The geotextile fabric cannot be salvaged.

# 3. Potential Environmental Effects

An effects assessment for the construction, operation and decommissioning phases of the Project has been completed in accordance with the requirements of *O. Reg. 359/09*. This section provides a summary of the potential effects and any residual effects of each phase as they relate to specific environmental conditions. For further detail on specific mitigation measures and monitoring plans, reference should be made to the Construction Plan Report (AECOM, 2013) and Design and Operations Report (AECOM, 2013).

As outlined previously, the procedures for decommissioning will be similar to the construction phase. As such, the potential effects for each of these phases are also deemed to be similar.

## 3.1 Cultural Heritage

*Construction and Decommissioning*

**Table 3-1** describes the mitigation measures, residual effects and monitoring plan associated with potential effects to cultural heritage resulting from construction and decommissioning.

**Table 3-1 Mitigation Measures, Residual Effects and Monitoring Plan: Cultural Heritage During Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Disturbance or displacement of 33 archaeological resources identified through Stage 2 Assessment due to construction of project infrastructure.** | • Avoid disturbance/ loss of archaeological sites | • Avoid site or conduct Stage 3 archaeological assessment if recommended based on the outcome of the Stage 2 assessment:<br>▪ To avoid, install a fence a minimum of 20 m from the site boundaries to protect it from adjacent construction activities and then enact the monitoring plan; or<br>▪ Conduct Stage 3 archaeological assessment, document findings in Stage 3 assessment report, and submit report to Ministry of Tourism, Culture and Sport (MTCS) for approval. Any potentially interested Aboriginal communities will be contacted, as appropriate, from at least this point onward.<br>• Avoid site or conduct Stage 4 archaeological assessment if recommended based on the outcome of the Stage 3 assessment:<br>▪ To avoid, install a fence a minimum of 10 from the site boundaries to protect it from adjacent construction activities and then enact the monitoring plan; or<br>▪ Conduct Stage 4 archaeological assessment, document findings in Stage 4 assessment report, and submit report to MTCS for approval. Construction can then proceed without any further documentation or monitoring. | • Disturbance or displacement of archaeological resources avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Retain a licensed archaeologist to monitor any construction activities within a 50 m monitoring zone for an archaeological resource surrounded by a 20 m buffer where a Stage 3 archaeological assessment has been recommended. Submit a report to MTCS detailing the results of any monitoring activities.<br>• Retain a licensed archaeologist to monitor any construction activities for Stage 4 avoidance close to the 10 m buffer area fenced off that may affect archaeological resources.<br>**Contingency Measures:**<br>• Cease work immediately should previously unidentified archaeological resources be discovered during the construction phase. The area will be secured and a licensed archaeologist contacted to conduct further archaeological work. Construction will only resume in the location when any archaeological assessment has been completed. Any potentially interested Aboriginal communities will be contacted, as appropriate.<br>• Cease work immediately should human remains be found during construction, and contact the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services. |

No effects to protected properties or heritage resources are anticipated. The Project Location was selected to avoid these features.

*Operation*

No effects to protected properties, archaeological resources or heritage resources are anticipated as a result of the operational phase of the Project.

## 3.2 Natural Heritage

### 3.2.1 Potential Effects to Generalized Candidate Significant Wildlife Habitat

*Construction and Decommissioning*

**Table 3-2** describes the mitigation measures, residual effects and monitoring plan associated with potential effects to Generalized Candidate Significant Wildlife Habitat resulting from construction and decommissioning.

*Operation*

There are no potential effects to Generalized Candidate Significant Wildlife Habitat as a result of operation activities.

### 3.2.2 Potential Effects to Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

*Construction and Decommissioning*

**Table 3-3** describes the mitigation measures, residual effects and monitoring plan associated with potential effects to Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat resulting from construction and decommissioning.

*Operation*

**Table 3-4** describes the mitigation measures, residual effects and monitoring plan associated with potential effects to Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat resulting from operations.

## Table 3-2 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling.** | • Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. | • Develop and implement an erosion and sediment control plan before commencement of construction as per Ontario Provincial Standard Specifications (OPSD 219.130).<br>• Utilize erosion blankets, erosion control fencing, straw bales, siltation bags, etc. For construction activities within 30 m of a wetland, woodland or water body, to mitigate potential excessive erosion and sedimentation. Extra erosion and sediment control materials should be kept on hand, (i.e., heavy duty silt fencing, straw bales).<br>• Check that erosion control tools are in good repair and properly functioning prior to conducting daily work and re-install or repair as required prior to commencing daily construction activities.<br>• Keep sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated).<br>• To avoid sedimentation in wetlands and watercourses, schedule grading within 30 m of a watercourse or wetland to avoid times of high runoff volumes, wherever possible. Temporarily suspend work if high runoff volume is noted or excessive flows of sediment discharges occur until contingency measures are in place.<br>• Re-vegetate temporary roads to pre-construction conditions as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. | • Increased erosion and sedimentation avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis:<br>▪ Weekly during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• **Contingency Measures:**<br>▪ Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). |
| **Removal/disturbance of topsoil and increased soil compaction from manoeuvring of heavy machinery, excavation and backfilling.** | • Minimize removal/ disturbance of topsoil and increased soil compaction. | • Where feasible, lighter vehicles and lighter machinery should be used in and around natural areas.<br>• Any vehicles used within natural areas should use wide-based tires. Tracked vehicles should be avoided. | • Increased erosion and sedimentation avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • See erosion and sedimentation above. |
| **Increased erosion and sedimentation resulting from directional drilling.** | • Minimize erosion and sedimentation. | • Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario *Water Resources Act*, R.S.O. 1990.<br>• Set back drill entry and exit pits at least 30 m from natural features (i.e., woodlands, wetlands) or water bodies.<br>• Monitor natural features for signs of surface disturbance (e.g., escape of drilling mud, evidence of tunnel collapse). | • Increased erosion and sedimentation avoided or minimized through application of mitigation measures.<br>• Moderate likelihood; if accidental damage occurred negative effects may be measurable but would likely represent a small change relative to existing conditions. | • See erosion and sedimentation above. |

## Table 3-2 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement.** | • Minimize disturbance and/or mortality to terrestrial wildlife. | • Time vegetation removal to avoid periods of habitat use to the extent possible, particularly to avoid sensitive life stages (e.g., breeding season for migratory birds, May 1 to July 30). Undertake active nest surveys prior to construction if clearing of vegetation must take place during this period.<br>• Avoid intersecting likely wildlife migration routes wherever possible.<br>• Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours (7:00 am to 7:00 pm), wherever possible.<br>• Clearly post construction speed limits (30 km/h). Install and maintain wildlife crossing and speed limit signs on access roads. | • Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction.<br>• **Contingency Measures:**<br>▪ In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |
| **Damage to vegetation while operating equipment.** | • Minimize disturbance to/loss of wildlife habitat and vegetation. | • Keep vegetation removal to a minimum and limited to non-significant habitats (e.g., hedgerows), where possible.<br>• For roadside collection line routes, vegetation removal (if any) will be kept to a minimum and will be limited to the road right-of-way.<br>• Where construction is to occur within 30 m of natural features, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation or intrusion into the natural feature.<br>• Where excavation for construction of access roads or collection lines is conducted adjacent to the dripline of woodlands (or within the dripline for collection line installation within road right-of-ways), implement proper root pruning measures to protect tree roots. | • Disturbance to or loss of wildlife habitat and damage to vegetation while operating equipment avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ If accidental damage to habitat occurs, habitat restoration will occur using suitable native species.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |
| **Disturbance to or loss of wildlife habitat, including active bird nests.** | • Minimize vegetation removal and destruction of bird nests. | • Schedule vegetation removal outside of breeding season (May 1 to July 30) where possible.<br>• Undertake active nest surveys prior to construction if clearing of vegetation must take place during this period.<br>• Only apply herbicides (if required) when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices).<br>• Only use herbicides (if required) approved for use adjacent to water bodies, riparian buffers, or woodland edges (does not apply to agricultural practices). | • Vegetation removal minimized and destruction of active bird nests avoided through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction.<br>• **Contingency Measures:**<br>▪ In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ If accidental damage to habitat occurs, habitat restoration will occur using suitable native species.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |

## Table 3-2 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Soil / water contamination by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.** | • Minimize soil/water contamination. | • Ensure machinery is maintained free of fluid leaks.<br>• Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features or water bodies. Use spill collection pads for vehicle refuelling and maintenance.<br>• Store any stockpiled materials at least 30 m away from a wetland, woodland or waterbody to prevent deleterious substances from inadvertently discharging to the environment.<br>• Develop a spill response plan and train staff on associated procedures.<br>• Maintain emergency spill kits on site.<br>• Control soil / water contamination through best management practices.<br>• Dispose of any waste material from construction activities by authorized and approved off-site vendors. | • Soil and water contamination avoided or minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Contractor to conduct daily inspections of construction equipment for leaks / spills.<br>• Develop an emergency spills plan.<br>• **Contingency Measures:**<br>▪ In the event of a spill, immediately stop all work until the spill is cleaned up.<br>▪ Notify MOE's Spills Action Centre of any leaks or spills.<br>▪ Assess and remediate affected soils and water by using spill kit kept on site.<br>▪ For spills near wetlands, analyze water samples for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum).<br>▪ Monitor daily to ensure proper cleanup is completed. |
| **Soil / water contamination by oils, gasoline, grease and other materials from spills during directional drilling.** | • Minimize soil/water contamination. | • Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario *Water Resources Act*, R.S.O. 1990.<br>• Develop "Frac-Out" Contingency Plan outlining steps to contain any chemicals or to avoid contamination of adjacent features.<br>• Collect drill cuttings as they are generated and place in a soil bin or bag for off-site disposal.<br>• Ensure drill depth is at an appropriate depth below feature to reduce the risk of a "frac-out". Drilling depth will be determined based on site-specific geotechnical conditions and will take into account soil type, soil variances and porosity, as derived from exploratory borehole information.<br>• Install protective fencing around vegetation to prevent accidental damage. | • Risk of soil / water contamination avoided or minimized through application of mitigation measures.<br>• Moderate likelihood; if accidental damage occurred negative effects may be measurable but would likely represent a small change relative to existing conditions. | • Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.<br>• **Contingency Measures:**<br>▪ In the event of a "frac-out", immediately stop all work, including the recycling of drilling mud / lubricant.<br>▪ Monitor "frac-out" for 4 hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).<br>▪ If the fracture becomes excessively large, engage a spill response team to contain and clean up excess drilling mud in the water.<br>▪ If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. Revegetated areas will be monitored twice per year for two years subsequent to "frac-out" to confirm revegetation is successful. |

**Table 3-2 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat During Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | ▪ Document post-cleanup conditions with photographs and prepare "frac-out" incident report describing time, place, actions taken to remediate "frac-out" and measures implemented to prevent recurrence. Provide incident report to MNR and MOE forthwith. |
| **Changes in surface water drainage patterns.**<br><br>**Obstruction of lateral flows in surface water to wetlands.** | • Minimize changes in surface water drainage patterns and obstruction of lateral flows in surface water to wetlands. | • Minimize changes in land contours and natural drainage; maintain timing and quantity of flows.<br>• Any grading of lands adjacent to natural features should match existing grades at the identified set-back, or buffer from the features.<br>• Control quantity and quality of stormwater discharge using best management practices (e.g. use of a permeable surface for access roads, complete a Stormwater Pollution Prevention Study to address any potential effects associated with stormwater runoff for the Operations and Maintenance Building prior to construction). | • Changes in surface water drainage patterns and obstruction of lateral flows avoided through mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Inspect locations within 30 m of wetlands following completion of access roads to ensure no grade changes.<br>• **Contingency Measures:**<br>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Accidental intrusion into natural features resulting in damage to the form or function of significant wetlands and / or woodlands.** | • Avoid accidental intrusion into significant features. | • Maintain 30 m setback from significant features, where possible, or a minimum 5 m setback (measured from the dripline of trees or feature edge if trees are absent).<br>• Limit vegetation removal for the transmission line to the existing road right-of-way at WET-053.<br>• Establish 30 m setback to significant wetlands from new transmission line pole locations, where possible.<br>• Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. | • Accidental intrusion will be avoided through clear delineation of boundaries and protective fencing.<br>• Negligible residual effects. | • Undertake weekly site inspection by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ If any wetland/woodland vegetation is damaged, habitat restoration will occur utilizing suitable native species. |
| **Accidental intrusion into bat maternity colonies causing habitat damage.** | • Avoid accidental intrusion into natural features. | • Clearly delineate construction boundaries where construction will occur within 10 m using protective fencing to ensure that construction activities occur outside the habitat boundaries. | • Habitat damage will be avoided through clear delineation of boundaries and protective fencing.<br>• Negligible residual effects. | • Undertake weekly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ If accidental damage to habitat occurs, habitat restoration will occur using suitable native species. |
| **Accidental intrusion into turtle wintering areas causing habitat damage.** | • Avoid accidental intrusion into habitat. | • Clearly delineate habitat boundaries within 10 m of the habitat boundary using protective fencing to ensure that construction activities occur outside the habitat boundaries. | • Disruption to turtle wintering habitats avoided through habitat delineation and fencing.<br>• Negligible residual effects. | • Undertake weekly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |
| **Accidental intrusion into reptile hibernacula causing habitat damage.** | • Avoid accidental intrusion into natural feature.<br>• Avoid damage to rock pile(s). | • Clearly delineate habitat boundaries where construction will occur within 10 m using protective fencing to ensure that construction activities occur outside the natural feature and avoid direct disturbance to the feature (e.g. rock pile). Avoid excavation within 30 m of the rock pile or foundation. Where avoidance is not possible, collection lines will be installed above-ground within 30 m of the rock pile. Collection line poles, transmission line poles and turbine construction disturbance areas will be set back at least 30 m from the rock pile or foundation. | • Habitat damage will be avoided and mortality minimized through clear habitat delineation.<br>• Negligible residual effects. | • Undertake weekly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |

**Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Accidental intrusion into amphibian woodland breeding habitat causing habitat damage.** | • Avoid accidental intrusion into habitat. | • Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing to ensure that construction activities occur outside the habitat boundaries. | • Disruption to amphibian habitats avoided through habitat delineation and fencing.<br>• Negligible residual effects. | • Undertake weekly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction.<br>• **Contingency Measures:**<br>▪ Repair protective fencing if damaged.<br>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.<br>▪ If accidental damage to habitat occurs, habitat restoration will occur within the disturbed area using suitable native species. |
| **Risk of soil or water contamination resulting from accidental spills of fuel, etc.** | • Minimize soil or water contamination. | • Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features. | • Soil and water contamination minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Contractor to conduct routine inspections of construction equipment for leaks / spills.<br>• Develop an emergency spills plan.<br>• **Contingency Measures**:<br>▪ In the event of a spill, immediately stop all work until the spill is cleaned up.<br>▪ Notify MOE's Spills Action Centre of any leaks or spills.<br>▪ Assess and remediate affected soils and water by using spill kit kept on site.<br>▪ If a spill enters a wetland, collect and analyze water samples for appropriate parameters.<br>▪ Monitor daily until cleanup is completed. |
| **Increased dust accumulation on peripheral wetland vegetation, causing damage to wetland plants.** | • Minimize dust accumulation on peripheral vegetation. | • Use of water as a dust suppressant within the construction footprint along areas where construction is located within 5 m of a significant wetland. | • Accumulation of dust on peripheral vegetation will be minimized through the application of mitigation measures.<br>• Some residual effects of limited magnitude likely. | • Daily monitoring of areas where active construction is occurring within 5 m of a significant wetland by Environmental Monitor.<br>• **Contingency Measures:**<br>▪ If dust accumulation on wetland plants occurs, spray down plants with water. |
| **Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation in wetlands and/or woodlands.** | • Minimize effects to soil moisture and species composition of vegetation. | • Ensure Best Management Practices are used to maintain current drainage patterns, including:<br>▪ Implement infiltration techniques to the maximum extent possible.<br>▪ Minimize paved surfaces and design roads to promote infiltration.<br>• Limit changes in land contours. | • Effects to soil moisture and species composition of vegetation minimized.<br>• Low likelihood and limited magnitude of effect as a result. | • Site inspection by Environmental Monitor following grading activities within 30 m of significant wetlands.<br>• **Contingency Measures:**<br>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling near significant wetlands and/or woodlands.** | • Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. | • Maintain 30 m setback from significant wetlands, where possible or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent).<br>• Install sediment and erosion control fencing along edge of construction area if within 30 m of a wetland or woodland as per Ontario Provincial Standard Specifications (OPSD 219.130).<br>• For construction of turbines and transmission line at Significant Valleyland Feature: utilize erosion control fencing, and keep in place until disturbed areas are stabilized; schedule grading within 30 m of feature to avoid times of high runoff during spring and fall where possible. Suspend work during periods of excessive flows; store stockpiled materials away from feature to prevent substances from inadvertently entering feature; minimize the area and duration of soil exposure; and, minimize vehicle traffic on exposed soils and avoid the use of heavy machinery on slopes.<br>• For construction of access roads at Turtle Over-Wintering Habitat Features: fence area as far from pond and as close to road as possible and install sediment and erosion control fencing at fenced area location.<br>• For construction of the transmission line at Azure Bluet Habitat Feature, Turtle Over-Wintering Habitat Feature and Amphibian Woodland Breeding Habitat Features:<br>▪ Fence area as far from pond and as close to transmission line disturbance area as possible.<br>▪ Install sediment and erosion control fencing at fenced area location.<br>▪ Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance.<br>▪ Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided.<br>▪ Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. | • Increased erosion and sedimentation avoided or minimized through the application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, flooding, etc.) where construction occurs within 5 m of a wetland feature by an Environmental Monitor on the following basis:<br>▪ Daily during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a wetland or woodland feature on the following basis:<br>▪ Weekly during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• **Contingency Measures:**<br>▪ Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. installation of extra erosion and sediment control materials kept on site such as silt fencing, straw bales, etc.). |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Potential for unplanned intrusion into significant wetlands and / or woodlands in event of equipment malfunction during directional drilling.**<br><br>**Risk of soil or water contamination from spills during directional drilling under wetlands and/or woodlands.**<br><br>**Risk of sedimentation or erosion into significant wetlands and/or woodlands wetlands when directionally drilling.** | • Minimize potential for accidental intrusion into significant features.<br>• Minimize soil or water contamination.<br>• Minimize erosion, sedimentation and turbidity during directional drilling. | • Where feasible, wetland crossings will be within existing right-of-ways adjacent to wetland areas.<br>• Crossings will be completed via horizontal directional drilling.<br>• Locate entrance and exit pits at least 30 m from feature edge.<br>• Install sediment fencing as per Ontario Provincial Standard Specifications (OPSD 219.130).<br>• Ensure drill depth is at an appropriate depth below feature to reduce the risk of a “frac-out”.<br>• Restore drilling sites to pre-construction conditions once construction is complete.<br>• Develop Frac-Out” Contingency Plan outlining steps to contain any chemicals and avoid contamination of features. | • Risk of unplanned intrusion into wetland due to directional drilling, resulting in soil or water contamination and / or sedimentation and erosion, minimized through the application of mitigation measures.<br>• Moderate likelihood; if unplanned intrusion occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. | • Monitor directional drilling for the duration of such activities by an Environmental Monitor to ensure that “frac-out” or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.<br>• **Contingency Measures:**<br>▪ In the event of a “frac-out”, immediately stop all work, including the recycling of drilling mud / lubricant.<br>▪ Monitor “frac-out” for 4 hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).<br>▪ If the fracture becomes excessively large, engage a spill response team to contain and clean up excess drilling mud in the water.<br>▪ If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. Revegetated areas will be monitored twice per year for two years subsequent to “frac-out” to confirm revegetation is successful.<br>▪ •Document post-cleanup conditions with photographs and prepare “frac-out” incident report describing time, place, actions taken to remediate “frac-out” and measures implemented to prevent recurrence. Provide incident report to MNR and MOE forthwith. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Clearing of vegetation resulting in loss of up to 2.6 ha of forest cover for transmission line construction within significant woodlands.** | • Minimize loss of forest cover over time. | • Establish an area of forest equal in area to the cleared area (up to 2.6 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be described in a Compensation Plan to be developed in consultation with MNR.<br>• Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). Undertake active nest surveys prior to construction if clearing of vegetation must take place during this period.<br>• Clearly stake area to be cleared.<br>• Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained.<br>• Limit size of machines entering significant woodlands to minimize soil compaction.<br>• Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester.<br>• Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under supervision of an Arborist or Forester. | • Clearing of vegetation will occur for the transmission line.<br>• Loss of forest cover minimized through afforestation; however there will be a time delay for the planted area to reach the same function as the cleared forest. | • Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor.<br>• Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization).<br>• **Contingency Measures:**<br>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. |
| **Disruption of Tundra Swans in stopover and staging habitat due to construction/ decommissioning activities in waterfowl stopover and staging areas.** | • Avoid disruption of Tundra Swan during migration. | • Schedule construction activities within 300 m of the stopover and staging habitat to occur outside the important period of staging Tundra Swan (March 1 to April 15). If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Clearly delineate work area using erosion fencing or similar barrier to avoid accidental damage to staging habitat.<br>• Restore temporary construction areas to pre-construction conditions as soon as possible (e.g. re-vegetate formerly naturally vegetated areas with native plants). | • Disruption of Tundra Swans will be minimized through the application of mitigation measures.<br>• Negligible residual effects. | • No monitoring or contingency measures required as long as construction occurs outside migration period. |
| **Changes to surface water drainage patterns resulting in indirect effects on waterfowl stopover and staging areas.** | • Minimize changes in surface water drainage patterns. | • Ensure Best Management Practices are used to maintain current drainage patterns, including:<br>▪ Implement infiltration techniques to the maximum extent possible.<br>▪ Minimize paved surfaces and design roads to promote infiltration.<br>▪ Limit changes in land contours. | • Habitat damage avoided through maintaining surface water drainage patterns.<br>• Low likelihood and limited magnitude of effect as a result. | • Site inspection by Environmental Monitor following grading activities within 30 m of stopover and staging area.<br>• **Contingency Measures:**<br>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern. |

**Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Noise disturbance to bats during construction near bat maternity colonies.** | • Minimize disturbance to bat roosting habitat. | • Schedule construction activities within 30 m of significant bat habitats to daylight hours during the bat maternal period of May 1st to July 31st, wherever possible. | • Disturbance will be avoided or minimized through timing of construction.<br>• Construction effects temporary and minor. | • No monitoring or contingency measures required during constriction. |
| **Displacement and/or mortality of nursing female and juvenile bats resulting from vegetation clearing for the transmission line.**<br><br>**Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees resulting from vegetation clearing for the transmission line.** | • No displacement and/or mortality of nursing female and juvenile bats.<br>• Maintain sufficient clusters of cavity trees within the woodland for ongoing bat maternity colony habitat use. | • Identify locations of cavity trees within the bat maternity colony habitat and ensure clusters of cavity trees will remain present within the habitat after tree removal is complete. A "cluster" is defined based on relative cavity tree density within a habitat. If these habitats are surveyed to contain a relatively high cavity tree density (≥10 cavity trees/ha), a cluster is defined as 4 suitable cavity trees within any 0.05 ha circular area (12.6 m in radius). If this mitigation measure is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Prepare a tree preservation plan which identifies specific trees to be removed and whether each tree contains a cavity suitable for potential use as a bat maternity colony.<br>• Schedule tree removal to occur outside of the bat maternal period of May 1 to July 31, wherever possible. If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Restoration of habitat temporarily disturbed during construction using suitable native tree species, if possible. | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Supervision of tree removal by a qualified Environmental Monitor.<br>• Contingency Measures<br>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. |
| **Noise disturbance and/or avoidance behaviour of bats during construction of the transmission line.** | • Minimize noise disturbance and/or avoidance behaviour during construction. | • Schedule tree removal to occur outside of the bat maternal period of May 1 to July 31, wherever possible. If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Schedule tree removal to occur during daylight hours. | • Disturbance avoided through timing of construction activities.<br>• No residual effects anticipated. | • No monitoring or contingency measures required. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Disruption or possible mortality of turtles moving between wintering ponds and other areas.** | • Minimize disruption of turtle movement. | • Fence area as far from pond and as close to proposed road as possible.<br>• Post speed limits (30 km/hr) and turtle crossing signage along relevant construction access roads.<br>• To avoid collisions with turtles, schedule construction activities within 30 m to occur during daylight hours and not during the period of emergence (March 15 to May 31). If construction must occur during this timing window, conduct area searches for turtles daily prior to construction activities. | • Disruption and/or mortality minimized through construction timing and speed limits.<br>• Low likelihood of occurring and limited magnitude. | • If construction occurs within 30 m of a turtle wintering area (if determined to be significant) between March 15 and May 31, conduct area searches for turtles by a qualified Biologist prior to soil stripping or grubbing, as well as daily prior to construction activities by the Contractor within the construction footprint.<br>• **Contingency Measures:**<br>▪ Turtles encountered within the construction area will be moved to a safe location (nearby pond) under the direction of the Environmental Monitor or a qualified Biologist. |
| **Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling resulting from access road construction near turtle wintering areas.** | • Minimize erosion and sedimentation in wintering pond. | • Install sediment and erosion control fencing along edge of construction area if within 30 m of habitat feature as per Ontario Provincial Standards Specifications (OPSD 219.130). | • Erosion and sedimentation mitigated through sediment and erosion control fencing.<br>• Moderate likelihood; if erosion and sedimentation occur, negative effects may be measurable but would likely represent a small change relative to existing conditions. | • Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis:<br>▪ Weekly during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, if the site is left alone for 30 days or longer.<br>• **Contingency Measures:**<br>▪ Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). |
| **Changes to surface water drainage patterns causing indirect effects on turtle wintering areas.** | • Minimize indirect effects on wintering habitat through changes to surface water drainage patterns. | • Ensure no grade changes within 30 m of pond. | • Indirect effects to habitat minimized by maintaining grade.<br>• Low likelihood of occurring and limited magnitude. | • Inspect locations following completion of access roads by an Environmental Monitor to ensure no grade changes.<br>• Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control.<br>• **Contingency Measures:**<br>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Risk of snake mortality from construction equipment.** | • Avoid mortality from equipment. | • Schedule construction activities within 30 m of the hibernaculum to avoid timing windows during which snakes emerge (April 1 - May 15) and return (September 1 – October 15) to hibernacula.<br>• If construction must take place within 30 m of hibernacula during these timing windows:<br>▪ Erect temporary drift fence where within 30 m; and<br>• Conduct area searches for snake species within the construction area daily prior to construction activities. | • Mortality minimized through construction timing or drift fencing.<br>• Low likelihood of occurring and limited magnitude (i.e., no or limited mortality expected). | • If construction occurs within 30 m of a reptile hibernaculum (if determined to be significant) between April 15 and May 31 or between September 1 and October 15, conduct area searches for snakes by a qualified Biologist prior to soil stripping or grubbing, as well as daily prior to construction activities by the Contractor within the construction footprint.<br>• Weekly inspection of drift fence while construction is occurring during specified timing windows.<br>• **Contingency Measures:**<br>▪ Snakes encountered within the construction area will be moved to a safe location under the direction of the Environmental Monitor or a qualified Biologist. |
| **Noise disturbance and/or avoidance behaviour of colonially-nesting birds during construction.** | • Minimize disturbance to colonially-nesting birds (Great Blue Herons). | • Schedule construction activities within 120 m (of 300 m buffer) to occur outside the sensitive breeding period of March 15 to August 1. If this is not possible, MNR will be consulted regarding mitigation measures that may be required. | • Disturbance to colonially-nesting birds will be avoided through construction timing.<br>• Negligible residual effects. | • No monitoring or contingency measures required. |
| **Noise disturbance and/or avoidance behaviour of deer during construction.** | • Minimize disturbance to wintering deer. | • Schedule construction activities within 120 m of deer winter congregation areas to occur before December 1 or after March 31 when the snow depth is greater than 20 cm or there is evidence of yarding.<br>• In years where environmental conditions are not favorable for yarding, contact MNR to determine if construction activities may proceed between December 1 and March 31. | • Disturbance to wintering deer will be minimized through construction timing.<br>• Negligible residual effects. | • No monitoring or contingency measures required if construction does not occur between December 1 and March 31.<br>• If construction is scheduled to occur between December 1 and March 31, undertake survey to determine snow depth and evidence of yarding (e.g. concentrations of tracks) by a qualified Biologist. Contact MNR to determine if construction activities may proceed. |
| **Risk of mortality from construction equipment to amphibians moving to breeding pools and home range.** | • Minimize disruption to amphibian movement. | • Limit construction of roads within 30 m of significant amphibian habitats to daylight hours between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), to avoid excessive noise and vehicle caused mortality, wherever possible.<br>• Post speed limits along construction access roads (30 km/hr). | • Disruption mitigated through construction timing and speed limits.<br>• Low likelihood of occurring and limited magnitude (i.e., no or limited mortality expected). | • No monitoring required if timing windows are applied.<br>• If construction occurs within 30 m of amphibian breeding habitat (if determined to be significant) after dark within the specified timing windows, amphibian mortality surveys will be conducted the following day by a qualified Biologist.<br>• **Contingency Measures:**<br>▪ Restrict work to daylight hours if significant amphibian mortality is detected through mortality surveys. |

## Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling resulting from access road construction near amphibian woodland breeding habitat.** | • Minimize erosion and sedimentation to breeding habitat. | • Install sediment and erosion control fencing along edge of construction area if within 30 m of habitat feature as per Ontario Provincial Standards Specifications (OPSD 219.130). | • Erosion and sedimentation mitigated through sediment and erosion control fencing.<br>• Moderate likelihood; if erosion and sedimentation occur negative effects may be measurable but would likely represent a small change relative to existing conditions. | • Monitor on-site conditions (*i.e.*, erosion and sediment control, spills, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis:<br>▪ Weekly during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (*i.e.*, spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• **Contingency Measures:**<br>▪ Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). |
| **Changes to surface water drainage patterns causing indirect effects on amphibian woodland breeding habitat.** | • Minimize indirect effects on breeding pools. | • Ensure no grade changes within 30 m of breeding pools. | • Indirect effects to habitat minimized by maintaining grade.<br>• Low likelihood of occurring and limited magnitude. | • Inspect locations following completion of construction by an Environmental Monitor to ensure no grade changes.<br>• **Contingency Measures:**<br>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern. |
| **Removal of vegetation resulting in habitat damage from clearing for transmission line within amphibian woodland breeding habitat.** | • Minimize disturbance to amphibian breeding habitat.<br>• No destruction of breeding pond. | • Clearing of vegetation will not take place between April 1 and June 30. If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Schedule construction activities within the woodland to outside April 1st and June 30th (for significant frog breeding habitats) or March 15th and April 30th (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. Work within 30 m of amphibian breeding habitats will not occur after dusk during the breeding season (as above). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. | • Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding habitat should remain undisturbed.<br>• Significance of residual effects will be determined based on the results of post-construction monitoring. | • Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control.<br>• **Contingency Measures:**<br>▪ If negative effects to the pond are detected based on the results of post-construction monitoring, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. |

**Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | • Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur, where possible. Install wildlife fencing (sediment fencing) prior to any earth movement, stockpiling or other activities on the site, to prevent any impact or disturbance to the breeding pool or pond.<br>• Minimize the area of tree removal within the natural area to the extent possible.<br>• Re-vegetate temporarily disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. | | |
| **Disruption or possible mortality of amphibians moving between breeding pools and home range resulting from transmission line construction within amphibian woodland breeding habitat.** | • Minimize disruption to amphibians. | • Schedule construction activities within the woodland to outside April 1 and June 30 (for significant frog breeding habitats) or March 15 and April 30 (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. Work within 30 m of amphibian breeding habitats will not occur after dusk during the breeding season (as above). If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Post speed limits along construction access roads (30 km/hr). | • Disruption mitigated through construction timing and speed limits.<br>• Low likelihood of occurring and limited magnitude (*i.e.*, no or limited mortality expected). | • No monitoring or contingency measures required if timing windows are applied.<br>• If construction occurs within 30 m of an amphibian breeding habitat (if determined to be significant) between April 1 and June 30, conduct area searches for amphibians by a qualified Biologist prior to soil stripping or grubbing. |
| **Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling resulting from transmission line construction within amphibian woodland breeding habitats.** | • No disturbance to breeding amphibians.<br>• No destruction (including erosion and sedimentation) of breeding sites. | • Install sediment and erosion control fencing along edge of construction area if within 30 m of habitat feature as per Ontario Provincial Standards Specifications (OPSD 219.130).<br>• Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance.<br>• Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided.<br>• Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. | • Erosion and sedimentation mitigated through sediment and erosion control fencing.<br>• Low likelihood and limited magnitude of effect as a result. | • Fencing must be keyed in correctly and monitored for proper installation and maintenance by an Environmental Monitor.<br>• Monitor on-site conditions (*i.e.*, erosion and sediment control, spills, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis:<br>▪ Weekly during active construction periods;<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (*i.e.*, spring freshet);<br>▪ Daily during extended rain or snowmelt periods;<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer. |

**Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | • **Contingency Measures:**<br>▪ Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). |
| **Possible indirect effects on amphibian breeding pool condition through changes to surface water drainage patterns resulting from transmission line construction within amphibian woodland breeding habitats.** | • Minimize indirect effects on breeding pools through changes to surface water drainage patterns. | • Ensure no grade changes within 30 m of breeding pools. | • Indirect effects to habitat minimized by maintaining grade.<br>• Low likelihood of occurring and limited magnitude. | • Inspect locations following completion of construction by an Environmental Monitor to ensure no grade changes.<br>• Monitor condition of vernal pools or ponds during on-site monitoring events at frequency described for sediment and erosion control.<br>• **Contingency Measures:**<br>▪ If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. |
| **Removal of vegetation within significant feature resulting in habitat damage resulting from transmission line construction within Red-headed Woodpecker Habitat.**<br><br>**Red-headed Woodpecker breeding habitat may be disturbed by noise from construction.** | • Minimize disturbance to breeding habitat.<br>• Avoid disturbance to breeding birds. | • Identify locations of cavity trees within the Red-headed Woodpecker habitat and ensure suitable snag trees will remain present within the habitat after vegetation removal is complete. If this is not possible, MNR will be consulted regarding mitigation measures that may be required.<br>• Schedule vegetation clearing within habitat to occur outside the breeding season of May 1 to July 31.<br>• Maintain a 10 m buffer around the nest within which no vegetation removal will occur.<br>• Clearly delineate habitat boundaries (i.e. 10 m buffer) using protective fencing to ensure that construction activities occur only within prescribed areas.<br>• Minimize the area of tree removal within the natural area to the extent possible.<br>• Nest searches will be conducted by a qualified Biologist prior to vegetation clearing.<br>• Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. If possible, leave some woody debris to decompose naturally. | • Some permanent vegetation removal within the woodland containing the Red-headed Woodpecker nesting site will occur.<br>• Significance of residual effects will be determined based on the results of post-construction monitoring. | • Supervision of vegetation removal by a qualified Environmental Monitor to limit removal of habitat to the extent possible.<br>• **Contingency Measures**<br>▪ Prune any damaged trees through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. |

**Table 3-3 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | • Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided.<br>• Use single poles for the transmission line, if possible. | | |

## Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Significant Wildlife Habitat** | | | | |
| **Risk of bird mortality caused by turbines (Project-wide).**<br><br>**Risk of bat mortality caused by turbines (Project-wide).** | • Minimize disturbance and/or mortality to wildlife. | • Utilize a lighting scheme that will minimize risk to bird or bat collisions, while fulfilling Transport Canada requirements.<br>• Implement contingency mitigation measures if mortality thresholds are exceeded based on the results of post-construction monitoring.<br>• Operational mitigation techniques for birds, which would be applied at times of the year when mortality risks to the affected bird species are particularly high (e.g., migration) may include:<br>▪ Periodic shut-down of select turbines<br>▪ Blade feathering<br>• Mitigation techniques for bats may include:<br>▪ Changing the wind turbine cut-in speed to 5.5 m/s<br>▪ Feathering of blades when wind speeds are below 5.5 m/s<br>• Co-ordinating turbine shut-down for maintenance with periods of high bat activity (specifically in June during the breeding season when bat maternity colony habitats are occupied) and/or mortality. | • Risk of bird and bat collisions with turbine minimized through mitigation.<br>• Significance of residual effects will be determined based on the results of post-construction monitoring. | • Develop and implement a monitoring program for bird and bat mortality consistent with *Birds and Bird Habitats: Guidelines for Wind Power Projects* (MNR, 2011h) and *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR, 2011g) including:<br>▪ Mortality surveys;<br>▪ Carcass removal trials; and<br>▪ Searcher efficiency trials.<br>• Conduct monitoring during the core season for bird activity and bat activity (May 1-October 31) for the first three years of operation. Mortality surveys will be conducted at each monitored turbine twice per week (at least 30% of turbines) and raptor mortality surveys will be continued once per week in November.<br>• Monitor all turbines within the Project Location once during the survey period for evidence of raptor mortalities.<br>• Conduct subsequent monitoring for two years at individual turbines (and unmonitored turbines in close proximity) where significant bird or raptor annual mortality is identified.<br>• Conduct effectiveness monitoring at individual turbines for three years where mitigation has been implemented.<br>• Report the findings of the bird and bat mortality monitoring programs to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures:**<br>▪ Institute changes to turbine operation if mortality thresholds are exceeded (see mitigation strategy in this table). |
| **Risk of soil or water contamination from oil, gas, etc. during maintenance activities where access roads, turbines or the transmission line are within 30 m of significant wetlands.** | • No off-site contamination of soil or no contamination of groundwater or surface water. | • Develop and implement an emergency spills plan outlining steps to contain any spills during maintenance activities to avoid contamination of significant wetlands. | • Residual effects considered negligible. | • No monitoring required.<br>• **Contingency Measures:**<br>▪ Report the details of the spill to MOE, including a description of any assessment and remediation undertaken. |

## Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Potential introduction of invasive species into wetland communities adjacent to access roads.** | • Minimize species invasion into wetland communities. | • Develop and implement a restoration plan to re-vegetate the 5 m buffer between the access road and the wetland. This will include the 1 year application of an approved herbicide (as per Ausable Bayfield Conservation Authority) to eradicate invasive species followed by seeding with a native seed mix and the planting of native shrubs along the edge consistent with existing vegetation composition. | • Introduction of invasive species avoided or minimized through the application of mitigation measures.<br>• Low likelihood and limited magnitude of effect as a result. | • Monitor re-vegetated areas once per growing season for two years to confirm survival of plantings and/or seed mix.<br>• **Contingency Measures:**<br>▪ Should seed mix and/or plantings not survive, additional seeding and/or plantings will be undertaken. |
| **Loss of forest cover (up to 2.6 ha) through vegetation clearing in Significant Woodlands due to transmission line establishment.** | • No loss of forest cover over time. | • Establish an area of forest equal in area to the cleared area (up to 2.6 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be described in a Compensation Plan to be developed in consultation with MNR. | • Clearing of vegetation will occur for the transmission line.<br>• Loss of forest cover minimized through afforestation; however there will be a time delay for the planted area to reach the same function as the cleared forest. | • Conduct post-planting inventory of planted area to determine success of establishment (may be undertaken by partner organization).<br>• **Contingency Measures:**<br>▪ If plantation is not establishing for any number of reasons, conduct silvicultural intervention including, but not limited to: fill planting, cleaning, re-planting or thinning (may be undertaken by partner organization). |
| **Disturbance to vegetation in Significant Woodlands as a result of spraying herbicide along transmission line.** | • Minimize disturbance to vegetation. | • Minimize aerial extent of herbicide spraying along transmission line.<br>• Only apply herbicides when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices). | • Operational effects considered negligible. | • As appropriate, and following the schedule for the application of herbicides, a certified Arborist or should be on site during the application of herbicides along transmission line. |
| **Avoidance by Tundra Swans of stopover and staging habitats during migration due to proximity of turbines.** | • Minimize disturbance or disruption to Tundra Swan stopover and staging habitats. | ▪ Implement contingency mitigation measures if disturbance effects are detected through post-construction monitoring (contingency measures). | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years of post-construction Tundra Swan monitoring at Features WSST-15 and WSST-36 (if determined to be significant) by a qualified Biologist, including:<br>▪ Conduct surveys on three occasions approximately one week apart during the peak migratory period, which typically occurs in March but can range from mid-February to mid-April.<br>▪ One survey station will be placed per 0.5 km of candidate Tundra Swan stopover and staging habitat and be monitored for approximately 15 min.<br>▪ All observed waterfowl will be recorded along with their approximate location, age and behavior.<br>• The findings of the Tundra Swan monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation. |

## Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | • **Contingency Measures:**<br>▪ If significant declines or disappearance of species is detected, determine whether this is likely to have been caused by the Project. If so, implement corrective measures that are developed through consultation with MNR. |
| **Disturbance to Tundra Swan stopover and staging habitats due to vehicular traffic on access roads.** | • Minimize disturbance or disruption to Tundra Swan stopover and staging habitat. | • Schedule regular (non-critical) maintenance activities to occur outside of the important period of staging Tundra Swan (March 1 to April 15), to the extent possible.<br>• Maintain wildlife crossing signs and limit speed of vehicles (30 km/hr) near stopover and staging areas. | • Disturbance effects reduced through mitigation measures.<br>• Operational effects minor (i.e., no or limited disturbance expected). | • No monitoring or contingency measures required. |
| **Bats may be disturbed by noise from operation of turbines.** | • Protect bat roosting habitat. | • Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years of post-construction monitoring for Features BMC-757, BMC-189, BMC-229, BMC-326, and BMC-342 according to protocol described for pre-construction survey (as described in March 2010 Draft version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including:<br>▪ Through the night acoustic monitoring stations to be positioned within 10 m of the potential roost.<br>▪ Survey same stations as pre-construction survey.<br>▪ Visual monitoring to be conducted at dusk in June.<br>▪ Acoustic monitoring to begin at dusk and continue for 5 hours, for up to 10 nights, or until roost is confirmed.<br>▪ Monitoring to occur between June 1 and June 30.<br>• Conduct 3 years of post-construction monitoring for Features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-352, and BMC-358 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including:<br>▪ Conduct monitoring of roost trees during exit surveys throughout June.<br>▪ Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June. |

**Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | • The findings of all monitoring programs will be reported to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures:**<br>▪ Institute changes to turbine operation if disturbance effects are detected through post-construction monitoring.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |
| **Bats may display avoidance behaviour caused by turbine lighting.** | • Protect bat roosting habitat. | • Propose a lighting scheme that will minimize potential disturbance to bats while fulfilling Transport Canada requirements. | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years of post-construction monitoring for Features BMC-757, BMC-189, BMC-229, BMC-326, and BMC-342 according to protocol described for pre-construction survey (as described in March 2010 Draft version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including:<br>▪ Through the night acoustic monitoring stations to be positioned within 10 m of the potential roost.<br>▪ Survey same stations as pre-construction survey.<br>▪ Visual monitoring to be conducted at dusk in June.<br>▪ Acoustic monitoring to begin at dusk and continue for 5 hours, for up to 10 nights, or until roost is confirmed.<br>▪ Monitoring to occur between June 1 and June 30.<br>• Conduct 3 years of post-construction monitoring for Features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-352, and BMC-358 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including:<br>▪ Conduct monitoring of roost trees during exit surveys throughout June.<br>▪ Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June.<br>• The findings of all monitoring programs will be reported to MNR on an annual basis for the first 3 years of operation. |

## Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | • **Contingency Measures:**<br>▪ Institute changes to turbine operation if disturbance effects are detected through post-construction monitoring.<br>▪ Consultation with MNR to determine additional contingency measures if necessary. |
| **Bats may be disturbed or avoid woodlands where tree removal will occur for the transmission line.** | • Continued use of habitat. | • Post-construction monitoring to ensure continued use of habitat. | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years of post-construction monitoring of all remaining cavity trees for Features BMC-648 and BMC-720 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including:<br>▪ Conduct monitoring of roost trees through exit surveys through June.<br>▪ Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June.<br>• The findings of all post-construction monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures:**<br>▪ If a permanent and significant disturbance has been noted within these Features, the MNR will be contacted to determine whether additional mitigation measures will be needed. |
| **Risk of road mortality to turtles moving between wintering ponds and other areas.** | • Minimize turtle mortality along access roads. | • Maintain wildlife crossing signs and limit speed of vehicles (30 km/hr) near turtle wintering areas. | • Risk of turtle road mortality reduced through mitigation measures.<br>• Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. | • No monitoring or contingency measures required. |
| **Possible mortality to snakes from vehicles using access roads.** | • Minimize snake mortality along access road. | • Advise operations staff to take extra care while driving access roads near features RH-01, RH-02, RH-03 and RH-05, particularly during timing windows when snakes emerge (April 15 - May 31) and return (September 1 – October 15) to hibernacula.<br>• Maintain wildlife crossing signs and limit speed of vehicles near crossings (30 km/hr).<br>• Erect long term drift fence between edge of habitat (RH-02, RH-03, RH-04 and RH-05) and road if hibernaculum determined to be large (>25 snakes). | • Risk of snake mortality minimized through the application of mitigation measures.<br>• Low likelihood of occurring and limited magnitude (*i.e.*, no or limited mortality expected) due to limited volume of maintenance vehicles. | • Conduct reptile hibernacula surveys at reptile hibernacula within 120 m of access roads (RH-01, RH-02, RH-03 and RH-05; if determined to be significant) by a qualified Biologist annually for 3 years post-construction to assess any potential changes in snake populations or species composition using protocol described for pre-construction survey, including:<br>▪ Examination of rock piles and vicinity on three occasions between mid-April and mid-May.<br>▪ Identify species and count individuals.<br>• Report the findings of the reptile hibernacula monitoring program to MNR on an annual basis for the first 3 years of operation. |

**Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | • **Contingency Measures:**<br>▪ If significant declines or disappearance of species is detected, determine whether likely to have been caused by the Project. If so, corrective measures will be taken, to be determined through consultation with MNR. |
| **Colonially-nesting birds may be disturbed by noise from operation of turbines.** | • Minimize disturbance to colonially-nesting birds (Great Blue Herons). | • Post-construction monitoring to ensure continued use of the habitat. | • Significance of residual effects will be determined based on the results of post-construction monitoring. | • Include Turbines 55 and 56 in post-construction mortality monitoring program.<br>• Conduct a pre-construction survey in the spring during leaf-off to gather more information about the heronry (e.g. number and location of additional nests), following the protocol described below.<br>• Conduct 3 years of post-construction colonially-nesting bird monitoring at feature CNB-01 by a qualified Biologist, including:<br>▪ Conduct surveys on two occasions per year, in April and June.<br>▪ At least one vantage point/listening station will be placed along the fence line north of Turbine 56 and be monitored for approximately 15 minutes.<br>▪ All observed (including heard) colonially-nesting birds will be recorded along with their approximate location, age and behaviour, if possible.<br>• Report the findings of the colonially-nesting bird monitoring program to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures:**<br>▪ If significant declines or disappearance of species is detected, determine whether this is likely to have been caused by the Project. Monitoring results will be discussed with MNR prior to implementing mitigation measures, which will be developed through consultation with MNR. |
| **Risk of road mortality to amphibians moving between breeding pools and home range.** | • Minimize amphibian mortality along access roads. | • Advise operations staff to avoid driving roads in proximity to these features at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible.<br>• Most access road traffic will be confined to daytime hours. Avoid access road use at night.<br>• Maintain wildlife crossing signs and limit speed of vehicles near crossings (30 km/hr). | • Risk of amphibian mortality reduced through mitigation measures.<br>• Low likelihood of mortality due to infrequent use of access roads by maintenance vehicles. | • Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution (if Features deemed to be significant) at features AWO-02, AWO-25, AWO-27 and AWO-30 by a qualified Biologist, including:<br>▪ Call surveys at each Feature three times between April 1st and June 30th, as per the *Marsh Monitoring Protocol*. Conduct surveys between one half-hour after sunset and 2:00 am |

**Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | and, to the extent possible, on nights that are clear, cloudy, damp, foggy, or have light rain and minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. Complete a 3-minute listening survey at each station.<br>▪ Conduct surveys to target non-vocalizing amphibians (i.e., salamanders) using one of the following three protocols:<br>o Nocturnal survey for adult salamanders in late March to early April;<br>o Surveys for salamander egg masses on two occasions in March and April;<br>o Surveys for larval salamanders in May or June.<br>• The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures**<br>▪ If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. |
| **Breeding amphibians may be disturbed by routine maintenance of the transmission line corridor.** | • Minimize disturbance due to maintenance activities. | • Advise operations staff to avoid maintenance activities in proximity to these features between April 1 and June 30 (for significant frog breeding habitats), or between March 15 and April 30 (for significant salamander breeding habitats) and any rainy nights from spring to early autumn.<br>• Conduct area searches for amphibians prior to beginning maintenance activities if required to take place within the above timing windows. | • Risk of disturbance reduced through mitigation measures including maintenance timing.<br>• Low likelihood of occurring and limited magnitude of residual effects. | • Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution (if Features deemed to be significant), including:<br>▪ Call surveys at each Feature three times between April 1st and June 30th, as per the *Marsh Monitoring Protocol*. Conduct surveys between one half-hour after sunset and 2:00 am and, to the extent possible, on nights that are clear, cloudy, damp, foggy, or have light rain and minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. Complete a 3-minute listening survey at each station.<br>▪ Conduct surveys to target non-vocalizing amphibians (i.e., salamanders) using one of the following three protocols:<br>o Nocturnal survey for adult salamanders in late March to early April; |

**Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | o Surveys for salamander egg masses on two occasions in March and April;<br>o Surveys for larval salamanders in May or June.<br>• The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures**<br>▪ If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. |
| **Risk of mortality to amphibians moving between breeding pools and home range resulting from maintenance of the transmission line corridor.** | • No amphibian mortality due to maintenance activities. | • Advise operations staff to avoid, where possible, maintenance activities in proximity to these features between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), and any rainy nights from spring to early autumn.<br>• Maintain wildlife crossing signs and limit speed of vehicles near crossings (30 km/hr). | • Risk of amphibian mortality reduced through maintenance timing.<br>• Low likelihood of occurring and limited magnitude of residual effects. | • No monitoring or contingency measures required. |
| **Removal of vegetation within Amphibian Woodland Breeding Habitats resulting from clearing for the transmission line.** | • Minimize disturbance to amphibian breeding habitat.<br>• No destruction of breeding pond. | • Schedule vegetation clearing within woodland to outside April 1 and June 30.<br>• Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. | • Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding pond should remain undisturbed.<br>• Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution (if Features deemed to be significant), including:<br>▪ Call surveys at each Feature three times between April 1st and June 30th, as per the *Marsh Monitoring Protocol*. Conduct surveys between one half-hour after sunset and 2:00 am and, to the extent possible, on nights that are clear, cloudy, damp, foggy, or have light rain and minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. Complete a 3-minute listening survey at each station. |

**Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | ▪ Conduct surveys to target non-vocalizing amphibians (i.e., salamanders) using one of the following three protocols:<br>o Nocturnal survey for adult salamanders in late March to early April;<br>o Surveys for salamander egg masses on two occasions in March and April;<br>o Surveys for larval salamanders in May or June.<br>• The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures**<br>▪ If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. |
| **Risk of disturbance to and/or mortality of amphibians from herbicide spraying along transmission line.** | • Minimize disturbance and/or mortality from herbicide spraying. | • Minimize aerial extent of herbicide spraying along transmission line.<br>• Only apply herbicides when wind speeds are low and no significant precipitation is expected.<br>• Maintain 10 m buffer to pond where no herbicides area applied.<br>• Apply only herbicides approved for use adjacent to water bodies within riparian buffer areas.<br>• A dye solution will be used in herbicide mix to visually detect uniform coverage of spray area.<br>• Conduct area searches for amphibians prior to herbicide application. | • Risk of amphibian mortality or disturbance reduced through mitigation measures.<br>• Low likelihood and limited magnitude of residual effects as a result. | • No monitoring or contingency measures required. |
| **Red-Headed Woodpecker Breeding Habitat may be disturbed by routine maintenance of the transmission line corridor.** | • No displacement of breeding Red-Headed Woodpeckers from habitat.<br>• No destruction of nesting habitat. | • Perform maintenance operations such as vegetation clearing outside the breeding season of May 1st to July 31st.<br>• Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. | • If routine maintenance operations such as vegetation trimming and clearing are conducted outside the breeding season of May 1st to July 31st there should be minimal residual effects from maintenance of the transmission line.<br>• Nesting in utility poles has been recorded for Red-Headed Woodpecker, thus there is a possibility that the poles could provide future nesting habitat. | • Supervision of vegetation removal by a qualified Biologist to ensure no destruction of nesting habitat.<br>• No additional monitoring or contingency measures required if timing window is applied. |

## Table 3-4 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat during Operations

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Absence of vegetation within Red-Headed Woodpecker Breeding Habitat resulting from clearing for the transmission line.** | • No displacement of breeding Red-headed Woodpeckers from habitat.<br>• No destruction of nesting habitat. | • Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring.<br>• Consideration of Red-headed Woodpecker habitat requirements in development of Compensation Plan for tree removal in significant woodland. | • Some permanent vegetation removal within the woodland containing the Red-Headed Woodpecker nesting site will occur.<br>• Significance of residual effects will be determined based on the results of post-construction monitoring. | • Conduct 3 years of post-construction monitoring for Feature SCB-03, according to protocol described for pre-construction surveys following the *Forest Bird Monitoring Protocol* including:<br>▪ Point counts within the woodlot on three separate visits during the period of May 15 – July 10.<br>▪ Conduct monitoring and evaluation of Red-Headed Woodpecker nest site to measure the use of the nesting location, and the success of breeding efforts.<br>▪ Examine utility poles for signs of nesting by Red-Headed Woodpecker.<br>• The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation.<br>• **Contingency Measures**<br>▪ If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. |
| **Risk of road mortality to deer moving through corridor.** | • Minimize road mortality to deer. | • Advise operations staff to avoid driving roads in proximity to this feature at night between November 15 and December 15, and between April 1 and April 30 where possible.<br>• Encourage slow vehicle speeds. Post and maintain speed limit signs (30 km/hr) and wildlife crossing signs on access roads. | • Risk of deer mortality reduced through mitigation measures.<br>• Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. | • No monitoring or contingency measures required. |

## 3.3 Surface Water and Groundwater

### 3.3.1 Surface Water

*Construction and Decommissioning*

Table 3-5 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to surface water resulting from construction and decommissioning.

