



Henvey Inlet Wind LP

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Henvey Inlet Wind Energy Centre

## **Natural Heritage Assessment: Environmental Impact Study Report**

Final

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## List of Acronyms and Glossary

<b>ANSI</b>	Area of Natural and Scientific Interest
<b>Candidate Important Wildlife Habitat</b>	Potential area of wildlife habitat that may be considered important using procedures established or accepted by the Ministry of Natural Resources and Forestry.
<b>Confirmed Important Wildlife Habitat</b>	Area of important wildlife habitat verified using procedures established or accepted by the Ministry of Natural Resources and Forestry.
<b>COSEWIC</b>	Committee on the Status of Endangered Wildlife in Canada
<b>COSSARO</b>	Committee on the Status of Species at Risk in Ontario
<b>CLI</b>	Canada Land Inventory
<b>DFO</b>	Fisheries and Oceans Canada
<b>Dripline</b>	The area defined by the outermost circumference of a tree canopy.
<b>EC-CWS</b>	Environment Canada – Canadian Wildlife Service
<b>EIS</b>	Environmental Impact Study
<b>ELC</b>	Ecological Land Classification; refers to ecological units defined on the basis of bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect) and corresponding vegetation.
<b>ESA</b>	Environmental Sensitive Area
<b>Feathering of blades</b>	Pitching of turbine blades out of the wind so the turbine does not capture the wind and will not produce power.
<b>Federal SAR</b>	Species listed as Endangered or Threatened under Schedule 1 of the federal <i>Species at Risk Act</i> , 2002.
<b>Frac-out</b>	Escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface.

<b>Generalized Candidate Important Wildlife Habitat</b>	Potential wildlife habitats listed in Appendix D of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2012), which are not required to be identified for a particular HIWEC component, but may exist within 120 m of that component and are assumed to exist.
<b>GIS</b>	Geographic Information System
<b>HIWEC</b>	Henvey Inlet Wind Energy Centre
<b>HIWEC Location</b>	The area encompassing all construction activities and HIWEC components.
<b>Important</b>	Natural feature that (1) the Ministry of Natural Resources and Forestry has identified as important, or (2) has been determined to be important using applicable evaluation criteria or procedures established or accepted by the Ministry of Natural Resources and Forestry.
<b>IWH</b>	Important Wildlife Habitats
<b>LIO</b>	Land Information Ontario
<b>MNR</b>	Ontario Ministry of Natural Resources and Forestry
<b>MOECC</b>	Ontario Ministry of Environment and Climate Change
<b>Natural Feature</b>	One of the following: (1) an Area of Natural and Scientific Interest (earth science or life science), (2) a wetland, (3) a wildlife habitat, (4) a woodland, (5) a provincial park, or (6) a conservation reserve.
<b>NHIC</b>	Natural Heritage Information Centre
<b>NRVIS</b>	Natural Resource Value and Information System
<b>NTS</b>	National Topographic System
<b>OGS</b>	Ontario Geological Survey
<b>OGSR</b>	Oil, Gas and Salt Resources
<b>OPA</b>	Ontario Power Authority
<b>OWES</b>	Ontario Wetland Evaluation System
<b>PIW</b>	Provincially Important Wetland
<b>Provincial SAR</b>	Species listed as Endangered or Threatened under the provincial <i>Endangered Species Act</i> , 2007 but not listed as Endangered or Threatened under Schedule 1 of the Federal <i>Species at Risk Act</i> , 2002.
<b>REA</b>	Renewable Energy Approval
<b>SAR</b>	Species at Risk, including both Federal SAR (species listed as Endangered or Threatened under Schedule 1 of the Federal <i>Species at Risk Act</i> , 2002) and Provincial SAR (species listed as Endangered or Threatened under the provincial <i>Endangered Species Act</i> , 2007 but not listed as Endangered or Threatened under Schedule 1 of the federal <i>Species at Risk Act</i> , 2002).

<b>SARA</b>	Federal <i>Species at Risk Act</i> , 2002
<b>SARO</b>	Species at Risk In Ontario
<b>SOCC</b>	Species of Conservation Concern, including (a) provincially rare species ranked by the Natural Heritage Information Centre (NHIC) as S1 (critically imperiled), S2 (imperiled) or S3 (vulnerable) in the province of Ontario but not listed as Endangered or Threatened under Schedule 1 of the Federal <i>Species at Risk Act</i> , 2002 (SARA) or the Provincial <i>Endangered Species Act</i> , 2007 (ESA); (b) species listed as Special Concern under Schedule 1 of SARA; (c) species evaluated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Special Concern, Threatened or Endangered but not listed as Endangered or Threatened under Schedule 1 of SARA or the ESA; and (d) species listed as Special Concern under the ESA.
<b>SWHTG</b>	Significant Wildlife Habitat Technical Guide
<b>UTM</b>	Universal Transverse Mercator
<b>Wetland</b>	Land such as a swamp, marsh, bog or fen, other than land that is being used for agricultural purposes and no longer exhibits wetland characteristics, that (a) is seasonally or permanently covered by shallow water or has the water table close to or at the surface, and (b) has hydric soils and vegetation dominated by hydrophytic or water-tolerant plants.
<b>Wildlife Habitat</b>	Area where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.
<b>Woodland</b>	Treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees, that is located south and east of the Canadian Shield.

# 1. Introduction

## 1.1 Project Overview

Nigig Power Corporation (Nigig) received a Feed-in-Tariff (FIT) Contract from the Ontario Power Authority (OPA) in 2011 for a 300 megawatt (MW) wind energy generation centre. Henvey Inlet Wind LP (HIW), a limited partnership between Pattern Renewable Holdings Canada ULC and Nigig Power Corporation, is proposing to develop the Henvey Inlet Wind Energy Centre (HIWEC), a 300 MW facility on Henvey Inlet First Nation Reserve No. 2 (HIFN I.R. #2). AECOM Canada Ltd. (AECOM) was retained by HIW to prepare an Environmental Assessment (EA) for the proposed HIWEC. The EA was conducted in accordance with the Henvey Inlet First Nation Environmental Assessment Guidance Instrument (HIFN EA Guidance) requirements.

The HIFN EA Guidance document includes a requirement to complete a Natural Heritage Assessment (NHA) having regard to the provincial process. Under the provincial process, a proponent who proposes to engage in a renewable energy project is required to conduct a NHA, consisting of the following:

- A Records Review;
- A Site Investigation; and
- An Evaluation of Importance (EOI).

Through this process, proponents identify natural features near the proposed HIWEC location and determine if prohibitions and setbacks apply. In instances where the HIWEC location is proposed within such a setback, the proponent must prepare an Environmental Impact Study (EIS) Report to identify and assess the potential negative environmental effects that may result from the proposed HIWEC, identify appropriate mitigation measures and describe how the potential effects will be addressed through the Environmental Effects Monitoring Plan (EEMP) and Construction Plan Report.

This document is intended to address the EIS requirements of the NHA for the HIWEC, including:

- Identify and assess the potential negative environmental effects of the HIWEC on natural features, provincial parks, federal parks and / or conservation reserves identified through the Evaluation of Importance;
- Identify mitigation measures to address the potential negative environmental effects on natural features, provincial parks, federal parks and / or conservation reserves where following activities are proposed:
  - The construction, installation or expansion of a transmission line in or within 50 meters (m) of an important wetland, important woodland, important wildlife habitat, provincial park, federal park or conservation reserve;
  - The construction, installation or expansion of other HIWEC components within 120 m of an important wetland, important woodland, important wildlife habitat, provincial park, federal park or conservation reserve;
- Describe how the Environmental Effects Monitoring Plan (EEMP) addresses any potential negative environmental effects; and
- Describe how the Construction Plan Report addresses any potential negative environmental effects.

Please note that the potential negative environmental effects of the HIWEC on water body features including lakes, lake trout lakes, permanent or intermittent streams and seepage areas, and associated mitigation measures, are described in the Water Assessment and Water Bodies Report (**Appendix H of Volume A**).

Throughout this NHA, the term “significant” or “significance” as per provincial requirements has been changed to “important” or “importance” as the term “significance” has specific meaning in the federal EA process which is different from the meaning in the provincial process. Therefore, the term in the provincial process has been changed to avoid confusion. The meaning of “significance” in the provincial process is carried over to the term “importance” for the purpose of the NHA. The term “significance” is not changed if it is in the title of a reference document.

## 1.2 Summary of Natural Features Carried Forward to the Environmental Impact Study

**Table 1-1** provides a summary of the natural features either treated as important or confirmed to be important during the Evaluation of Importance; these are the features that were carried forward to the Environmental Impact Study (EIS). The EIS was conducted to assess potential negative environmental effects of the HIWEC on these features and identify appropriate mitigation measures to address those effects in accordance with the HIFN EA Guidance document.

**Table 1-1: Summary of Natural Features Carried Forward to the EIS**

Feature	Natural Features Carried Forward to the EIS
<b>Conservation Reserves</b>	The North Georgian Bay Shoreline and Islands Conservation Reserve was carried forward to the EIS.
<b>Important Wetlands</b>	Four (4) wetland features were evaluated and confirmed to be important, and carried forward to the EIS.
<b>Important Woodlands</b>	A total of 35 woodland features were evaluated and confirmed to be important, and carried forward to the EIS.
<b>Important Wildlife Habitat</b>	<p>The following Candidate IWH features were either evaluated and determined to be IWH, or were treated as IWH, and carried forward to the EIS (in some cases, a determination as to whether the mitigation measures described in the EIS will be applied may be made based on the outcome of pre-construction surveys):</p> <ul style="list-style-type: none"> <li>• Bat Maternity Colonies;</li> <li>• Turtle Wintering Areas;</li> <li>• Reptile Hibernacula;</li> <li>• Deer Yarding Areas;</li> <li>• Cliffs and Talus Slopes;</li> <li>• Precambrian Rock Barrens;</li> <li>• Sand Barrens;</li> <li>• Old-growth Forest;</li> <li>• Bogs;</li> <li>• Waterfowl Nesting Areas;</li> <li>• Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;</li> <li>• Woodland Raptor Nesting Habitat;</li> <li>• Turtle Lizard and Nesting Areas;</li> <li>• Seeps and Springs;</li> <li>• Aquatic Feeding Habitat;</li> <li>• Amphibian Breeding Habitat (Woodland and Wetland);</li> <li>• Mast Producing Areas;</li> <li>• Marsh Bird Breeding Habitat;</li> </ul>