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Reduced groundwater upwelling areas (and hence streamflows) from groundwater dewatering activities (if required) for excavation of foundation area, resulting in increased surface water temperatures and reduced baseflows from reduced groundwater contributions.** | • Minimize reduction of stream baseflows and groundwater upwelling areas, and increase in water temperatures. | **Water Management**<br>• Control rate and timing of water pumping; pump from deep wells to infiltration galleries adjacent to water bodies or wetlands.<br>• Control quantity and quality of stormwater discharge using best management practices, and implement infiltration techniques to the extent possible.<br>• Restrict taking groundwater and surface water during drought conditions.<br>• The water taker will regulate the discharge at such a rate that there is no flooding in the downstream area and no soil erosion, or stream channel scouring is caused at the point of discharge. The water taker will use a discharge diffuser or other energy dissipation device, if necessary, to mitigate flows which physically alter the stream channel or banks.<br>• Siltation control measures will be installed at both the taking location upstream of the construction site and (if necessary) the discharge site and will be sufficient for the volumes pumped. All measures will be taken to properly maintain these control devices throughout the construction period.<br>**Timing Windows**<br>• Time construction to avoid periods of habitat use to the extent possible, these timing windows are applied to protect fish from any works in and around water during spawning, migration and other critical life history stages. Construction timing windows are based on site specific criteria such as type of fish species present, thermal regime and fish spawning times (spring or fall). The generic restricted in-water work timing windows established by DFO are:<br>▪ Fall Spawning Period – October 1st to May 31st<br>▪ Spring Spawning Period – May 1st to July 15th<br>**Water Quality**<br>• Develop a spill response plan and train staff on associated procedures.<br>• Maintain emergency spill kits on site.<br>• Pass groundwater from dewatering activities (if required) through a sediment filtration system prior to being discharged to a watercourse.<br>• Control soil / water contamination through best management practices. | • Reduced stream baseflows, groundwater upwelling areas and increase in water temperatures minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects as there will only be small scale dewatering (if required). | • Where known groundwater dewatering is required, install staff gauges to monitor stream levels.<br>• Monitor water level at these locations to monitor watercourse depth and estimated flow before, during and after dewatering activities.<br>• Contingency Measures:<br>▪ Control rate and timing of water pumping. In the event of a decrease in stream water levels, of which it can be attributed to the dewatering activities, stop all dewatering until appropriate site specific mitigation plan has been developed. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increase to streamflows in watercourses that receive temporary groundwater dewatering discharge (if required). Groundwater discharge has potential to cause streambed and/or bank erosion and downstream sedimentation if not managed properly.** | • Minimize increase in flows to watercourses and erosion and/or sedimentation. | **Erosion and Sediment Control**<br>• Develop and implement an erosion and sediment control plan before commencement of construction.<br>• Install erosion blankets, erosion control fencing, straw bales, etc., where necessary to mitigate potential excessive erosion and sedimentation.<br>• Ensure any materials placed in floodline are free from silt and other such particles.<br>• Maintain extra erosion and sediment control materials on site (e.g., heavy duty silt fencing, strawbales).<br>• Maintain sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated).<br>• Schedule grading within 30 m of watercourses to avoid times of high runoff volumes.<br>• Temporarily suspending work if excessive flows of sediment discharges occur until mitigation measures are in place.<br>• Direct discharged water to an appropriately sized energy dissipating outlet device to prevent erosion at the point of discharge.<br>**Water Management – See above**<br>**Timing Windows – See above** | • **I**ncreased flows to watercourses and associated streambed and/or bank erosion minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects as there will only be small scale dewatering (if required). | • Monitor erosion and sedimentation of receiving watercourse before and during dewatering events.<br>• Monitor water level and stream flow at these locations to test watercourse depth and flow speed before and during construction.<br>• Collect surface water samples from discharge locations before and after construction. Analyze for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum). These data will be used to determine background watercourse water quality at discharge locations. In conjunction with the streamflow measurements, these data will allow for site-specific loading calculations to determine watercourse assimilation capacity.<br>• The findings of the monitoring program will be reported back to MOE following the completion of dewatering activities.<br>• Contingency Measures:<br>▪ Install a temporary storage basin adjacent to foundation area to allow water to infiltrate. |
| **Increased erosion, sedimentation and turbidity from clearing and grubbing on adjacent lands for construction of turbines, pads/turnaround areas, and access roads and from directional drilling activities.** | • Minimize erosion, sedimentation and turbidity. | **Erosion and Sediment Control – See above**<br>**Grading and Excavation**<br>• Minimize changes in land contours and natural drainage; maintain timing and quantity of flows.<br>**Equipment Use**<br>• Ensure machinery arrives on site in a clean, washed condition and is maintained free of fluid leaks.<br>• Minimize vehicle traffic on exposed soils, avoid compacting or other hardening of natural ground surface, and avoid the movement of heavy machinery on areas with sensitive slopes.<br>• Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features including water bodies and significant woodlands, wetlands, and wildlife habitat.<br>• Implement vehicle and equipment cleaning procedures and practices to minimize or eliminate the discharge of pollutants from vehicle/ equipment cleaning operations to watercourses or natural areas.<br>• Limit speed of vehicles near watercourse crossings. | • Increased erosion, sedimentation and turbidity from clearing and grubbing minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a water course on the following basis:<br>▪ Weekly during active construction periods.<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet).<br>▪ Daily during extended rain or snowmelt periods.<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• In the event that a spill / flooding occurs, the details of the event will be reported back to MOE, including a description of any assessment and remediation undertaken.<br>• Contingency Measures:<br>▪ Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Soil compaction, which may result in hardening of surfaces and increased runoff into watercourses.** | • Minimize soil compaction and increased runoff into watercourses. | • **Erosion and sediment control – See above**<br>• **Grading and Excavation – See above**<br>• **Water Quality – See above** | • Soil compaction and associated increase in runoff into watercourses minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a water course on the following basis:<br>▪ Weekly during active construction periods.<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet).<br>▪ Daily during extended rain or snowmelt periods.<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• Contingency Measures:<br>• Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place. |
| **Release or discharge of sediment-laden runoff from the construction area, which has the potential to transport nutrients and contaminants from construction of turbines, access roads, collection lines, and water crossings.** | • Minimize release or discharge of sediment-laden surface water into adjacent watercourse or drainage features. | • **Water Quality – See above**<br>• **Erosion and Sediment Control – See above**<br>• **Timing Windows – See above** | • Release or discharge of sediment laden surface water into the adjacent watercourse or drainage features minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a water course on the following basis:<br>▪ Weekly during active construction periods.<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet).<br>▪ Daily during extended rain or snowmelt periods.<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>• In the event that a spill / discharge of sediment occurs, the details of the event will be reported back to MOE, including a description of any assessment and remediation undertaken.<br>• Contingency Measures:<br>▪ Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Obstruction of lateral flows in watercourses from water crossings.** | • Minimize obstruction of lateral flows in watercourses. | **Stream Flow**<br>• Design and install culverts to prevent creation of barriers to fish movement and maintain bankfull channel functions.<br>• Design culverts to accommodate high flows of the watercourse.<br>• Embed the culvert below the streambed to maintain lateral flow.<br>• Install adequate gravel base to maintain flow of shallow groundwater.<br>• Locate crossings within straight sections of the stream, perpendicular to the bank. Avoid crossings on meander bends, braided streams and any other unstable areas.<br>• Use only clean material (i.e., rock or coarse gravel) for approaches to culverts.<br>**Isolated Crossing**<br>• Install in-water works for permanent water bodies in the dry via dam and pump method or creation of a diversion channel to maintain flow around the work site. For intermittent water bodies, work is preferred to be completed in the dry and carried out during seasonally dry or when the water body is frozen to the bottom.<br>• Develop and implement a fish rescue plan for dewatering areas. This will include appropriate sized end-of-pipe fish screen to prevent potential losses of fish due to entrainment or impingement as outlined in the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline.<br>• Retain an adequate portion of channel with sufficient width and depth to allow for fish passage if construction requires that an instream work area be isolated from the primary channel. In the event that an area must be blocked from bank to bank, construct a temporary by-pass to allow fish passage around the construction area. | • Obstruction of lateral flows in watercourses avoided through application of mitigation measures.<br>• No likelihood of effect occurring. | • Monitor on-site conditions at all water body crossings (i.e., culverts are installed properly and embedded below the streambed.):<br>▪ Prior to, during and after the installation of the culvert to ensure lateral flows have been maintained.<br>• Contingency Measures:<br>▪ In the event the culvert creates issues relating to lateral flow and fish barriers, steps will be required to fix issues which may involve re-installing the culvert to ensure it is properly installed and embedded within the streambed. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Temporary disruption of substrates/habitat associated with in-water works.** | • Minimise temporary disruption of substrates/habitats. | **Timing Windows – See above**<br>**Isolated Crossing – See above**<br>**Erosion and Sediment Control – See above**<br>**Rehabilitation**<br>• Re-vegetate and restore the turbine staging area following turbine installation with tiling (if desired by the owner).<br>• Restore and maintain vegetative buffers around water bodies including within the foundation footprint where possible.<br>• Restore and maintain vegetative buffers around water bodies including within the temporary construction areas.<br>• Keep vegetation removal to a minimum.<br>• Add suitable stream substrates (e.g., gravel or rip rap) to stabilize sediment and provide cover. | • Temporary disruption of substrates/habitat associated with in-water works minimized through application of mitigation measures.<br>• Moderate likelihood and magnitude of effect occurring due to number of watercourse crossings; however, magnitude of effect limited due to marginal habitat and common species; as such fish passage will be maintained and will continue to provide habitat. | • Monitor fish habitat once per week or as required throughout duration of in-water construction to identify any minor or major disturbances caused by construction activities by undertaking the following :<br>▪ Turbidity monitoring for sediment loading;<br>▪ Monitoring bank stability;<br>▪ Monitoring substrate composition;<br>▪ Monitoring stream flow and ensure fish passage is maintained at all times.<br>• Document changes to aquatic habitat as a result of construction activities and obtain photographic documentation.<br>• The findings of the monitoring program will be reported back to MOE following the completion of in-water construction activities.<br>• Contingency Measures:<br>▪ Mitigate or compensate for any disturbance to fish habitat according to Department of Fisheries and Oceans Canada (DFO) authorization and in consultation with ABCA and UTRCA. |
| **Degradation of fish habitat.** | • Minimize degradation of fish habitat. | **Stream Flow – See above** | • Degradation of fish habitat minimized through application of mitigation measures.<br>• Moderate likelihood of effect occurring due to number of watercourse crossings; however, magnitude of effect limited due to marginal habitat and common species; as such fish passage will be maintained and will continue to provide habitat. | • Monitor fish habitat throughout duration of in-water construction to identify any minor or major disturbances caused by construction activities.<br>• Document changes to aquatic habitat as a result of construction activities and obtain photographic documentation.<br>• Contingency Measures:<br>▪ Mitigate or compensate for any disturbance to fish habitat according to Department of Fisheries and Oceans Canada (DFO) authorization and in consultation with ABCA and UTRCA. |
| **Soil/water contamination by oils, grease and other materials from accidental spills and release of contaminants from construction equipment.** | • Minimize soil/water contamination. | **Equipment Use – See above**<br>**Material Stockpiling and Handling**<br>• Store any stockpiled materials away from natural features to prevent deleterious substances from inadvertently discharging to the environment.<br>• Dispose of any waste material from construction activities by authorized and approved off-site vendors.<br>**Water Quality – See above**<br>**Timing Windows – See above** | • Soil / water contamination minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects on surface water and groundwater as a result. | • Conduct daily inspections of construction equipment for leaks / spills.<br>• Implement Contingency Measures in the event of a spill:<br>▪ Install a spill collection pad for refuelling and maintenance.<br>▪ In the event of a spill, immediately stop all work until the spill is cleaned up.<br>▪ Notify MOE's Spills Action Centre of any leaks or spills.<br>▪ Assess and remediate affected soils and water by using spill kit kept on site. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| | | | | ▪ Analyze water samples for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum) during and after construction.<br>▪ Monitor daily to ensure proper cleanup is completed. |
| **Fractures in substrate releasing pressurized drilling fluids into watercourse and causing potential change to groundwater flow patterns due to directional drilling.** | • Minimize fractures in substrates and release of pressurized drilling fluids into watercourse. | **Directional Drilling**<br>• Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario *Water Resources Act*, R.S.O. 1990.<br>• Locate drill entry and exit pits at least 30 m from water bodies.<br>• Collect drill cuttings as they are generated and place in a soil bin or bag for off-site disposal.<br>• Ensure drill depth is at an appropriate depth below the water body to reduce the risk of a 'frac-out'.<br>**Water Quality – See above** | • Fractures in substrate releasing pressurized drilling fluids into watercourse and causing potential change to groundwater flow patterns minimized through application of mitigation measures**.**<br>• Low likelihood of effects as a result of mitigation measures; however magnitude of effects could be high as benthic invertebrates, aquatic plants and fish and their eggs could be smothered by the fine particles if bentonite were discharged to waterways. | • Monitor directional drilling for the duration of such activities to ensure that "frac-out" does not occur, and if it does, to ensure that effects are minimized on surface or groundwater.<br>• Contingency Measures:<br>▪ In the event of a "frac-out", immediately stop all work, including the recycling of drilling mud / lubricant.<br>▪ Monitor frac-out for 4 hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).<br>▪ If the fracture becomes excessively large, engage a spill response team to contain and clean up excess drilling mud in the water and bottom substrates.<br>▪ If the spill affects an area that is vegetated, reseed and/or replant the area using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. Revegetated areas will be monitored twice per year for two years subsequent to frac-out to confirm revegetation is successful.<br>▪ Document post-cleanup conditions with photographs and prepare frac-out incident report describing time, place, actions taken to remediate frac-out and measures implemented to prevent recurrence. Provide incident report to MNR and MOE within 30 days of the incident. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Reduction of streamflow due to the withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g., hydroseeding).** | • Minimize effects to surface water and fish habitat. | **Erosion and Sediment Control – see above**<br>**Water Management**<br>• Restrict taking groundwater and surface water during drought conditions.<br>• Control rate and timing of water pumping from surface water features.<br>• Regulate the discharge of water-taking to ensure there is no soil erosion, or stream channel scouring is caused by the point of discharge. | • Low likelihood and limited magnitude of effects on surface water as a result. | • Monitor all surface water-taking activities to ensure no damage to watercourse and fish habitat occurs, including drops in water levels and damage to stream banks and bed from discharge.<br>Contingency Measures:<br>• In the event of decreased water levels and damage to stream banks and bed, suspend work until mitigation measures are in place. |
| **Loss of riparian habitat adjacent to watercourses for installation of transmission line poles.** | • Minimize loss of riparian habitat adjacent to watercourses. | **Rehabilitation**<br>• Keep vegetation removal to a minimum.<br>• Restore and maintain vegetative buffers around water bodies including within the temporary construction areas.<br><br>**Erosion and Sediment Control – see above** | • Loss of riparian habitat adjacent to watercourses minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects riparian cover and adjacent watercourse. | • Monitor site during riparian vegetation removal.<br>• Monitor on-site conditions (i.e., erosion and sediment control, etc.) where construction occurs within 30 m of a water course on the following basis:<br>▪ Weekly during active construction periods.<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet).<br>▪ Daily during extended rain or snowmelt periods.<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>Contingency Measures:<br>• Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place.<br>• Restabilize banks with plantings as soon as works are complete to ensure no further damage to stream banks. |