**Table 1-1: Summary of Natural Features Carried Forward to the EIS**

Feature	Natural Features Carried Forward to the EIS
	<ul style="list-style-type: none"> <li>Habitat for Specific SOCC, including: <ul style="list-style-type: none"> <li>Black Tern (<i>Chlidonias niger</i>);</li> <li>Eastern Wood-pewee (<i>Contopus virens</i>);</li> <li>Prairie Warbler (<i>Setophaga discolor</i>);</li> <li>Wood Thrush (<i>Hylocichla mustelina</i>);</li> <li>Yellow Rail (<i>Coturnicops noveboracensis</i>);</li> <li>Horned Clubtail (<i>Arigomphus cornutus</i>);</li> <li>Mottled Darner (<i>Aeshna clepsydra</i>);</li> <li>Pine Imperial Moth (<i>Eacles imperialis pini</i>);</li> <li>Common Five-linked Skink (<i>Plestiodon inexpectatus</i>);</li> <li>Eastern Ribbonsnake (<i>Thamnophis sauritus sauritus</i>);</li> <li>Milksnake (<i>Lampropeltis triangulum</i>);</li> <li>Northern Map Turtle (<i>Graptemys geographica</i>); and</li> <li>Snapping Turtle (<i>Chelydra serpentina</i>).</li> </ul> </li> </ul> <p>The following Generalized Candidate IWH features were carried forward to the EIS:</p> <ul style="list-style-type: none"> <li>Shorebird Migratory Stopover Areas;</li> <li>Bat Maternity Colonies;</li> <li>Turtle Wintering Areas;</li> <li>Reptile Hibernacula;</li> <li>Precambrian Rock Barren;</li> <li>Bogs;</li> <li>Waterfowl Nesting Areas;</li> <li>Woodland Raptor Nesting Habitat;</li> <li>Turtle and Lizard Nesting Areas;</li> <li>Seeps and Springs;</li> <li>Amphibian Breeding Habitat (Woodland and Wetland);</li> <li>Mast Producing Areas;</li> <li>Marsh Bird Breeding Habitat; and</li> <li>Habitat for Specific SOCC, including: <ul style="list-style-type: none"> <li>Eastern Wood-pewee;</li> <li>Prairie Warbler;</li> <li>Wood Thrush;</li> <li>Yellow Rail;</li> <li>Horned Clubtail;</li> <li>Mottled Darner;</li> <li>Pine Imperial Moth;</li> <li>Eastern Ribbonsnake;</li> <li>Milksnake;</li> <li>Northern Map Turtle; and</li> <li>Snapping Turtle.</li> </ul> </li> </ul>
<b>Federal Species at Risk</b>	<p>A total of 14<sup>1</sup> Federal Species At Risk (SAR) were carried forward to the EIS, including:</p> <ul style="list-style-type: none"> <li>Canada Warbler (<i>Cardellina canadensis</i>);</li> <li>Common Nighthawk (<i>Chordeiles minor</i>);</li> <li>Olive-sided Flycatcher (<i>Contopus cooperi</i>);</li> <li>Eastern Whip-poor-will (<i>Antrostomus vociferus</i>);</li> <li>Little Brown Bat (<i>Myotis lucifugus</i>);</li> <li>Northern Bat (<i>Myotis septentrionalis</i>);</li> <li>Tri-coloured Bat (<i>Perimyotis subflavus</i>);</li> <li>Blanding's Turtle (<i>Emydoidea blandingii</i>);</li> <li>Eastern Foxsnake (<i>Pantherophis gloydi pop. 1</i>);</li> <li>Eastern Hog-nosed Snake (<i>Heterodon platirhinos</i>);</li> <li>Eastern Musk Turtle (<i>Sternotherus odouratus</i>);</li> <li>Massasauga Rattlesnake (<i>Sistrurus catenatus pop. 1</i>); and</li> <li>Kirtland's Warbler (<i>Setophaga kirtlandii</i>).</li> </ul>

1. Records of Species At Risk considered to be restricted are not being made public due to the threat of poaching experienced by these species. These records will be provided under a separate cover to the Ministry of Natural Resources and Forestry (MNR) and / or Environment Canada – Canadian Wildlife Service (EC-CWS) for permitting purposes.

## 2. Project Description

HIFN I.R. #2 is a parcel of federal Crown land on the shore of Georgian Bay at Key River (approximately 80 kilometres (km) north of Parry Sound, Ontario) held by the Crown subject to the Aboriginal title of and for the benefit of HIFN. A small residential area comprised of HIFN Band Members is located immediately west of Highway 69 on Bekanon Road. Private, largely seasonal, cottage lot leases are located on the north side of Henvey Inlet and several HIFN Band Members have cabins within the HIWEC study area described in **Section 2.1**. Several HIFN Band Members utilize recreational lots within the HIWEC study area. The remainder of the study area is undeveloped and unpopulated.

HIFN I.R. #2 has been in active use by HIFN since pre-contact for habitation, hunting, fishing, gathering, burial, traditional use and cultural gatherings. In recent times, HIFN has used these lands for hunting, fishing, gathering, traditional use and cultural gatherings, forestry, aggregate extraction, waste management, and recreation. There have also been various proposals for commercial and economic development. HIFN requires that any future development be located to protect areas of cultural importance. The proposed HIWEC will have precedence over general uses of these lands, but otherwise these uses may continue.

The HIWEC will use wind to generate energy through the use of commercial WTG technology. The HIWEC will also include pad-mounted transformers, crane pads, 34.5 kilovolts (kV) overhead and / or underground electrical collector cables, communication lines, meteorological towers, access roads, an operations and maintenance (O&M) building, an on-Reserve transmission line (230 kV) within the study area, two (2) 34.5 – 230 kV transformer stations (TSs), construction compounds and storage yards. It will include other ancillary facilities as required, such as a concrete batch plant(s), crusher(s), and parking areas.

The EA assesses 120 wind turbine generators (WTGs) for the HIWEC; however, only up to 91 WTGs will be constructed. To date, 21 of the 120 WTG locations have been identified for removal based on technical and environmental studies completed and comments received from HIFN members and the public. The EA is based on the 120 WTG layout and the permanent HIWEC footprint will be approximately 173.1 hectares (ha) based on installation of 120 WTGs. This footprint represents 1.4% of the land within the approximately 12,278 ha that constitute the HIWEC study area. The final layout of (up to) 91 WTGs will result in approximately 20-25% reduction in the overall footprint from what is presented in this EA.

HIFN has broad authority to manage and protect its Reserve lands. This authority comes from the *First Nations Land Management Act (FNLMA)*, related instruments, and the HIFN Land Code. On August 9<sup>th</sup>, 2015, HIFN approved a Land Law allowing for the lease of HIFN I.R. #2 lands for the HIWEC. This authority includes responsibility for environmental protection and the environmental assessment of projects and physical activities on Reserve lands.

Off-Reserve there will be a new Transmission Line to deliver the electricity generated by the HIWEC to the Ontario electricity grid. The HIW FIT Contract awarded in 2011 has an approved interconnection point south of Parry Sound to the 230 kV Hydro One Network Inc. (HONI) system (Route B). In addition to the assessment of interconnection of Route B, HIW in close consultation and discussions with IESO, HONI and expert consultants, conducted a technical and legal assessment of the possibility of amending the FIT Contract to permit interconnection at the HONI 500 kV circuit (Route A) to reduce the overall length of transmission required for the HIWEC. The FIT Contract amendment was not approved and the assessment has resulted in the conclusion that the current technically and legally viable interconnection point for the HIWEC is the connection point south of Parry Sound to the 230 kV HONI system (Route B), and HIW will continue exclusive assessment and development of that interconnection point and the associated Transmission Line.

The off-Reserve Transmission Line is not within the regulatory authority of HIFN powers and responsibilities set out in the *FNLMA* or the Land Code. The off-Reserve Transmission Line is undergoing an EA under Ontario Regulation 116/01. However, HIFN requested that this EA consider this off-Reserve electricity transmission and its effects so that HIFN may fully understand the implications of approving what is proposed on-Reserve. The off-Reserve Transmission Line is described in **Volume B**.

## 2.1 HIWEC Components

### 2.1.1 Permanent Components

#### 2.1.1.1 Wind Turbine Generators and Foundations

One-hundred and twenty commercial WTGs are being assessed for the HIWEC with only up to 91 WTGs ultimately being constructed. The selected WTG technology is the Vestas V126-3.3MW Turbine, with a nominal power of 3.3 MW. The WTGs are an upwind, horizontal axis unit, with three (3) rotor blades (roughly 61.66 m in length) and a maximum hub height of up to 137 m. The nacelle on each WTG will be located at the top of the tower and will consist of a generator, gearbox, bearings, couplings, and auxiliary equipment. Typically, the nacelle cover is constructed from reinforced fiberglass and the blades are constructed from fiberglass along with epoxy resin. The WTG tower will be constructed from tubular steel or concrete with an approximate diameter of 5 m at the base. The tower contains an internal ladder for maintenance access.

The maximum height of the WTG from base to the blade tip is approximately 200 m. External lighting will be required on some of the WTGs and will be installed in accordance with the Transport Canada and NAV CANADA requirements.

Geotechnical assessments will be used to determine the most suitable foundation design for each WTG. Where site specific conditions permit, rock anchors may be used to bolt the WTGs to bedrock. Alternatively, gravity spread concrete footings could be used. The foundation design will include conduits to connect to the collector system and a grounding grid consisting of copper or aluminum wire and ground rods.

The land area required for each WTG will be dependent upon the final locations of the WTGs relative to access roads, associated infrastructure, and adjacent environmental and terrain features.

#### 2.1.1.2 Access Roads and Crane Pads

Access roads will be constructed to support construction, operations, and decommissioning activities and to provide access to WTGs and other HIWEC infrastructure. Access roads will be designed to minimize the effects on the environment (e.g., maintaining local drainage patterns and minimizing width of disturbance). Access roads will use crushed gravel and range from 5 to 20 m wide, with additional travel clearance required to accommodate large cranes and equipment transport during construction and decommissioning. In some locations it is anticipated that rock will need to be blasted and some areas filled with crushed rock to reduce grades to allow vehicles to bring in required equipment, cranes and WTG components.

Access roads that intersect with Highway 69 will be designed in accordance with Ontario Ministry of Transportation (MTO) standards. Applicable MTO permits will be obtained prior to construction.

Crane pads will be required to be constructed at each WTG. Typical crane pads are approximately 20 x 30 m in size. Final crane pad design will be determined based the specific requirements of the cranes used for the HIWEC. Crane pads will remain in place to support any crane activities during the operations and / or decommissioning phases of the HIWEC.

### **2.1.1.3 Meteorological Towers**

Meteorological (Met) towers are required during the operations phase to validate the performance of the WTGs and provide meteorological data to the IESO to support their wind forecasting activities and operation of the provincial electrical system. Met towers will be connected to the O&M building via fibre optic cables (either overhead and / or underground). Four (4) Met towers will be utilized. As needed, additional meteorological equipment will be used to meet IESO market requirements.

Given the rocky nature of the site, Met tower bases are bolted to surface bedrock with guy wires and anchors for lateral support. All Met towers have been installed as per IESO requirements and the Canadian Standards Association (CSA) protocol for power performance measurements.

### **2.1.1.4 Pad-Mounted Transformers and Collector Lines**

A pad-mounted transformer will be located at the base of each WTG to step-up the voltage of electricity generated to the collector system voltage (e.g., 690 volts (V) to 34.5 kV). Each pad-mounted transformer will be affixed to a precast or poured in place concrete pad. Power cables entering and exiting the pad-mounted transformer will be installed underground along with a grounding grid consisting of copper or aluminum wire and grounding rods.

From each pad-mounted transformer, above or below ground 34.5 kV collector lines will carry electricity from the WTGs to the HIWEC's TSs. Fibre optic communication lines will be installed along with the collector system.

The collector lines may include overhead or below ground sections dependent on site specific conditions; however, it is anticipated that the collector system will be primarily aboveground due to the rocky nature of the site. Aboveground collector lines will be constructed on standard single wooden pole structures. Collector lines will generally follow the access roads to reduce construction area and to minimize potential construction effects. Water crossings for the collector lines will likely be overhead and will be constructed according to the federal and provincial requirements.

### **2.1.1.5 Transformer Stations**

Two (2) TSs will be constructed on HIFN I.R. #2 to step up the 34.5 kV voltage of the collector lines to the 230 kV voltage of the Transmission Line that will transport electricity to the provincial transmission grid. One (1) TS will be located on the north side and the other on the south side.

The HIWEC TSs will consist primarily of power transformers, grounding transformers, 34.5 kV and 230 kV circuit breakers and disconnect switches, surge arrestors, instrument transformers, meters, a protection and control building, and ancillary equipment, along with associated concrete foundations to mount the equipment. The HIWEC TSs will be located on a graded area, roughly 50 m x 50 m, which will be confirmed during the detailed design phase. The HIWEC TSs will be fenced and secured to prevent unauthorized entry and maintain public safety. All non-current carrying and conducting metal components within the TS area will be connected to a grounding grid installed below finished grade.

### **2.1.1.6 On-Reserve Transmission Towers and Foundations**

From the HIWEC TSs, a section of overhead transmission line of 230 kV will be constructed on HIFN I.R. #2. The Transmission Line will consist of Aluminum Conductor Steel Reinforced (ACSR) cable. The conductors will be attached to insulators and tower structures that will be approximately 30 to 40 m in height. An Optical Ground Wire

(OPGW) will be installed on the transmission line to facilitate communications between the HIWEC and the TSs. The towers will be steel monopole and / or wood structures directly buried, erected on concrete foundations or bolted to bedrock as appropriate for the tower location. On average, the structures will be spaced approximately 200 to 400 m apart except where site specific conditions require shorter or longer tower spans (e.g., significant changes in line direction, large waterbody crossings, or in compliance with design codes and laws).

#### **2.1.1.7 Operations and Maintenance Building**

An O&M building will be constructed to monitor the day-to-day operations of the HIWEC and provide an area for storage of spare parts and maintenance equipment. The O&M building will require a concrete foundation and may include offices, staff parking, a workshop, parts and vehicle storage, a septic system, water well(s), a storage yard, and other ancillary facilities.

Fencing will surround the building for security purposes. Domestic water, if required, will be supplied from a water well. Wastewater will be delivered to a septic system or tank for removal off-site. A small amount of domestic solid waste (e.g., garbage, recycling, and organics) will be generated by workers during maintenance activities and will be collected and permanently disposed of at a licensed facility. Power to the O&M building will be supplied through the local distribution network with a back-up, liquid fuel-fired generator.

#### **2.1.2 Temporary Components**

During HIWEC construction, lands will be temporarily used for: construction compounds and laydown yards; construction areas surrounding infrastructure including parking areas (e.g., WTG staging areas); concrete batch plant(s); crusher(s) and water withdrawal points. Temporary cleared areas will be minimized as much as possible and will be limited to the minimum area required to safely and efficiently support associated construction activities. Following construction, temporary areas will be restored to a safe and clean condition.

##### **2.1.2.1 Construction Compounds & Laydown Yards**

Temporary construction compounds and laydown yards will be required to support general construction activities and for temporary storage of WTG components, electrical equipment (e.g., cable reels and pad-mounted transformers), construction materials, containers, vehicles, equipment, office trailers, concrete batch plant(s), crusher(s) and portable toilets. Typically, these areas are cleared and graded. Temporary storage of materials will conform to applicable codes, including any fuel storage which will have adequate secondary containment and bollards for impact protection.

##### **2.1.2.2 Wind Turbine Generator Staging Areas**

A staging area will be cleared around each WTG location to support assembly of the WTGs, provide space for construction equipment, and for storage of material excavated for foundation construction. Staging areas will be cleared and leveled (with gravel or blasted rock if required) on land adjacent to the base of the WTGs. Geotextile will be used to facilitate removal of gravel following construction activities if required. WTG components will either be delivered to the construction compounds for temporary storage or directly to the staging areas for assembly. If required, portable generator sets used for WTG pre-commissioning may also be located in these areas.

### 2.1.2.3 Concrete Batch Plant(s)

At least one (1) temporary concrete batch plant will be located within a construction compound and laydown yard, and will produce concrete required for HIWEC construction. A typical concrete batch plant for a wind energy centre of this size would produce around 100 to 150 cubic yards per hour. Site preparation for the plant will consist of clearing, grading and leveling activities. Concrete batching activities will occur in parallel with the relevant HIWEC construction activities (i.e., foundation installation).

Aggregate materials required for concrete will be obtained from local aggregate sources in the vicinity of HIFN I.R. #2.

### 2.1.2.4 Crusher(s)

One (1) or more temporary crushers will be located within a construction compound and laydown yard, and will crush rock from blasting activities. Blasting will be needed to remove rock for access roads. The crushed rock will then be used to fill areas needed for access roads. Rock crushing requirements for the HIWEC may vary between 150 to 500 tons per hour depending on the scope for the crusher and the type of crusher selected for construction. Site preparation for the crusher will consist of clearing, grading and levelling activities. Crushing activities will occur in parallel with the access road construction.

### 2.1.2.5 Parking Areas

Parking areas for staff of HIW and its partners will be located in appropriate locations, such as construction compounds and laydown yards.

## 2.1.3 Construction, Operation and Decommissioning Activities

### 2.1.3.1 Construction Phase

Activities that may occur during the pre-construction phase include: planning and resource management, pre-construction surveys, geotechnical investigations, Met tower installation, permitting and detailed design.

The construction phase may consist of the following key activities:

- **Site preparation**
  - Delineation of work area and installation of erosion and sedimentation control measures
  - Vegetation clearing and site grading
  - Delineation and preparation of temporary work areas
- **Construction of access roads and laydown areas**
  - Construction of access roads as required (including blasting)
  - Installation of temporary facilities including concrete batch plant(s), crusher(s), WTG staging areas, construction compounds and laydown yards
- **Transportation of equipment and materials**
  - On-site delivery of construction vehicles, equipment and materials
- **Foundation excavation and construction**
  - Installation (includes excavation, blasting and construction as required) of WTG foundations
  - Installation (includes excavation, blasting and construction as required) of crane pads
  - Installation (includes excavation, blasting and construction as required) of pad-mounted transformers

- Installation (includes excavation, blasting and construction as required) of TS foundations
- Installation (includes excavation, blasting and construction as required) of O&M foundation and building
- **WTG installation**
  - Erection of WTGs
- **Collector system and transmission line installation**
  - Installation of above and / or below ground electrical collector lines
  - Installation of on-Reserve transmission infrastructure
- **Installation of TSs**
- **Construction completion**
  - Reclamation of temporary construction areas
  - Demobilization of construction works
- **Power connection and commissioning**

### 2.1.3.2 Operations Phase

The HIWEC will be designed to operate for 30+ years; however, it is not uncommon for well-maintained facilities to extend beyond this design life. With the exception of routine and unplanned maintenance, it is expected that operation of the HIWEC will be 24 hours a day, seven (7) days a week. The HIWEC will be controlled and monitored remotely 24 hours a day via computer, with a team of locally based WTG technicians conducting routine maintenance and repairs. Operation is anticipated to require up to 15 trained technical and administrative staff, including WTG maintenance technicians and a site supervisor.

The operations and maintenance phase may consist of the following key activities:

- **HIWEC operation**
  - WTG operation
  - Meter calibrations
  - Met tower data acquisition
- **WTG, collector system, road and crossing repair / maintenance**
  - Preventative and unplanned maintenance of HIWEC components (includes accessing such components)
  - Maintenance of the collector system and any on-Reserve transmission lines (includes accessing such components)
  - Access road maintenance
- **Environmental monitoring**

The safe operation of the proposed HIWEC will involve the real-time collection of a series of operations parameters, including: wind speed, wind direction, air temperature, atmospheric pressure and electrical parameters. This real-time monitoring of WTG functioning is essential to reduce unplanned outage events and duration by detecting early changes to WTG performance. To provide accurate on-site monitoring of climatic conditions, four (4) Met towers up to 100 m tall were installed for the HIWEC. An additional Sonic Detection and Ranging (SODAR) unit has also been installed adjacent to one (1) Met tower to supplement meteorological data collected from the tower. Nacelle-mounted meteorological data collection points will be located such that no WTG will be located further than 5 km from the nearest data collection point.

If temperature and humidity conditions result in ice formation on WTG blades, sensors installed on each WTG will detect ice build-up by monitoring vibrations, imbalances and generation efficiency. If an event occurs that is considered to be out of the normal operating range for a WTG, the WTG will be taken out of service immediately. Through the Supervisory Control and Data Acquisition (SCADA) system, the status of the WTG will be reported to the HIWEC operator. WTGs that have been shut down will not be re-started until a site visit has been conducted to inspect the WTG and an investigation is completed that deems the WTG safe. Operational logs will be kept by technical staff that will document HIWEC operations (including WTG shutdowns) and communications with the public and agencies.

Routine preventative maintenance activities will be scheduled at approximately six (6) month intervals with specific maintenance tasks scheduled for each interval. Scheduled maintenance activities for WTGs will include a complete inspection of the tower and components, functionality testing, replacement of any worn parts, and lubrication of moving parts. Following all maintenance work on WTGs the area in the vicinity of the WTGs will be thoroughly cleaned to ensure continued safe operation.

WTGs are very reliable and major components are designed to operate for over 20 years. However, there is a possibility that component failure may occur despite the reliability of the WTGs fleet-wide. Most commonly, the failure of small components such as switches, fans or sensors will take the WTG out of service until the facility component is replaced. These repairs can usually be carried out by a single crew visiting the WTG 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 which was used to install the WTGs, may be required.