## Table 3-5 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water During Construction and Decommissioning

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Damage to stream banks from the use of heavy machinery.** | • Minimize damage to stream banks. | **Work Area**<br>• Stabilize banks where necessary, minimizing area and duration of soil exposure.<br>• Operate machinery on land and in a manner that minimizes disturbance to stream banks.<br>• Erect sediment fencing around water bodies and areas to be avoided.<br><br>**Erosion and Sediment Control – see above**<br><br>**Rehabilitation**<br>• Keep vegetation removal to a minimum.<br>• Restore and maintain vegetative buffers around water bodies including within the temporary construction areas. | • Damage to stream banks minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects on surface water and groundwater as a result. | • Monitor on-site conditions (i.e., erosion and sediment control, etc.) where construction occurs within 30 m of a water course on the following basis:<br>▪ Weekly during active construction periods.<br>▪ Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet).<br>▪ Daily during extended rain or snowmelt periods.<br>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.<br>Contingency Measures:<br>• Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place.<br>• Restabilize banks with appropriate measures as soon as works are complete to ensure no further damage to stream banks. |

*Operation*

Table 3-6 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to surface water resulting from operation.

## Table 3-6 Mitigation Measures, Residual Effects and Monitoring Plan: Surface Water during Operation

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increase in impervious surfaces from presence of turbine foundation and access roads, resulting in increased water temperatures, increased surface runoff and stream peak flows, and reduced infiltration, base flows and upwelling.** | • No changes to surface water quality or quantity. | • Adhere to all setback requirements from watercourses.<br>• Control quantity and quality of stormwater discharge using best management practices, and implement infiltration techniques to the extent possible (e.g., use of a permeable surface for access roads). | • Increase in impervious surfaces and subsequent changes to surface water quality or quantity minimized due to setback requirements and through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect due to small increase in impervious surfaces within entire Project Study Area. | • No monitoring or contingency measures required. |
| **Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance activities, use of access roads).** | • No off-site contamination of soil and no contamination of groundwater or surface water. | • Control soil / water contamination through best management practices.<br>• Ensure machinery arrives on site in a clean, washed condition and is to be maintained free of fluid leaks.<br>• Develop a spill response plan and train staff on associated procedures and maintain emergency spill kits on site.<br>• Site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features including water bodies and significant woodlands, wetlands, and wildlife habitat.<br>• Implement vehicle and equipment cleaning procedures and practices to minimize or eliminate the discharge of pollutants from vehicle/ equipment cleaning operations to watercourses or natural areas.<br>• Store any stockpiled materials away from natural features to prevent deleterious substances from inadvertently discharging to the environment.<br>• Dispose of any waste material from maintenance activities by authorized and approved off-site vendors. | • Soil / water contamination will be minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects on surface water and groundwater as a result. | • Conduct regular site inspections and monitoring of turbines by a designated on-site Environmental Monitor(s).<br>• Contingency Measures<br>▪ Notify MOE's Spills Action Centre of any spills.<br>▪ Assess and remediate affected soils and water.<br>• In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken. |

### 3.3.2 Geology and Groundwater

*Construction and Decommissioning*

Table 3-7 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to geology and groundwater resulting from construction and decommissioning.

**Table 3-7 Mitigation Measures, Residual Effects and Monitoring Plan: Geology and Groundwater during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Reduction in groundwater quality and quantity due to dewatering when excavating and constructing the turbine bases.** | • Minimize reduction in groundwater quality and quantity. | • Restrict dewatering during extreme low flow conditions (i.e., high summer) and direct the discharge from dewatering back into the nearest watercourse (following sediment control practices) to negate the potential that drawdown will decrease baseflow into streams.<br>• Maintain a setback of 120 m from the nearest water wells, buildings, and significant natural features.<br>• Avoid excavating more than one foundation at a time for turbines within the silty sand units (Turbines 3, 8, 10, 11, 13, 39, 41, 65, 67, and 73). | • Reduction in groundwater quality and quantity minimized through application of mitigation measures.<br>• Low likelihood and negligible magnitude of effects based on the limited amount of dewatering required and distance between known water wells, buildings, and significant natural features (> 120 m) and dewatering activities. | • As no water wells, buildings, or significant natural features are located within the calculated radius of influence for construction dewatering, no monitoring or contingency measures are required. |
| **Increase in impervious area created by the turbine base and access roads resulting in reduced infiltration near to the noted groundwater recharge areas (beach ridge and glacial outwash deposits).** | • Minimize increase in impervious areas. | • Direct runoff from the constructed impervious surfaces to ground surface to prevent any decrease in infiltration and recharge. | • Reduced infiltration near groundwater recharge areas minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects based on amount of dewatering required. | • No monitoring or contingency measures required. |

*Operation*

Table 3-8 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to geology and groundwater resulting from operation.

## Table 3-8 Mitigation Measures, Residual Effects and Monitoring Plan: Geology and Groundwater during Operation

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increase in impervious surfaces from presence of turbine foundation and access roads, resulting in increased water temperatures, increased surface runoff and stream peak flows, and reduced infiltration, base flows and upwelling.** | • No changes to surface water quality or quantity. | • Adhere to all setback requirements from watercourses.<br>• Control quantity and quality of stormwater discharge using best management practices, and implement infiltration techniques to the extent possible (e.g., use of a permeable surface for access roads). | • Increase in impervious surfaces and subsequent changes to surface water quality or quantity minimized due to setback requirements and through application of mitigation measures.<br>• Low likelihood and limited magnitude of effect due to small increase in impervious surfaces within entire Project Study Area. | • No monitoring or contingency measures required. |
| **Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance activities, use of access roads).** | • No off-site contamination of soil and no contamination of groundwater or surface water. | • Control soil / water contamination through best management practices.<br>• Ensure machinery arrives on site in a clean, washed condition and is to be maintained free of fluid leaks.<br>• Develop a spill response plan and train staff on associated procedures and maintain emergency spill kits on site.<br>• Site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features including water bodies and significant woodlands, wetlands, and wildlife habitat.<br>• Implement vehicle and equipment cleaning procedures and practices to minimize or eliminate the discharge of pollutants from vehicle/ equipment cleaning operations to watercourses or natural areas.<br>• Store any stockpiled materials away from natural features to prevent deleterious substances from inadvertently discharging to the environment.<br>• Dispose of any waste material from maintenance activities by authorized and approved off-site vendors. | • Soil / water contamination will be minimized through application of mitigation measures.<br>• Low likelihood and limited magnitude of effects on surface water and groundwater as a result. | • Conduct regular site inspections and monitoring of turbines by a designated on-site Environmental Monitor(s).<br>• Contingency Measures<br>▪ Notify MOE's Spills Action Centre of any spills.<br>▪ Assess and remediate affected soils and water.<br>• In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken. |

## 3.4 Emissions to Air

### 3.4.1 Potential Effects

*Construction and Decommissioning*

Table 3-9 describes the mitigation measures, residual effects and monitoring plan associated with potential effects from emissions to air resulting from construction and decommissioning.

**Table 3-9 Mitigation Measures, Residual Effects and Monitoring Plan: Emissions to Air During Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased dust and air emissions due to construction activity.** | • Minimize deterioration of air quality. | • Use spray water and environmentally friendly dust suppressants applied at an environmentally acceptable rate to minimize the release of dust from gravel, paved areas and exposed soils only where necessary on problem areas;<br>• Implement a speed limit that will lead to reduced disturbance of dust on paved and unpaved roads; and,<br>• Ensure proper maintenance of vehicles and machinery to limit noise, Criteria Air Contaminant (CAC) emissions and leaks. | • Increased dust and air emissions minimized through application of mitigation measures.<br>• High likelihood of effects occurring; however, any dust and air emissions are short-term and magnitude of such effects will be limited. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• **Contingency Measures:**<br>▪ Suspend construction in high winds. |

*Operation*

Table 3-10 describes the mitigation measures, residual effects and monitoring plan associated with potential effects from emissions to air resulting from operation.

**Table 3-10 Mitigation Measures, Residual Effects and Monitoring Plan: Emissions to Air During Operation**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Emissions of contaminants from maintenance vehicles.** | • Limit impact of maintenance vehicles on local air quality. | • Ensure all engines (vehicles and generators) meet emission requirements specified by the MOE and Ontario Ministry of Transportation (MTO). | • Emissions of contaminants from maintenance vehicles minimized through application of mitigation measures.<br>• Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• No contingency measures required. |
| **Dust as a result of vehicle traffic over gravel roads and/or cleared areas.** | • Limit dust production from maintenance vehicles. | • Limit speed of maintenance vehicles to minimize dust generation. | • Dust from vehicular traffic minimized through application of mitigation measures.<br>• Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• No contingency measures required. |

## 3.5 Noise

### 3.5.1 Potential Effects

*Construction and Decommissioning*

Table 3-11 describes the mitigation measures, residual effects and monitoring plan associated with potential effects from noise resulting from construction and decommissioning.

**Table 3-11 Mitigation Measures, Residual Effects and Monitoring Plan: Noise during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased noise due to construction activity.** | • Minimize noise increases for inhabited areas. | • Ensure that construction equipment is kept in good condition and does not exceed noise emissions as specified in MOE publication NPC-115.<br>• Operate construction vehicles in accordance with municipal by-laws.<br>• Implement speed limit on unpaved roads. | • Increased noise minimized through application of mitigation measures.<br>• High likelihood of effect occurring; however, increase in noise levels associated with construction is short-term and magnitude of such effects will be limited. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• **Contingency Measures:**<br>▪ Repair faulty equipment resulting in increased noise levels in a timely fashion. |

*Operation*

Table 3-12 describes the mitigation measures, residual effects and monitoring plan associated with potential effects from noise resulting from operation.