The collector lines and TSs will require periodic preventative maintenance activities. Routine maintenance will include condition assessment for aboveground infrastructure and protective relay maintenance of the TSs, in addition to monitoring of the secondary containment systems for traces of oil. Vegetation control will be required around the collector lines and on-Reserve transmission line to prevent any damage to the lines and ensure safe operation. The vegetation is typically cleared by mechanized equipment (e.g., chainsaw / hydro axe).

### 2.1.3.3 Decommissioning Phase

Although the HIWEC is expected to operate for 30+ years, it could also be repowered prior to considering any decommissioning activities to extend the design life. Repowering may involve switching / upgrading gearboxes and generators, replacing WTG blades, and upgrading electrical equipment.

The decommissioning phase may include the following key activities, at the discretion of HIFN:

- **Power disconnection and decommissioning of service**
  - Disconnection of collector TSs
- **Transportation of equipment and materials**
  - On-site delivery of decommissioning vehicles and equipment
  - Removal of HIWEC components and infrastructure from site
- **Disassembly and removal of collector system components**
  - Disassembly and removal of collector TSs
  - Disassembly and removal of pad-mounted transformers
  - Disassembly and removal of above and / or below ground electrical collector lines
  - Disassembly and removal of on-Reserve transmission infrastructure

- **WTG and / or tower disassembly and removal**
  - Disassembly and removal of WTG infrastructure
  - Disassembly and removal of Met towers
- **Disassembly and removal of O&M building infrastructure**
- **Decommissioning completion**
  - Reclamation of disturbed areas (includes reclamation of access roads, as required)
  - Grading of concrete foundations
  - Demobilization of decommissioning works

The specific schedule for decommissioning will be determined at the time it is undertaken.

### 3. Conservation Reserves

This section describes potential environmental effects of the HIWEC on Conservation Reserves during its construction, operational and decommissioning phases. Details regarding how the Construction Plan and Environmental Effects Monitoring Plan address these potential negative effects, including mitigation measures, performance objectives, monitoring methods and contingency measures, are also described herein.

A total of one (1) Conservation Reserve, the North Georgian Bay Shoreline and Islands Conservation Reserve, was identified within 120 m of the HIWEC location. The North Georgian Bay Shoreline and Islands Conservation Reserve is located within 19 m of a proposed WTG, along the south side of the HIFN Reserve #2 lands. No construction, decommissioning or operations activities will take place inside the North Georgian Bay Shoreline and Islands Conservation Reserve. Taking into consideration the close proximity of the North Georgian Bay Shoreline and Islands Conservation Reserve to the HIWEC location, and the similar ecological characteristics of this feature compared to other locations within 120 m of the HIWEC location, the mitigation measures presented in **Sections 4, 5, 6 and 7** for construction, decommissioning and operations activities that will take place adjacent to wetlands, woodlands, IWH features, and Federal Species at Risk (SAR) habitat, will be used and are considered sufficient to address potential negative environmental effects of construction, operation and decommissioning of the HIWEC on the North Georgian Bay Shoreline and Islands Conservation Reserve.

## 4. Important Wetlands

This section describes potential environmental effects of the HIWEC on Important Wetlands during its construction, operational and decommissioning phases. Details regarding how the Construction Plan and Environmental Effects Monitoring Plan address these potential negative effects, including mitigation measures, performance objectives, monitoring methods and contingency measures, are also described herein.

A total of four (4) Important Wetland features were identified within 120 m of the HIWEC location. The HIWEC was designed to avoid or minimize placing infrastructure or temporary construction disturbance areas within Important Wetland features to the extent possible. However, up to 24.5 ha of Important Wetland features (comprising 1% of wetlands within the HIFN I.R. #2) will be removed as a result of the HIWEC, which will result in direct loss and fragmentation of these features. Adjacent wetlands being retained may also be negatively affected by construction, operation and decommissioning. The potential negative environmental effects of the HIWEC on Important Wetland features are described in **Table 4-1** below.

Where the HIWEC location is proposed within Important Wetland features or in areas adjacent to Important Wetland features, mitigation measures have been identified to address the potential negative environmental effects associated with construction, operation and decommissioning in **Table 4-1** below. The mitigation measures in this table are also described in the Construction Plan Report (**Appendix B of Volume A**) and the Description Report (**Appendix A of Volume A**).

Table 4-1: Potential Effects and Proposed Mitigation Measures for Important Wetlands

Important Wetland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
Construction activities within 120 m of an Important Wetland feature	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>Damage to wetland vegetation as a result of soil or water contamination (including groundwater) by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.</li></ul>	<ul style="list-style-type: none"><li>Prevent soil or water contamination.</li></ul>	<ul style="list-style-type: none"><li>Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example:<ul style="list-style-type: none"><li>In the event of a contaminant spill all work will stop in the immediate area until the spill is cleaned up.</li><li>Spill control and containment equipment / materials shall be readily available on site.</li><li>Protocols for access to additional spill clean-up materials if needed.</li><li>Contaminated materials to be handled in accordance with relevant federal and provincial guidelines and standards.</li><li>Including the use of Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li><li>Proper training of construction staff on associated emergency response and spill clean-up procedures.</li><li>Spills to be cleaned up as soon as possible, with contaminated soils removed to a licenced disposal site, if required.</li><li>Materials contained in spill clean-up kits are restocked as necessary.</li><li>Any soil encountered during excavation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to be analyzed to determine its quality in order to identify the appropriate disposal method.</li><li>To include reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and project management phone numbers.</li></ul></li><li>Apply the following general mitigation measures to avoid soil contamination:<ul style="list-style-type: none"><li>Ensure machinery is maintained free of fluid leaks.</li><li>Site maintenance, vehicle maintenance, vehicle washing and refuelling to be done on spill pads in specified areas at least 30 m away from wetlands and / or waterbodies.</li><li>Store any stockpiled materials at least 30 m away from wetlands and / or waterbodies.</li><li>Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li></ul></li><li>Undertake waste management in accordance with relevant federal and provincial guidelines and standards and construction site to be kept clear of garbage and debris.</li><li>Ensure that wash water used for the cleaning of cement construction materials does not come in contact with the ground. Deposit waste water in a concrete washout container that allows evaporation and hardening for easier disposal or recover and recycle wash water back into cement truck.</li><li>Develop and implement a Construction Dewatering Discharge Plan describing appropriate areas and methods for discharge.</li><li>If dewatering of excavations is required and is expected to exceed 50,000 L/day, sample discharge water daily during the days the water is discharged and tested for suspended sediments. The company shall not discharge turbid water and will comply with protocols in the Canadian Council of Ministers of the Environment (CCME) “Canadian Water Quality Guidelines for the Protection of Aquatic Life: Total Particulate Matter”, which includes requirements for measuring suspended sediments, and the Provincial Water Quality Objectives (PWQO).</li><li>The Contractor shall implement appropriate measures (e.g., geosock or similar device) to reduce the amount of sediment released.</li><li>Dispose of any contaminated waste material generated from construction activities off-site by authorized and approved haulers and receivers. Where feasible, leave a layer of vegetation intact between the outfall and receiving waterbody to provide additional water dispersion and entrapment of suspended solids.</li><li>Ensure that no direct discharge to Georgian Bay, Key River, Henvey Inlet or any surface water feature outside the HIWEC will occur without acquiring applicable approvals.</li><li>Should groundwater dewatering activities be expected to exceed 50,000 L/day, implement the following measures:<ul style="list-style-type: none"><li>Surround inlet pump head with clear stone and filter fabric.</li><li>Regulate the discharge rate to ensure there is no flooding in the receiving water body and that no soil erosion is caused that impacts the receiving water body.</li></ul></li></ul>	<ul style="list-style-type: none"><li>Contractor to conduct routine inspections of construction equipment for leaks / spills.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>If a spill enters a wetland:<ul style="list-style-type: none"><li>Collect and analyze water samples for comparison with appropriate parameters.</li><li>Monitor daily until cleanup is completed or a Biologist determines that contaminant levels are below thresholds which may affect wetland form or function. If this is not possible, Environment Canada and HIFN will be contacted regarding additional mitigation measures that may be required.</li></ul></li></ul></li></ul>
	<ul style="list-style-type: none"><li>Damage to wetland vegetation due to increased dust accumulation.</li></ul>	<ul style="list-style-type: none"><li>Minimize dust accumulation on peripheral vegetation.</li></ul>	<ul style="list-style-type: none"><li>Use water as a dust suppressant, as needed, along areas where construction activities are located within 5 m of a wetland.</li><li>Implement construction speed limit of 30 km/hr on all access roads.</li><li>Conduct dust suppression (i.e., spraying water on access roads and work areas) during dry conditions to minimize dust generation.</li><li>If complaints arise, develop and maintain a reporting log, respond to complaint in a timely fashion and mitigate accordingly.</li></ul>	<ul style="list-style-type: none"><li>Daily monitoring of areas where active construction is occurring within 5 m of an Important Wetland by an Environmental Monitor.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>In the event that dust accumulates on leaves of wetland plants, which may reduce photosynthesis, water will be used to wash dust off of vegetation.</li></ul></li></ul>

Table 4-1: Potential Effects and Proposed Mitigation Measures for Important Wetlands