**Table 3-12 Mitigation Measures, Residual Effects and Monitoring Plan: Noise during Operation**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Increased noise levels experienced by receptors (residents located on non-leased properties) due to turbine operation.** | • Limit noise levels to <40 dBA at non-participating receptors. | • Adhere to noise setbacks.<br>• Repair equipment in a timely manner. | • Noise levels experienced by receptors (residents located on non-leased properties) due to turbine operation will be below 40 dBA. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• **Contingency Measures**<br>▪ Repair damaged turbine component.<br>▪ Operate turbines that are out of compliance in noise-reduced mode. |
| **Increased noise levels experienced by receptors (residents located on non-leased properties) due to substation operation.** | • Limit noise level to < 40 dBA at non-participating receptors. | • Repair equipment in a timely manner.<br>• Install a 6 m high noise barrier around the transformer substation to comply with MOE noise limits. | • Noise levels experienced by receptors near the substation will be below 40 dBA due to application of mitigation measures.<br>• High likelihood but limited magnitude of effects as a result. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• No contingency measures required. |

## 3.6 Local Interests, Land Use and Infrastructure

### 3.6.1 Existing Land Uses

*Construction and Decommissioning*

Table 3-13 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to local interests, land use and infrastructure resulting from construction and decommissioning.

**Table 3-13 Mitigation Measures, Residual Effects and Monitoring Plan: Local Interests, Land Use and Infrastructure during Construction and Decommissioning**

| Potential Effect | Performance Objectives | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Minor reduction in usable agricultural land.** | • Minimize reduction in usable agricultural land. | • Minimize length of access roads (most agricultural use only affected during construction) where possible. | • Minor reduction in usable agricultural land minimized through application of mitigation measures.<br>• High likelihood of effect occurring; however, however limited magnitude due to size of overall footprint within the entire Project Study Area. | • No monitoring or contingency measures required. |
| **Increased congestion due to increase in truck traffic and short-term lane closures on local roads during delivery of project components.** | • Minimize disturbances to local traffic patterns. | • Develop a traffic management plan for the construction phase and submit to the Municipalities prior to construction; and,<br>• Notify the community in advance of construction delivery schedules and install signage to notify road users of construction activity. | • Increased congestion due to increase in truck traffic and short-term lane closures minimized through application of mitigation measures.<br>• High likelihood of effect occurring; however, limited magnitude due to spread-out nature of the project and duration of lane closures. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• **Contingency Measures:**<br>▪ Establish alternate delivery routes. |
| **Damage to local infrastructure** | • Minimize damage to local infrastructure. | • Adhere to best practices regarding the operation of construction equipment and delivery of construction materials; and,<br>• Undertake roads condition survey prior to construction and post-construction. | • Damage to local infrastructure minimized through application of mitigation measures.<br>• Moderate likelihood and magnitude of effects occurring due to presence oversize loads during delivery of turbine components. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>• **Contingency Measures:**<br>▪ Return damaged infrastructure to original condition (or better) where appropriate. |

*Operation*

Table 3-14 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to local interests, land use and infrastructure resulting from operation.

**Table 3-14 Mitigation Measures, Residual Effects and Monitoring Plan: Local Interests, Land Use and Infrastructure during Operation**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Minor reduction in usable agricultural land.** | • Minimize reduction of farmland. | • Minimize length of access roads where possible.<br>• Consult with landowners to design access roads to minimize impacts to agricultural practices.<br>• Compensate landowners on Project Location as per land lease agreement. | • Minor reduction in usable agricultural land.<br>• High likelihood of effect, however limited magnitude due to size of overall footprint within the entire Project Study Area. | • No monitoring or contingency measures required. |
| **Reduction in aesthetic quality of landscape which may affect the use and enjoyment of private property and recreational amenities.** | • Limit aesthetic impact of turbines where possible. | • Adhere to setback requirements. | • Reduction in aesthetic quality of landscape which may affect the use and enjoyment of private property and recreational amenities.<br>• Likelihood and magnitude dependent on perception of residents and visitors to presence of turbines. | • No monitoring or contingency measures required. |
| **Damage to crops or trees due to turbine malfunction or failure associated with 16 turbines located within 80 m of neighbouring property lines.** | • Minimize damage to crops or trees due to turbine malfunction or failure. | • Ensure ongoing regular maintenance and monitoring of turbines.<br>• Implement shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. | • Damage to crops or trees minimized through mitigation measures.<br>• No likelihood of effect as a result of mitigation strategy. | • No monitoring or contingency measures required. |

### 3.6.2 Stray Voltage and Effects to Livestock

*Construction and Decommissioning*

Potential effects from stray voltage are not anticipated during the construction or decommissioning phase of the Project.

*Operation*

Table 3-15 describes the mitigation measures, residual effects and monitoring plan associated with potential effects from stray voltage and effects to livestock resulting from operation.

**Table 3-15 Mitigation Measures, Residual Effects and Monitoring Plan: Local Interests, Land Use and Infrastructure during Operation (Stray Voltage)**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Stray voltage effects to livestock.** | • Minimize effects of stray voltage on livestock. | • Build and maintain the Project as prescribed by the Distribution System Code and the Electrical Safety Authority to minimize the risk of stray voltage.<br>• Point of interconnection is part of the transmission system, not the distribution system thus reducing potential to impact any customers. | • Stray voltage effects to livestock.<br>• Low likelihood and limited magnitude expected based on existing wind farm operations. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan.<br>• No contingency measures required. |

## 3.7 Other Resources

*Construction and Decommissioning*

One petroleum resource was identified within 75 m of Project infrastructure based on the MNR's Oil, Gas and Salt Resources Library. Specifically, the access road and collection line between Turbines 54 and 84 is approximately 60 m from an active oil producing well.

Three other resources were identified based on ground-truthing of the Project Location. There is a storage tank and natural gas line 9 m from the collection line between Turbines 53 and 55, and a natural gas line 7 m from the collection line between Turbines 14 and 31.

*Operation*

No potential effects on landfills or petroleum wells are anticipated as a result of the operation phase of the Project due to the distance between the Project and these resources.

## 3.8 Public Health and Safety

*Construction and Decommissioning*

Effects on public health and safety have been described in previous sections, including Emissions to Air, Noise, and Local Interests, Land Use and Infrastructure.

*Operation*

To minimize or avoid effects on public health and safety, the turbines are sited according to setback distances outlined in *O.Reg.359/09* and as described above. Effects relating to noise are described in Section 3.5.

The mitigation measures, residual effects, and the monitoring plan associated with potential effects relating to public health and safety are described in **Table 3-16** below.

**Table 3-16 Mitigation Measures, Residual Effects and Monitoring Plan: Public Health and Safety**

| Potential Effect | Performance Objective | Mitigation Strategy | Residual Effects | Monitoring Plan and Contingency Measures |
|---|---|---|---|---|
| **Impacts on public health and safety from ice shed and/or shadow flicker.** | • No public health and safety incidents. | • Adhere to setback requirements to limit likelihood of any impacts. | • No impacts on public health and safety from ice shed and/or shadow flicker due to setback requirements.<br>• Low likelihood and limited magnitude expected based on existing wind farm operations. | • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).<br>**Contingency Measures**<br>• Suspend operations during icing conditions to minimize the risk of ice shed. |

## 3.9 Areas Protected Under Provincial Plans and Policies

The Project is not proposed in any protected or plan areas. As such, there are no potential effects on these areas as a result of the Project.

# 4. Summary and Conclusions

Field work and data collection were undertaken to determine the potential effects of this Project during the construction and operation / maintenance phases. Mitigation measures to manage these potential effects have been identified and monitoring and contingency plans proposed to ensure effects are minimized.

Significant adverse effects have been avoided through careful site selection, facility layout planning and strict adherence to all regulatory requirements. All turbines, access roads, and ancillary facilities have been sited with landowner consultation to minimize the impact to current agricultural operations.

**The overall conclusion is that this project can be constructed, installed and operated without any significant adverse residual effects to the environment. Post-construction monitoring related to effects on wildlife, including birds and bats, will be undertaken to confirm this conclusion.**

# 5. References

AECOM, 2013:
Final Goshen Wind Energy Centre Construction Plan Report

AECOM, 2013:
Final Goshen Wind Energy Centre Decommissioning Plan Report

AECOM, 2013:
Final Goshen Wind Energy Centre Design and Operations Plan Report

AECOM, 2013:
Final Goshen Wind Energy Centre Water Assessment and Water Body Report

AECOM, 2013:
Final Goshen Wind Energy Centre Wind Turbine Specification Report

Ontario Ministry of the Environment, 2011:
Technical Guide to Renewable Energy Approvals. Available: http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_088422.pdf

# Appendix A

## Land Ownership

# Appendix A. Land Ownership

Table A1 below provides a legal description of the properties on which project infrastructure will be sited. All properties are privately owned and are under agreement with NextEra.

| Legal Description |
|---|
| PART LOT 11 CONCESSION 7 STEPHEN AS IN R277879; LT 12 CON 7 STEPHEN SAVE AND EXCEPT PT 1, 22R5753 MUNICIPALITY OF SOUTH HURON |
| LT 13 CON 7 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 12 CON 1 STEPHEN E OF RAILWAY EXCEPT HWP2028; S/T R26807 MUNICIPALITY OF SOUTH HURON |
| LT 12 CON 1 STEPHEN W OF RAILWAY; S/T R26807 MUNICIPALITY OF SOUTH HURON |
| PT LT 13 CON 4 STEPHEN AS IN R291892; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 4 USBORNE AS IN R288143; MUNICIPALITY OF SOUTH HURON |
| LT 6 CON 11 USBORNE; MUNICIPALITY OF SOUTH HURON |
| LT 13 CON 6 STEPHEN; PT LT 14 CON 5 STEPHEN PT 1, 22R1860; S/T EXECUTION 94-0299, IF ENFORCEABLE; S/T EXECUTION 94-0318, IF ENFORCEABLE; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 4 USBORNE; PT LT 9 CON 4 USBORNE; PT LT 8 CON 4 USBORNE AS IN R251089; S/T INTEREST IN THE MUNICIPALITY; MUNICIPALITY OF SOUTH HURON |
| PT LT 8 CON 4 USBORNE; PT LT 9 CON 4 USBORNE AS IN R153596 W OF UTA9687; MUNICIPALITY OF SOUTH HURON |
| PT LT 7 CON 4 USBORNE AS IN R291672; MUNICIPALITY OF SOUTH HURON |
| PT LT 7 CON 4 USBORNE AS IN R299225; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 11 USBORNE AS IN R303034; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 13 USBORNE AS IN R27075; S/T EXECUTION 99-0147, IF ENFORCEABLE; MUNICIPALITY OF SOUTH HURON |
| LT 13 CON 2 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 3 USBORNE; MUNICIPALITY OF SOUTH HURON |
| PT LT 7 CON 1 USBORNE AS IN R266796; S/T R76252; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 2 USBORNE; S/T R76258; MUNICIPALITY OF SOUTH HURON |
| PT LT 8 CON 2 USBORNE AS IN R308721; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 11 USBORNE AS IN R338120; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 11 USBORNE AS IN R240775; MUNICIPALITY OF SOUTH HURON |
| LT 8 CON 11 USBORNE; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 11 USBORNE; MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 12 USBORNE; PT LT 12 CON 12 USBORNE; AS IN R153290; MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 12 USBORNE AS IN R241892; MUNICIPALITY OF SOUTH HURON |
| PT LT 12 CON 5 STEPHEN AS IN R308932; MUNICIPALITY OF SOUTH HURON |
| LT 6 CON 7 USBORNE; MUNICIPALITY OF SOUTH HURON |
| LT 3 CON 5 USBORNE; LT 4 CON 5 USBORNE; LT 5 CON 5 USBORNE; MUNICIPALITY OF SOUTH HURON |
| LT 12 CON 2 STEPHEN; MUNICIPALTIY OF SOUTH HURON |
| PT LT 11 CON 14 USBORNE AS IN R279217; S/T UTA10109; MUNICIPALITY OF SOUTH HURON |
| LT 5 CON 6 USBORNE; MUNICIPALITY OF SOUTH HURON |
| S 1/2 LT 13 CON 3 STEPHEN; PT LT 12 CON 3 STEPHEN AS IN R321529; MUNICIPALITY OF SOUTH HURON |
| PT LT 12 CON 4 STEPHEN AS IN R235695; MUNICIPALITY OF SOUTH HURON |
| PT LT 8 CON 3 USBORNE AS IN R156581; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 8 USBORNE AS IN R326642; MUNICIPALITY OF SOUTH HURON |
| PT LT 5 CON 8 USBORNE BEING PTS 1 & 2, 22R5909; MUNICIPALITY OF SOUTH HURON |
| PT LT 5 CON 8 USBORNE AS IN R237176 SAVE AND EXCEPT PART 2, PLAN 22R−5909 MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 12 USBORNE AS IN R185649; DESCRIPTION MAY NOT BE ACCEPTABLE IN FUTURE AS IN R185649 RE LAST COURSE; MUNICIPALITY OF SOUTH HURON |
| PT LT 8 CON 12 USBORNE AS IN R299705; S/T EXECUTION 99-0147, IF ENFORCEABLE; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 5 USBORNE; LT 8 CON 5 USBORNE; LT 6 CON 6 USBORNE; PT LT 6 CON 5 USBORNE AS IN R288140; MUNICIPALITY OF SOUTH HURON |
| LT 10 CON 12 HAY; MUNICIPALITY OF BLUEWATER |
| LT 10 CON 9 HAY EXCEPT PT 1, 22R4297; S/T HWP3235; MUNICIPALITY OF BLUEWATER |
| PT LT 15 CON 10 HAY AS IN R82636; S/T HWP3237; MUNICIPALITY OF BLUEWATER |
| PT LT 14 CON 10 HAY AS IN R235456; S/T HWP3269; MUNICIPALITY OF BLUEWA TER |
| LT 15 CON N BOUNDARY STEPHEN EXCEPT HWP1936; MUNICIPALITY OF SOUTH HUR ON |
| PT LT 21 CON 9 STEPHEN AS IN R292816; S/T HWP3204; MUNICIPALITY OF SOUTH HURON |