Important Wetland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
	<ul style="list-style-type: none"><li>• Changes in wetland function due to change in surface water drainage patterns or obstructions of lateral flows in surface water to wetlands resulting in effects to soil moisture and species composition of vegetation.</li></ul>	<ul style="list-style-type: none"><li>• Minimize effects to soil moisture and species composition of vegetation.</li></ul>	<ul style="list-style-type: none"><li>• Ensure BMPs are used to maintain current drainage patterns, including:<ul style="list-style-type: none"><li>▪ Minimize paved surfaces and design roads to promote infiltration;</li><li>▪ Limit changes in land contours to the maximum extent possible; and</li><li>▪ Ensure roadway culverts are designed and installed to maintain existing drainage patterns.</li></ul></li><li>• Where the installation of a flow equalizing culvert is proposed, appropriate erosion control measures (i.e., rip rap, seeding) will be installed at the ends of each culvert to prevent erosion which can change land contours.</li></ul>	<ul style="list-style-type: none"><li>• Inspect locations following completion of culvert installation by an Environmental Monitor to ensure no changes in drainage patterns.</li><li>• Examine condition of Important Wetlands within 30 m of construction areas at the completion of construction.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns.</li></ul></li></ul>
	<ul style="list-style-type: none"><li>• Changes in wetland function due to reductions in groundwater recharge quantities into wetlands due to increases in impervious surfaces.</li></ul>	<ul style="list-style-type: none"><li>• Minimize reductions in groundwater recharge.</li></ul>	<ul style="list-style-type: none"><li>• Minimize paved surfaces and design roads to promote groundwater infiltration.</li><li>• Implement groundwater infiltration techniques to the maximum extent possible. Examples include:<ul style="list-style-type: none"><li>▪ Releasing water to vegetated areas after applying appropriate water quality and temperature controls;</li><li>▪ Lining ditches with permeable material (rather than clay, for example); and</li><li>▪ Groundwater should remain on site and not disposed of off-site (unless contaminated).</li></ul></li><li>• Where possible, direct groundwater discharge water to natural infiltration systems after applying appropriate water quality and temperature controls.</li></ul>	<ul style="list-style-type: none"><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality prior to, during, and post completion of construction.</li><li>• <b>Contingency Measures:</b></li><li>• In the event of a reduction in wetland water level and / or water quantity, corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li></ul>
	<ul style="list-style-type: none"><li>• Reduced wetland function due to increased erosion and sedimentation resulting from construction activity.</li></ul>	<p>Minimize erosion and sedimentation from construction activity.</p>	<ul style="list-style-type: none"><li>• Install and maintain sediment and erosion controls such as silt fence barriers, rock flow check dams, compost filter socks or approved alternative along the edge of the construction footprint area if within 30 m of an Important Wetland to minimize potential sediment loading to the feature.</li><li>• Develop and implement an Erosion and Sediment Control Plan.</li><li>• Utilize erosion blankets, sediment control fencing, straw bale etc. for construction activities in areas where there is erosion and sedimentation potential near a wetland, woodland or waterbody.</li><li>• Utilize sediment logs (compost filter sock) in areas where bedrock is exposed at surface or trenching and securing of erosion control fencing is not possible.</li><li>• Maintain undisturbed buffer strips greater than 30 m in width around watercourses, where possible, except where access roads approach water crossings.</li><li>• Store stockpiled material at least 30 m from a wetland or waterbody.</li><li>• Monitor to ensure erosion and sedimentation control measures 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 for the duration of construction / decommissioning activity.</li><li>• Minimize the size of cleared areas to limit the area of exposed soil.</li><li>• Re-vegetate or stabilize exposed sites as soon as possible following disturbance using species native to the area to limit the duration of soil exposure.</li><li>• Divert access road runoff through drainage ditches directed into vegetated areas or through environmental protection measures (such as sediment traps, rock flow check dams, sediment barriers etc.) to ensure that exposed soils or road materials are not transported into waterbodies or wetlands. Ditches &gt;5% in slope may require lining with appropriate sized rip rap to protect against erosion and also slow the flow velocity.</li><li>• Grade disturbed / remediated slopes or stockpiles to a stable angle to avoid slope instability and reduce erosion.</li><li>• Grade soil stockpiles by mechanical means to compact the soil and limit the erosion. Tracks of machinery should be perpendicular to the slope of the pile to reduce the flow velocity of rainfall over the stockpile.</li><li>• Identify unstable rock structures and sensitive soils through field investigation prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li><li>• Keep all equipment within identified work areas to minimize disturbance of adjacent soils.</li><li>• Restrict construction equipment to designated controlled vehicle access routes to minimize the potential for soil compaction and to minimize vehicle traffic on exposed and / or sensitive soils.</li><li>• Routine visual inspections of sediment and erosion control devices for effectiveness.</li><li>• Repair and maintenance to sediment and erosion control devices performed regularly.</li></ul>	<ul style="list-style-type: none"><li>• Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) where construction occurs within 30 m of an Important Wetland by an Environmental Monitor on the following basis:<ul style="list-style-type: none"><li>▪ Weekly during active construction periods (or daily where construction occurs within 5 m of an Important Wetland);</li><li>▪ Prior to, during and post forecasted large rainfall events (&gt;20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet);</li><li>▪ Daily during extended rain or snowmelt periods;</li><li>▪ Increased vigilance will be given to sediment and erosion control materials installed on bedrock to ensure proper functioning during large rainfall events.</li><li>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.</li></ul></li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If the amount of sediment being released into the environment is not being contained by the primary mitigation measure, other sediment and erosion control measures should be employed to increase effectiveness of the erosion and sediment controls in place. Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place.</li></ul></li></ul>

**Table 4-1: Potential Effects and Proposed Mitigation Measures for Important Wetlands**

Important Wetland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Undertake blasting operations in accordance with relevant federal and provincial guidelines and standards.</li><li>• Investigate alternative rock-excavating techniques (i.e., mechanical means) where possible.</li><li>• Develop and implement a Blasting Plan that includes standard BMPs to minimize extent of adverse noise, vibration and slope instability from blasting, including:<ul style="list-style-type: none"><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all material, including soluble substances used for blasting;</li><li>▪ Use blasting mats over top of holes to minimize scattering of blast debris around the area;</li><li>▪ Reduce blasting footprint to the extent possible;</li><li>▪ Ensure the order of firing is correct to minimize the frequency of blasts;</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li><li>• Identify unstable rock structures through field investigations prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li><li>• Routine visual inspections for slope instability performed during and after blasting operations.</li></ul>	<ul style="list-style-type: none"><li>•</li></ul>
	<ul style="list-style-type: none"><li>• Change in wetland function due to reduced water levels caused by temporary construction dewatering activities and associated dewatering discharge.</li></ul>	<ul style="list-style-type: none"><li>• Minimize water draw down in wetlands from groundwater takings.</li></ul>	<ul style="list-style-type: none"><li>• Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine anticipated groundwater taking quantities, groundwater quality and predicted zone of influence (ZOI) prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided.</li><li>• Limit duration of dewatering to as short a time frame as possible.</li><li>• Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls) where possible.</li><li>• Construct new water supply wells according to regulatory standards and be operated in a manner to conserve water (i.e., excessive water taking is avoided).</li></ul>	<ul style="list-style-type: none"><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality prior to, during, and post completion of construction.</li><li>• <b>Contingency Measures:</b></li><li>• In the event of a reduction in wetland water level and / or water quantity, corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>• Risk of soil or water contamination from oil, gas, etc. during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• No on-site contamination of soil, groundwater or surface water.</li></ul>	<ul style="list-style-type: none"><li>• Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example:<ul style="list-style-type: none"><li>▪ Protocols for access to spill control and containment equipment / materials (e.g., ensure that spill control and containment equipment / materials are readily available on site and additional spill clean-up materials will be available if needed, restock materials contained in spill clean-up kits as necessary).</li><li>▪ Protocols for handling contaminated materials (i.e., to be handled in accordance with relevant federal and provincial guidelines and standards).</li><li>▪ Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li><li>▪ Training requirements for operational staff on associated emergency response plan and spill clean-up procedures.</li><li>▪ Protocols for cleaning up spills (i.e., clean up spills as soon as possible, with contaminated soils removed to a licenced disposal site, if required; analyze any soil encountered during operation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to determine its quality in order to identify the appropriate disposal method).</li><li>▪ Reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and project management phone numbers.</li></ul></li><li>• Apply the following general mitigation measures to avoid soil contamination:<ul style="list-style-type: none"><li>▪ Ensure machinery is maintained free of fluid leaks.</li><li>▪ Site maintenance, vehicle maintenance, vehicle washing and refuelling to be done on spill pads in specified areas at least 30 m away from wetlands and / or waterbodies.</li><li>▪ Store any stockpiled materials at least 30 m away from wetlands and / or waterbodies.</li><li>▪ Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li><li>▪ All potentially hazardous materials to be stored in containment sites within the Operations and Maintenance Building, within berms where possible.</li><li>▪ Keep ROW for access roads, collector lines / on-reserve transmission lines and WTGs clear of garbage and debris.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• No monitoring required.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If a spill enters a wetland:<ul style="list-style-type: none"><li>– Collect and analyze water samples for comparison with appropriate parameters.</li><li>– Monitor daily until cleanup is completed or a Biologist determines that contaminant levels are below thresholds which may affect wetland form or function. If this is not possible, Environment Canada and HIFN will be contacted regarding additional mitigation measures that may be required.</li></ul></li></ul></li></ul>

Table 4-1: Potential Effects and Proposed Mitigation Measures for Important Wetlands

Important Wetland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
	<ul style="list-style-type: none"><li>• Introduction of invasive species resulting in change in wetland species diversity, quality and function.</li></ul>	<ul style="list-style-type: none"><li>• Prevent the introduction and spread of invasive species.</li></ul>	<ul style="list-style-type: none"><li>• If encroachment of invasive species is detected, management recommendations will be determined by a qualified Biologist.</li><li>• Vegetation trimming will be limited to within areas that have been cleared during construction.</li></ul>	<ul style="list-style-type: none"><li>• Monitor Important Wetlands once per growing season for two (2) years to confirm introduction of invasive species has not occurred.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Should invasive species introduction occur, corrective actions to remove and reduce the spread of these species will be undertaken. Habitat rehabilitation will occur.</li></ul></li></ul>
<b>Construction activities within an Important Wetland feature</b>	<b>Construction/ Decommissioning</b> <ul style="list-style-type: none"><li>• Permanent loss of Important Wetland features.</li></ul>	<ul style="list-style-type: none"><li>• Minimize amount of wetland vegetation removal.</li><li>• Minimize disturbance to Important Wetlands.</li></ul>	<ul style="list-style-type: none"><li>• Vegetation removal will be minimized to the extent possible.</li><li>• Site permanent infrastructure outside of wetlands to the extent possible.</li><li>• Where excavation of a wetland cannot be avoided, the area of disturbance will be delineated to ensure that work does not occur outside the construction footprint.</li><li>• Where construction activities occur within 30 m of a wetland, install and maintain construction fencing (or similar delineation device) to clearly define the construction footprint area to prevent accidental damage to vegetation.</li><li>• Preserve topsoil (and therefore seed bank), where present, for use during rehabilitation.</li><li>• Fell trees toward the construction footprint area to reduce damage to adjacent vegetation being retained, where feasible.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of wetland that was removed (e.g., replant swamp areas using native stock, consider transplanting native wetland species into temporarily disturbed areas suitable for wetland planting) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Where excavation for construction of access roads, WTGs or collector lines is required within the rooting zone of trees (i.e., within 1 m of the dripline), implement proper root pruning measures to protect tree roots.</li></ul>	<ul style="list-style-type: none"><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor.</li><li>• Vegetation monitoring of rehabilitated wetlands will occur at a minimum frequency of annually for the first two (2) years after re-seeding to ensure rehabilitation is progressing. Further rehabilitation will occur as determined necessary.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair string lines (or alternative method used) if damaged.</li><li>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.</li></ul></li></ul>

## 5. Important Woodlands

This section describes potential environmental effects of the HIWEC on Important Woodlands during its construction, operational and decommissioning phases. Details regarding how the Construction Plan and Environmental Effects Monitoring Plan address these potential negative effects, including mitigation measures, performance objectives, monitoring methods and contingency measures, are also described herein.

A total of 35 Important Woodland features were identified within 120 m of the HIWEC location. The HIWEC was designed to avoid or minimize placing infrastructure or temporary construction disturbance areas within Important Woodland features to the extent possible. However, there will be some vegetation removal of Important Woodland as a result of the HIWEC, which will result in direct loss and fragmentation of these features. Adjacent woodlands being retained may also be negatively affected by construction, operation and decommissioning. The potential negative environmental effects of the HIWEC on Important Woodland features are described in **Table 5-1** below.

Where the HIWEC location is proposed within Important Woodland features or in areas adjacent to Important Woodland features, mitigation measures have been identified to address the potential negative environmental effects associated with construction, operation and decommissioning in **Table 5-1** below. The mitigation measures in this table are also described in the Construction Plan Report (**Appendix B** of **Volume A**) and the Description Report (**Appendix A** of **Volume A**).

Table 5-1: Potential Effects and Proposed Mitigation Measures for Important Woodlands

Important Woodland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
<p><b>Construction activities within 120 m of an Important Woodland feature</b></p> <ul style="list-style-type: none"> <li>•WOOD-029</li> <li>•WOOD-035</li> <li>•WOOD-039</li> <li>•WOOD-040</li> <li>•WOOD-057</li> <li>•WOOD-063</li> <li>•WOOD-069</li> <li>•WOOD-135</li> <li>•WOOD-138</li> </ul>	<p><b>Construction / Decommissioning</b></p> <ul style="list-style-type: none"> <li>• Reduction in soil quality due to accidental release of contaminants during construction, heavy equipment and vehicle use, excavation, concrete truck rinsing, etc.</li> <li>• Damage to woodland vegetation as a result of soil or water contamination (including groundwater) by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent soil or water contamination.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example: <ul style="list-style-type: none"> <li>▪ In the event of a contaminant spill all work will stop in the immediate area until the spill is cleaned up.</li> <li>▪ Spill control and containment equipment / materials5 shall be readily available on site.</li> <li>▪ Protocols for access to additional spill clean-up materials if needed.</li> <li>▪ Contaminated materials to be handled in accordance with relevant federal and provincial guidelines and standards.</li> <li>▪ Including the use of Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li> <li>▪ Proper training of construction staff on associated emergency response and spill clean-up procedures.</li> <li>▪ Spills to be cleaned up as soon as possible, with contaminated soils removed to a licenced disposal site, if required.</li> <li>▪ Materials contained in spill clean-up kits are restocked as necessary.</li> <li>▪ Any soil encountered during excavation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to be analyzed to determine its quality in order to identify the appropriate disposal method.</li> <li>▪ To include reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and project management phone numbers.</li> </ul> </li> <li>• Apply the following general mitigation measures to avoid soil contamination: <ul style="list-style-type: none"> <li>▪ Ensure machinery is maintained free of fluid leaks.</li> <li>▪ Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li> </ul> </li> <li>• Undertake waste management in accordance with relevant federal and provincial guidelines and standards and construction site to be kept clear of garbage and debris.</li> <li>• Ensure that wash water used for the cleaning of cement construction materials does not come in contact with the ground. Deposit waste water in a concrete washout container that allows evaporation and hardening for easier disposal or recover and recycle wash water back into cement truck.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor to conduct routine inspections of construction equipment for leaks / spills.</li> <li>• <b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>▪ Monitor daily until cleanup is completed or a Biologist determines that contaminant levels are below thresholds which may affect woodland form or function. If this is not possible, Environment Canada and HIFN will be contacted regarding additional mitigation measures that may be required.</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Change in Species Diversity and change in woodland quality and function due to increased erosion and sedimentation resulting from construction activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimize erosion and sedimentation from construction activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Install and maintain sediment and erosion controls such as silt fence barriers, rock flow check dams, compost filter socks or approved alternative along the edge of the construction footprint area if within 30 m of an important woodland to minimize potential sediment loading to the feature.</li> <li>• Develop and implement an Erosion and Sediment Control Plan.</li> <li>• Utilize erosion blankets, sediment control fencing, straw bale etc. for construction activities in areas where there is erosion and sedimentation potential near a wetland, woodland or waterbody.</li> <li>• Utilize sediment logs (compost filter sock) in areas where bedrock is exposed at surface or trenching and securing of erosion control fencing is not possible.</li> <li>• Monitor to ensure erosion and sedimentation control measures 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 for the duration of construction / decommissioning activity.</li> <li>• Minimize the size of cleared areas to limit the area of exposed soil.</li> <li>• Re-vegetate or stabilize exposed sites as soon as possible following disturbance using species native to the area to limit the duration of soil exposure.</li> <li>• Grade disturbed / remediated slopes or stockpiles to a stable angle to avoid slope instability and reduce erosion.</li> <li>• Grade soil stockpiles by mechanical means to compact the soil and limit the erosion. Tracks of machinery should be perpendicular to the slope of the pile to reduce the flow velocity of rainfall over the stockpile.</li> <li>• Identify unstable rock structures and sensitive soils through field investigation prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li> <li>• Keep all equipment within identified work areas to minimize disturbance of adjacent soils.</li> <li>• Restrict construction equipment to designated controlled vehicle access routes to minimize the potential for soil compaction and to minimize vehicle traffic on exposed and / or sensitive soils.</li> <li>• Routine visual inspections of sediment and erosion control devices for effectiveness.</li> <li>• Repair and maintenance to sediment and erosion control devices performed regularly.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) where construction occurs within 30 m of an Important Woodland by an Environmental Monitor on the following basis: <ul style="list-style-type: none"> <li>▪ Weekly during active construction periods (or daily where construction occurs within 5 m of an Important Woodland);</li> <li>▪ Prior to, during and post forecasted large rainfall events (&gt;20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet);</li> <li>▪ Daily during extended rain or snowmelt periods;</li> <li>▪ Increased vigilance will be given to sediment and erosion control materials installed on bedrock to ensure proper functioning during large rainfall events.</li> <li>▪ Monthly during inactive construction periods, where the site is left alone for 30 days or longer.</li> </ul> </li> <li>• <b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>▪ If the amount of sediment being released into the environment is not being contained by the primary mitigation measure, other sediment and erosion control measures should be employed to increase effectiveness of the erosion and sediment controls in place. Suspend work if excessive flows.</li> </ul> </li> </ul>

Table 5-1: Potential Effects and Proposed Mitigation Measures for Important Woodlands

Important Woodland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Undertake blasting operations in accordance with relevant federal and provincial guidelines and standards.</li><li>• Investigate alternative rock-excavating techniques (i.e., mechanical means) where possible.</li><li>• Develop and implement a Blasting Plan that includes standard BMPs to minimize extent of adverse noise, vibration and slope instability from blasting, including:<ul style="list-style-type: none"><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all material, including soluble substances used for blasting;</li><li>▪ Use blasting mats over top of holes to minimize scattering of blast debris around the area;</li><li>▪ Reduce blasting footprint to the extent possible;</li><li>▪ Ensure the order of firing is correct to minimize the frequency of blasts;</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li><li>• Identify unstable rock structures through field investigations prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li><li>• Routine visual inspections for slope instability performed during and after blasting operations.</li></ul>	
	<b>Operation</b> <ul style="list-style-type: none"><li>• Risk of soil or water contamination from oil, gas, etc. during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• No on-site contamination of soil, groundwater or surface water.</li></ul>	<ul style="list-style-type: none"><li>• Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example:<ul style="list-style-type: none"><li>▪ Protocols for access to spill control and containment equipment / materials (e.g., ensure that spill control and containment equipment / materials are readily available on site and additional spill clean-up materials will be available if needed, restock materials contained in spill clean-up kits as necessary).</li><li>▪ Protocols for handling contaminated materials (i.e., to be handled in accordance with relevant federal and provincial guidelines and standards).</li><li>▪ Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li><li>▪ Training requirements for operational staff on associated emergency response plan and spill clean-up procedures.</li><li>▪ Protocols for cleaning up spills (i.e., clean up spills as soon as possible, with contaminated soils removed to a licenced disposal site, if required; analyze any soil encountered during operation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to determine its quality in order to identify the appropriate disposal method).</li><li>▪ Reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and project management phone numbers.</li></ul></li><li>• Apply the following general mitigation measures to avoid soil contamination:<ul style="list-style-type: none"><li>▪ Ensure machinery is maintained free of fluid leaks.</li><li>▪ Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li><li>▪ All potentially hazardous materials to be stored in containment sites within the Operations and Maintenance Building, within berms where possible.</li></ul></li><li>• Keep ROW for access roads, collector lines / on-reserve transmission lines and WTGs clear of garbage and debris.</li></ul>	<ul style="list-style-type: none"><li>• No monitoring required.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Monitor daily until cleanup is completed or a Biologist determines that contaminant levels are below thresholds which may affect woodland form or function. If this is not possible, Environment Canada and HIFN will be contacted regarding additional mitigation measures that may be required.</li></ul></li></ul>
	<ul style="list-style-type: none"><li>• Introduction of invasive species resulting in change in woodland species diversity, quality and function.</li></ul>	<ul style="list-style-type: none"><li>• Prevent the introduction and spread of invasive species.</li></ul>	<ul style="list-style-type: none"><li>• If encroachment of invasive species is detected, management recommendations will be determined by a qualified Biologist.</li><li>• Vegetation trimming will be limited to within areas that have been cleared during construction.</li></ul>	<ul style="list-style-type: none"><li>• Monitor Important Woodlands once per growing season for two (2) years to confirm introduction of invasive species has not occurred.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Should invasive species introduction occur, corrective actions to remove and reduce the spread of these species will be undertaken. Habitat rehabilitation will occur.</li></ul></li></ul>

Table 5-1: Potential Effects and Proposed Mitigation Measures for Important Woodlands

Important Woodland Feature(s)	Potential Effects	Performance Objectives	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
<b>Construction activities within an Important Woodland feature</b>  •WOOD-004 •WOOD-005 •WOOD-010 •WOOD-018 •WOOD-023 •WOOD-026 •WOOD-034 •WOOD-036 •WOOD-045 •WOOD-047 •WOOD-048 •WOOD-050 •WOOD-051 •WOOD-058 •WOOD-070 •WOOD-071 •WOOD-074 •WOOD-075 •WOOD-087 •WOOD-088 •WOOD-107 •WOOD-111 •WOOD-114 •WOOD-127 •WOOD-128 •WOOD-129	<b>Construction/Decommissioning</b> • Permanent loss of forest cover.	• Minimize amount of forest vegetation removal.	<ul style="list-style-type: none"><li>• The area of disturbance will be delineated to ensure that work does not occur outside the construction footprint.</li><li>• Vegetation removal will be minimized to the extent possible.</li><li>• Fell trees toward the construction footprint area to reduce damage to adjacent vegetation being retained, where feasible.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of woodland that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Where excavation for construction of access roads, WTGs or collector lines is required within the rooting zone of trees (i.e., within 1 m of the dripline), implement proper root pruning measures to protect tree roots.</li></ul>	<ul style="list-style-type: none"><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor.</li><li>• Vegetation monitoring of rehabilitated woodlands will occur at a minimum frequency of annually for the first two (2) years after re-seeding to ensure rehabilitation is progressing. Further rehabilitation will occur as determined necessary.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.</li></ul></li></ul>

## 6. Important Wildlife Habitat

This section describes potential environmental effects of the HIWEC on Important Wildlife Habitat (IWH) during its construction, operational and decommissioning phases. Details regarding how the Construction Plan and Environmental Effects Monitoring Plan address these potential negative effects, including mitigation measures, performance objectives, monitoring methods and contingency measures, are also described herein.