| Legal Description |
|---|
| LT 21 CON 10 STEPHEN; S/T HWP3212; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 20 STEPHEN AS IN R324194; MUNICIPALITY OF SOUTH HURON |
| PT LT 13 CON 10 HAY AS IN R260386; S/T HWP3258; MUNICIPALITY OF BLUEWATER |
| LT 13 CON RIVER AUX SABLES STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| LT 12 CON 22 STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| LT 14 CON 22 STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| LT 6 CON 12 STEPHEN; PT LT 7 CON 12 STEPHEN AS IN R85036 EXCEPT R259538 & HWP2213; MUNICIPALITY OF SOUTH HURON |
| LT 5 CON 15 STEPHEN; S/T HWP2134; MUNICIPALITY OF SOUTH HURON |
| PT LT 3 CON 12 HAY AS IN R290462; MUNICIPALITY OF BLUEWATER |
| E 1/2 LT 6 CON 16 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 11 CON 12 HAY; MUNICIPALITY OF BLUEWATER |
| PT LT 11 CON 13 HAY AS IN R71532; MUNICIPALITY OF BLUEWATER |
| PT LT 7 CON 12 HAY AS IN R102124; MUNICIPALITY OF BLUEWATER |
| PT LT 7 CON 13 HAY; PT LT 8 CON 13 HAY AS IN R102124; MUNICIPALITY OF BLUEWATER |
| LT 15 CON 9 HAY; S/T HWP3232; MUNICIPALITY OF BLUEWATER |
| PT LT 7 CON 13 HAY; PT LT 8 CON 13 HAY; PT LT 7 CON 14 HAY; PT LT 8 CON 14 HAY AS IN R81046; MUNICIPALITY OF BLUEWATER |
| LT 6 CON 12 HAY S/T INTEREST IN R312983; MUNICIPALITY OF BLUEWATER |
| LT 13 CON 13 HAY EXCEPT PT 1, 22R4347; MUNICIPALITY OF BLUEWATER |
| PT LT 13 CON 12 HAY AS IN R188057; MUNICIPALITY OF BLUEWATER |
| PT LT 14, CON 9 HAY AS IN 273324 EXCEPT PT 1 22R4520, S/T HWP3259, HWP3267; MUNICIPALITY OF BLUEWATER |
| PT LT 12 CON 12 STEPHEN AS IN R260029; MUNICIPALITY OF SOUTH HURON |
| LT 4 CON 13 STEPHEN; LT 5 CON 13 STEPHEN EXCEPT HWP2213; MUNICIPALITY OF SOUTH HURON |
| LT 5 CON 12 STEPHEN EXCEPT R240532 & HWP2213; MUNICIPALITY OF SOUTH HURON |
| PT LT 5 CON 12 STEPHEN AS IN R240532 EXCEPT HWP2213; MUNICIPALITY OF SOUTH HURON |
| LT 5 CON 14 STEPHEN S/T INTEREST IN R269459; S/T HWP2134; MUNICIPALITY OF SOUTH HURON |
| PT LT 4 CON 12 STEPHEN AS IN R328739 EXCEPT HWP2213; MUNICIPALITY OF SOUTH HURON |
| LT 16 CON RIVER AUX SABLES STEPHEN; LT 17 CON RIVER AUX SABLES STEPHEN; LT 18 CON RIVER AUX SABLES STEPHEN; LT 19 CON RIVER AUX SABLES STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| LT 6 CON 11 STEPHEN; LT 7 CON 11 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| W 1/2 LT 6 CON 14 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 21 STEPHEN AS IN R191326; MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 14 STEPHEN AS IN R255380; PT LT 11 CON 13 STEPHEN AS IN R278090; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 16 STEPHEN; W 1/2 LT 6 CON 16 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 13 CON 22 STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| PT LT 16 CON 22 STEPHEN AS SHOWN ON PL 121, AS IN R224927; MUNICIPALITY OF SOUTH HURON |
| PT LT 16 CON 22 STEPHEN; PT LT 17 CON 22 STEPHEN; PT LT 43 CON S BOUNDARY STEPHEN AS SHOWN ON PL 121, AS IN R183700; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 11 HAY AS IN R181291; MUNICIPALITY OF BLUEWATER |
| PT LT 13 SOUTH BOUNDARY CON HAY AS IN R294918; MUNICIPALITY OF BLUEWATER |
| PT LT 11 CON 10 HAY; PT LT 12 CON 10 HAY AS IN R188157; S/T HWP3255; MUNICIPALITY OF BLUEWATER |
| PT LT 12 CON 10 HAY AS IN R176190; S/T HWP3257; MUNICIPALITY OF BLUEWATER |
| PT LT 13 CON 9 HAY AS IN R290442; S/T HWP3266; MUNICIPALITY OF BLUEWATER |
| LT 11 CON 9 HAY; LT 12 CON 9 HAY EXCEPT PT 1, 22R5534; S/T HWP3241; MUNICIPALITY OF BLUEWATER |
| PT LT 14 SOUTH BOUNDARY CON HAY AS IN R212220; MUNICIPALITY OF BLUEWATER |
| LT 8 CON 7 STEPHEN; PT LT 9 CON 7 STEPHEN AS IN R345393; SOUTH HURON |
| PART LOT 11 CONCESSION 7 STEPHEN AS IN R277879; LT 12 CON 7 STEPHEN SAVE AND EXCEPT PT 1, 22R5753 MUNICIPALITY OF SOUTH HURON |
| LT 13 CON 7 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| S 1/2 LT 14 CON 7 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 14 CON 16 STEPHEN EXCEPT PT 1, 22R3837; PT LT 15 CON 16 STEPHEN AS IN R302307; MUNICIPALITY OF SOUTH HURON |
| PT LT 13 CON 15 STEPHEN AS IN R242659; PT LT 14 CON 15 STEPHEN AS IN R304668; MUNICIPALITY OF SOUTH HURON |
| PT LT 15 CON 15 STEPHEN AS IN R308421; MUNICIPALITY OF SOUTH HURON |
| N1/2 LT 15 CON 15 STEPHEN S/T INTEREST IN R164626; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 16 STEPHEN; PT LT 10 CON 16 STEPHEN AS IN R208094; S/T HWP2134; MUNICIPALITY OF SOUTH HURON |
| LT 8 CON 16 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 20 STEPHEN AS IN R306115; MUNICIPALITY OF SOUTH HURON |
| N 1/2 LT 7 CON 20 STEPHEN AS IN R339465 SAVE & EXCEPT HWP2228; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 20 STEPHEN; PT LT 7 CON 20 STEPHEN AS IN R331913; MUNICIPALITY OF SOUTH HURON |

| Legal Description |
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| PT LT 9 CON 19 STEPHEN; PT LT 10 CON 19 STEPHEN; PT LT 10 CON 20 STEPHEN AS IN R324194; MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 18 STEPHEN PT 2, 22RD160; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 18 STEPHEN AS IN R304095; MUNICIPALITY OF SOUTH HURON |
| LT 8 CON 17 STEPHEN; PT LT 7 CON 17 STEPHEN AS IN R269241; PT LT 9 CON 17 STEPHEN AS IN R259021; PT LT 10 CON 17 STEPHEN AS IN R302308; S/T R251291; MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 17 STEPHEN AS IN R57075 EXCEPT R91899, R91902, PT 1 22R777, PT 1 22R3002, PT 1 22R4790 & HWP2110; MUNICIPALITY OF SOUTH HURON S/T DEBTS IN R57075 |
| LT 14 CON 17 STEPHEN; PT LT 15 CON 17 STEPHEN AS IN R338720; S/T HWP2134; MUNICIPALITY OF SOUTH HURON |
| PT LT 12 CON 15 STEPHEN AS IN R188639; MUNICIPALITY OF SOUTH HURON |
| LT 18 CON 14 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| LT 17 CON 14 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| PT LT 12 CON 14 STEPHEN PT 2, 22R2092; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 14 STEPHEN; PT LT 10 CON 14 STEPHEN AS IN R267573; MUNICIPALITY OF SOUTH HURON |
| E 1/2 LT 6 CON 14 STEPHEN; LT 6 CON 13 STEPHEN EXCEPT HWP2213; MUNICIPALITY OF SOUTH HURON |
| LT 7 CON 13 STEPHEN EXCEPT HWP2213 MUNICIPALITY OF SOUTH HURON |
| PT LT 11 CON 13 STEPHEN AS IN R118229; MUNICIPALITY OF SOUTH HURON |
| LT 8 CON 15 STEPHEN S/T INTEREST IN R218273; S/T HWP2134; MUNICIPALITY OF SOUTH HURON |
| PT LT 3 CON 10 STEPHEN; PT LT 4 CON 10 STEPHEN AS IN R267824; S/T HWP3193; MUNICIPALITY OF SOUTH HURON |
| PT LT 3 CON 10 STEPHEN AS IN R333013; S/T HWP3183; MUNICIPALITY OF SOUTH HURON |
| PT LT 4 CON 9 STEPHEN; PT LT 5 CON 9 STEPHEN AS IN R249415; S/T HWP3198; MUNICIPALITY OF SOUTH HURON |
| LOT 17 CON 8 STEPHEN, SAVE AND EXCEPT PART 1 22R4360; MUNICIPALITY OF SOUTH HURON |
| LT 14 CON 8 STEPHEN; PT LT 13 CON 8 STEPHEN AS IN R68324; MUNICIPALITY OF SOUTH HURON |
| PT LT 9 CON 8 STEPHEN; PT LT 10 CON 8 STEPHEN AS IN R94598; MUNICIPALI TY OF SOUTH HURON |
| PT LT 8 CON 8 STEPHEN AS IN R291700 & R291702 EXCEPT PT 2, 22R3334; PT LT 9 CON 8 STEPHEN AS IN R303960; MUNICIPALITY OF SOUTH HURON |
| LT 23 CON 7 STEPHEN; PT LT 13 CON N BOUNDARY STEPHEN AS IN R295298; MUNICIPALITY OF SOUTH HURON |
| PT LT 14 CON N BOUNDARY STEPHEN AS IN R294918; MUNICIPALITY OF SOUTH HURON |
| LT 17 CON 9 STEPHEN; LT 18 CON 9 STEPHEN; LT 19 CON 9 STEPHEN; LT 20 CON 9 STEPHEN; PT LT 19 CON 10 STEPHEN AS IN R260045; S/T HWP3188, HWP3220, HWP3221, R76353; MUNICIPALITY OF SOUTH HURON |
| PT LT 15 CON 10 STEPHEN AS IN R288124; S/T HWP3192; MUNICIPALITY OF SOUTH HURON |
| LT 9 CON 9 STEPHEN; S/T HWP3207; MUNICIPALITY OF SOUTH HURON |
| LT 9 CON 10 STEPHEN; S/T HWP3223; MUNICIPALITY OF SOUTH HURON |
| LT 8 CON 10 STEPHEN; S/T HWP3194; MUNICIPALITY OF SOUTH HURON |
| S 1/2 LT 15 CON RIVER AUX SABLES STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| LT 12 CON RIVER AUX SABLES STEPHEN AS SHOWN ON PL 121; MUNICIPALITY OF SOUTH HURON |
| S1/2 LT 16 CON 16 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| PT LT 16 CON 16 STEPHEN; PT LT 17 CON 16 STEPHEN; PT LT 18 CON 16 STEPHEN AS IN R292810; MUNICIPALITY OF SOUTH HURON |
| N1/2 LT 18 CON 16 STEPHEN; PT LT 19 CON 16 STEPHEN AS IN R296089; S/T R77663; MUNICIPALITY OF SOUTH HURON |
| LT 16 CON 15 STEPHEN; MUNICIPALITY OF SOUTH HURON |
| PT LT 10 CON 7 STEPHEN AS IN R274271; MUNICIPALITY OF SOUTH HURON |
| PT LT 6 CON 21 STEPHEN PT 1, HWP2143; MUNICIPALITY OF SOUTH HURON |
| LOT 13, PLAN 212 STEPHEN SAVE & EXCEPT HWP2086; MUNICIPALITY OF SOUTH HURON |
| W1/2 LT 20 CON 16 STEPHEN; S/T R77660; MUNICIPALITY OF SOUTH HURON |