### 6.1 Potential Direct Effects of Operations on Birds and Bats

The potential direct effects of operation of WTGs at the HIWEC on bird and bat mortality, and mitigation measures to address these effects, are described in **Table 6-1** below. The mitigation measures in this table are also described in the Design and Operations Report (**Appendix C of Volume A**). Additional details regarding the post-construction bird and bat mortality monitoring program are provided in the Environmental Effects Monitoring Plan (**Appendix G of Volume A**).

**Table 6-1: Potential Direct Effects of Turbine Operation on Birds and Bats and Associated Mitigation Measures**

Potential Effect	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
<ul style="list-style-type: none"> <li>Possible bat and bird mortality as a result of collisions with WTGs (project-wide).</li> </ul>	<ul style="list-style-type: none"> <li>Minimize mortality to birds and bats.</li> </ul>	<ul style="list-style-type: none"> <li>Utilize a lighting scheme that will minimize potential risks for bird and bat collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following: <ul style="list-style-type: none"> <li>Implement red LED flashing lights on turbines.</li> <li>Light turbines and permanent meteorological / communication towers to the minimum federal standards.</li> <li>Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li> <li>Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li> <li>Any internal nacelle lighting will only be used when occupied.</li> </ul> </li> <li>Implement a proactive approach to feathering WTG blades below the manufacturer's recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li> <li>Develop and implement an Environmental Effects Monitoring Plan (EEMP) which includes a post-construction mortality monitoring program consistent with the following guidance documents: <ul style="list-style-type: none"> <li>Birds and Bird Habitats: Guidelines for Wind Power Projects (MNRF, 2011a);</li> <li>Bats and Bat Habitats: Guidelines for Wind Power Projects (MNRF, 2011b);</li> <li>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (EC-CWS, 2007a); and</li> <li>Wind Turbines and Birds A Guidance Document for Environmental Assessment (EC-CWS, 2007b).</li> </ul> </li> <li>Report the findings of the post-construction mortality monitoring program to HIFN and Environment Canada – Canadian Wildlife Service (EC-CWS) as required on an annual basis.</li> <li>Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to the EEMP for details of the post-construction mortality monitoring program.</li> <li><b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li> </ul> </li> </ul>

## 6.2 Potential Effects on Important Wildlife Habitat Features

In accordance with provincial guidance (MNRF, 2012), potential IWH features were identified through the Site Investigation were assessed to determine whether they are either overlapped by the HIWEC location or within 120 m of qualifying HIWEC infrastructure. Potential IWH features identified within 120 m of the HIWEC location but not within 120 m of qualifying HIWEC infrastructure (as described in MNRF, 2012) were carried forward to the EIS as Generalized Candidate IWH; these features require only generalized mitigation measures during the construction and decommissioning phases of the HIWEC, as described in **Section 5.2.1** below. Potential IWH features that are either overlapped by the HIWEC location or within 120 m of qualifying HIWEC infrastructure (as described in MNRF, 2012) were either evaluated and confirmed to be important or treated as important in the Evaluation of Importance; these features require habitat-specific mitigation measures as described in **Section 5.2.2**.

### 6.2.1 Potential Effects on Generalized Candidate Important Wildlife Habitat Features

This section describes potential environmental effects of the HIWEC on Generalized Candidate IWH features during its construction, operational and decommissioning phases. The following Generalized Candidate IWH features were identified within 120 m of the HIWEC location:

- Shorebird Migratory Stopover Areas;
- Bat Maternity Colonies;
- Turtle Wintering Areas;
- Reptile Hibernacula;
- Precambrian Rock Barren;
- Bog;
- Waterfowl Nesting Areas;
- Woodland Raptor Nesting Habitat;
- Turtle and Lizard Nesting Areas;
- Seeps and Springs;
- Amphibian Breeding Habitat (Woodland and Wetland);
- Mast Producing Areas;
- Marsh Bird Breeding Habitat;
- Habitats for specific SOCC, including:
  - Eastern Wood-pewee;
  - Prairie Warbler;
  - Wood Thrush;
  - Yellow Rail;
  - Horned Clubtail;
  - Mottled Darner;
  - Pine Imperial Moth;
  - Eastern Ribbonsnake;
  - Milksnake;
  - Northern Map Turtle;
  - Snapping Turtle.

The potential negative environmental effects of the HIWEC on these Generalized Candidate IWH features are described in **Table 6-2** below. Where the HIWEC location is proposed in areas adjacent to Generalized Candidate IWH features, mitigation measures have been identified to address the potential negative environmental effects associated with construction and decommissioning in **Table 6-2** below. These mitigation measures are also described in the Construction Plan Report (**Appendix B of Volume A**). No negative environmental effects on these features are anticipated during the operational phase of the HIWEC.

Note that this section discusses non-Species at Risk (SAR) species. Please refer to **Section 7** for potential effects and proposed mitigation for SAR species.

Table 6-2: Potential Effects and Mitigation Measures Associated with Generalized Candidate Important Wildlife Habitat Features

Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
<b>Construction/Decommissioning</b> <ul style="list-style-type: none"><li>Disturbance to wildlife due to construction activities, including noise and vibration from sub-surface excavation activities (e.g., blasting).</li></ul>	<ul style="list-style-type: none"><li>Minimize disturbance to wildlife.</li></ul>	<ul style="list-style-type: none"><li>Reduce blasting footprint to the extent possible and undertake blasting operations in accordance with relevant federal and provincial guidelines and standards.</li><li>Provide suitable blasting timing windows to be included in a Blasting Plan. The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>Blasting will only occur in areas that have already been cleared of vegetation;</li><li>Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>Blast mats will be used to control debris generated from blasting;</li><li>Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>Follow proper drilling, explosive handling and loading procedures;</li><li>Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li></ul>	<ul style="list-style-type: none"><li>An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>If a turtle or snake is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle or snake handler. In the unlikely event that similar habitat is not found within those parameters, the turtle or snake will be relocated to the next closest location of similar habitat.</li></ul></li></ul>
<ul style="list-style-type: none"><li>Loss and fragmentation of wildlife habitat due to construction.</li></ul>	<ul style="list-style-type: none"><li>Minimize loss and fragmentation of wildlife habitat to the extent possible.</li></ul>	<ul style="list-style-type: none"><li>Minimize vegetation removal and limit to within the construction footprint area. The construction footprint will be clearly defined. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>Where construction activities occur within 30 m of an IWH, install and maintain construction fencing (or similar delineation device) to clearly define the construction disturbance area and prevent accidental damage to vegetation.</li><li>Fell trees toward the construction footprint area to reduce damage to adjacent vegetation being retained where feasible.</li><li>Where excavation for construction of access roads, WTGs or collector lines is conducted within the rooting zone of trees (e.g., within 5 m of the dripline), implement proper root pruning measures to protect tree roots.</li></ul>	<ul style="list-style-type: none"><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>
<ul style="list-style-type: none"><li>Disturbance and possible mortality to terrestrial wildlife due to vegetation clearing.</li></ul>	<ul style="list-style-type: none"><li>Minimize disturbance and avoid mortality of wildlife.</li></ul>	<ul style="list-style-type: none"><li>If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the <i>Migratory Birds Convention Act</i> (MBCA):<ul style="list-style-type: none"><li>A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest surveys as required;</li><li>Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>From May 1 to July 28, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period; and</li><li>From July 29 to August 31, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above.</li><li>If an active bird nest or confirmed bird nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>The bird nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li></ul>	<ul style="list-style-type: none"><li>The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>If any confirmed, or suspected, turtle nests are identified within the vicinity of the HIWEC location, nest monitoring will be conducted twice per week during the construction and decommissioning phases to monitor the success of the nest and ensure its protection from construction impacts. Surveys will be completed during the turtle nesting / hatching season between June 1 and September 15.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li></ul></li></ul>

Table 6-2: Potential Effects and Mitigation Measures Associated with Generalized Candidate Important Wildlife Habitat Features

Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"><li>• If vegetation* is to be removed between June 1 and September 15 within those areas that provide confirmed and / or likely turtle nesting habitat (i.e., within sandy habitats, shorelines, soil-filled cracks in rock barren, or wetlands where turtle nesting activity has been observed or suitable habitat is within an area with concentrated turtle observations) and that are identified to be cleared of vegetation, the following will be adhered to:<ul style="list-style-type: none"><li>▪ Construction will avoid nesting areas, where possible;</li><li>▪ In suitable nesting areas that are unavoidable, exclusionary fencing will be installed around the extent of the construction footprint that overlaps nesting habitat prior to the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.) to prevent turtle nesting activity prior to construction activities;</li><li>▪ Immediately prior to vegetation clearing between June 1 and September 15, a qualified Biologist will search the area to ensure no nests are present;</li><li>▪ In the rare case where construction initially avoided an area and exclusionary fencing had not been installed prior to the turtle nesting period, a qualified Biologist will complete area searches immediately prior to construction to identify any potential nesting areas and nesting activity during the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.);</li><li>▪ If an active nest or confirmed nesting activity is found, a minimum buffer area of 30 m will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context, which will be confirmed by a qualified Biologist. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked and UTM coordinates will be taken. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation; and</li><li>▪ Once the Biologist has cleared the area, install turtle appropriate exclusionary fencing during construction / decommissioning within areas of concentrated turtle activity to limit road and construction-related mortality.</li></ul></li><li>• Construction activities will not occur within 30 m of any confirmed turtle nest during the period of June 1 to September 15 (GBBR, n.d.).</li><li>• Immediately prior to vegetation clearing, a qualified Biologist will conduct an area search of the proposed vegetation clearing area to ensure no reptiles are present;<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all reptiles observed within the construction area during area searches and observe whether the individual(s) vacate the construction area. Should observed non-SAR reptiles (except for nesting turtles) that are encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat by a qualified Biologist / Handler or Environmental Monitor.</li></ul></li><li>• Stockpile areas placed prior to June 30 (turtle egg laying period; GBBR, date unknown) will be assessed by a qualified Biologist to determine if they are suitable turtle nesting habitat and exclusionary fencing will be installed where necessary. Stockpiles placed after June 30 do not require assessment or installation of exclusionary fencing as this is after the typical period for turtle egg laying.</li><li>• Removal of natural vegetation using heavy machinery within suitable turtle and / or snake hibernating habitat is proposed to occur outside the winter turtle and snake hibernation season, from October 15 to April 30 (GBBR, n.d.), within aquatic habitats or wetlands. If this is not possible, the following will occur:<ul style="list-style-type: none"><li>▪ Removal of natural vegetation within suitable turtle and snake hibernating habitat (wetland and aquatic habitat) will be completed by hand from October 15 to April 30 (GBBR, n.d.), when feasible;</li><li>▪ If vegetation clearing must occur within suitable turtle and snake hibernating habitat (wetland and aquatic habitat) through use of heavy machinery between October 15 to April 30 (GBBR, n.d.), best management practices for heavy machinery usage within wetlands will be used to reduce impact on overwintering turtles. Best management practices may include, but are not limited to, low ground pressure equipment, wide tires, rubberized tracks, swamp mats, lightweight equipment, varying paths (Wetland Stewardship Partnership, 2009), and low tire inflation pressure (Alakukku, <i>et al.</i> 2003); and</li><li>▪ Heavy machinery will be required to cross wetlands during the turtle and snake hibernation period of October 15 to April 30 (GBBR, n.d.). Where these crossings are necessary, heavy machinery will cross at the most narrow crossing location (as deemed reasonable) or as close to the edge as possible within the construction footprint. Best management practices for heavy machinery use in wetlands will also be applied.</li></ul></li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, whenever possible.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• The following mitigation measures will be implemented with respect to the Environmental Monitor:<ul style="list-style-type: none"><li>▪ An Environmental Monitor will be on site during all construction activities;</li><li>▪ An Environmental Monitor will be present during all blasting activities (to review the site prior to and during blasting activities, and ensure compliance with the Blasting Plan;</li><li>▪ Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements;</li></ul></li></ul>	

Table 6-2: Potential Effects and Mitigation Measures Associated with Generalized Candidate Important Wildlife Habitat Features

Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"><li>Environmental Monitors will also complete daily, weekly and monthly monitoring of general and specific activities / measures (such as monitoring ecopassages and culverts to ensure that no debris is compromising their use, effectiveness of erosion and sedimentation control measures, fuel storage tanks etc.); and</li><li>Environmental Monitors will also keep daily logs of their activities and note any non-compliance issues. Any non-compliance issues will be provided to the General Contractor for immediate follow-up.</li></ul> <p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	
<ul style="list-style-type: none"><li>Mortality to wildlife as result of vehicles using access roads.</li></ul>	<ul style="list-style-type: none"><li>Avoid mortality of wildlife on access roads.</li></ul>	<ul style="list-style-type: none"><li>Clearly post speed limit and wildlife crossing signs along access roads (20 kilometres per hour (km/hr)), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, whenever possible.</li><li>Ecopassages or designated movement corridors should be considered in areas of high reptile activity or abundance, to limit road mortality, in areas where constructability allows the installation of these structures.</li><li>Develop and implement a reporting and tracking system for turtle and snake sightings as well as any wildlife mortality on access roads, which could be used to inform adaptive management for mortality, if required.</li><li>Install movement fencing in areas of high turtle and / or snake crossing activity or wildlife mortality. Monitor locations where fencing is installed to ensure that it is in good repair.</li><li>All construction vehicles and equipment that are parked overnight or left idle for over 1 hour within the HIWEC study area between April 1 and November 30 will be surveyed for the presence of snakes before ignition.</li><li>Avoid driving on access roads in proximity to amphibian breeding habitats at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible.</li></ul>	<ul style="list-style-type: none"><li>The Environmental Monitor is to ensure speed limits are posted and communicated to project staff.</li><li>Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages / designated movement corridors and wildlife mortality rates.<ul style="list-style-type: none"><li>In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for turtles and snakes (April 15 to September 30) when construction is occurring.</li><li>These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high wildlife activity.</li></ul></li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider retrofitting a road with an ecopassage, speed bump, or wildlife crossing sign.</li><li>If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</li><li>Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all construction buildings. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined.</li><li>Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul></li></ul>

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Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
<ul style="list-style-type: none"> <li>Increased erosion and sedimentation into wildlife habitat resulting from construction activity.</li> <li>Removal / disturbance of topsoil and increased soil compaction within wildlife habitat from manoeuvring of heavy machinery, excavation, backfilling, and other construction activity.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize erosion and sedimentation into wildlife habitat.</li> <li>Minimize removal / disturbance of topsoil and minimize soil compaction within wildlife habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize vegetation removal and limit to within the construction footprint area. The construction footprint will be clearly defined. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li> <li>Develop and implement an Erosion and Sediment Control Plan.</li> <li>Utilize erosion blankets, sediment control fencing, straw bale etc. for construction activities in areas where there is erosion and sedimentation potential near a wetland, woodland or waterbody.</li> <li>Utilize sediment logs (compost filter sock) in areas where bedrock is exposed at surface or trenching and securing of erosion control fencing is not possible.</li> <li>Maintain undisturbed buffer strips greater than 30 m in width around watercourses, where possible, except where access roads approach water crossings.</li> <li>Store stockpiled material at least 30 m from a wetland or waterbody.</li> <li>Monitor to ensure erosion and sedimentation control measures 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 for the duration of construction / decommissioning activity.</li> <li>Minimize the size of cleared areas to limit the area of exposed soil.</li> <li>Re-vegetate or stabilize exposed sites as soon as possible following disturbance using species native to the area to limit the duration of soil exposure.</li> <li>Divert access road runoff through drainage ditches directed into vegetated areas or through environmental protection measures (such as sediment traps, rock flow check dams, sediment barriers etc.) to ensure that exposed soils or road materials are not transported into waterbodies or wetlands. Ditches &gt; 5% in slope may require lining with appropriate sized rip rap to protect against erosion and also slow the flow velocity.</li> <li>Grade disturbed / remediated slopes or stockpiles to a stable angle to avoid slope instability and reduce erosion.</li> <li>Grade soil stockpiles by mechanical means to compact the soil and limit the erosion. Tracks of machinery should be perpendicular to the slope of the pile to reduce the flow velocity of rainfall over the stockpile.</li> <li>Identify unstable rock structures and sensitive soils through field investigation prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li> <li>Keep all equipment within identified work areas to minimize disturbance of adjacent soils.</li> <li>Restrict construction equipment to designated controlled vehicle access routes to minimize the potential for soil compaction and to minimize vehicle traffic on exposed and / or sensitive soils.</li> <li>Routine visual inspections of sediment and erosion control devices for effectiveness.</li> <li>Repair and maintenance to sediment and erosion control devices performed regularly.</li> <li>Undertake blasting operations in accordance with relevant federal and provincial guidelines and standards.</li> <li>Investigate alternative rock-excavating techniques (i.e., mechanical means) where possible.</li> <li>Develop and implement a Blasting Plan that includes standard BMPs to minimize extent of adverse noise, vibration and slope instability from blasting, including:               <ul style="list-style-type: none"> <li>Follow proper drilling, explosive handling and loading procedures;</li> <li>Implement safe handling and storage procedures for all material, including soluble substances used for blasting;</li> <li>Use blasting mats over top of holes to minimize scattering of blast debris around the area;</li> <li>Reduce blasting footprint to the extent possible;</li> <li>Ensure the order of firing is correct to minimize the frequency of blasts;</li> <li>Remove all blasting debris and other associated equipment / products from the blast area.</li> </ul> </li> <li>Identify unstable rock structures through field investigations prior to construction. If any areas of concern are identified, design modifications may be implemented (as required) to minimize potential erosion, settlement, slope instability, foundation failure or rock fall hazards as a result of construction.</li> <li>Routine visual inspections for slope instability performed during and after blasting operations.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) where construction occurs within 30 m of an IWH by an Environmental Monitor on the following basis:               <ul style="list-style-type: none"> <li>Weekly during active construction periods (or daily where construction occurs within 5 m of an IWH);</li> <li>Prior to, during and post forecasted large rainfall events (&gt;20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet);</li> <li>Daily during extended rain or snowmelt periods;</li> <li>Increased vigilance will be given to sediment and erosion control materials installed on bedrock to ensure proper functioning during large rainfall events.</li> <li>Monthly during inactive construction periods, where the site is left alone for 30 days or longer.</li> </ul> </li> <li><b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>If the amount of sediment being released into the environment is not being contained by the primary mitigation measure, other sediment and erosion control measures should be employed to increase effectiveness of the erosion and sediment controls in place. Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Damage to wildlife habitat as a result of accidental soil or water contamination (including groundwater) by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize damage to wildlife habitat from soil or water contamination.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example:               <ul style="list-style-type: none"> <li>In the event of a contaminant spill all work will stop in the immediate area until the spill is cleaned up.</li> <li>Spill control and containment equipment / materials shall be readily available on site.</li> <li>Protocols for access to additional spill clean-up materials, if needed.</li> <li>Contaminated materials to be handled in accordance with relevant federal and provincial guidelines and standards.</li> <li>Including the use of Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li> <li>Proper training of construction staff on associated emergency response and spill clean-up procedures.</li> <li>Spills to be cleaned up as soon as possible, with contaminated soils removed to a licenced disposal site, if required.</li> <li>Materials contained in spill clean-up kits are restocked as necessary.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Contractor to conduct routine inspections of construction equipment for leaks / spills.</li> <li><b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>If a spill enters a wetland:                   <ul style="list-style-type: none"> <li>Collect and analyze water samples for comparison with appropriate parameters.</li> <li>Monitor daily until cleanup is completed or a Biologist determines that contaminant levels are below thresholds which may affect wetland form or function. If this is not possible, Environment Canada and HIFN will be contacted regarding additional mitigation measures that may be required.</li> </ul> </li> </ul> </li> </ul>

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Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"><li>▪ Any soil encountered during excavation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to be analyzed to determine its quality in order to identify the appropriate disposal method.</li><li>▪ To include reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and HIWEC management phone numbers.</li><li>• Apply the following general mitigation measures to avoid soil contamination:<ul style="list-style-type: none"><li>▪ Ensure machinery is maintained free of fluid leaks.</li><li>▪ Site maintenance, vehicle maintenance, vehicle washing and refuelling to be done on spill pads in specified areas at least 30 m away from wetlands and / or waterbodies.</li><li>▪ Store any stockpiled materials at least 30 m away wetlands and / or waterbodies.</li><li>▪ Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li></ul></li><li>• Undertake waste management in accordance with relevant federal and provincial guidelines and standards and construction site to be kept clear of garbage and debris.</li><li>• Ensure that wash water used for the cleaning of cement construction materials does not come in contact with the ground. Deposit waste water in a concrete washout container that allows evaporation and hardening for easier disposal or recover and recycle wash water back into cement truck.</li></ul>	
• Changes in surface water drainage patterns or obstruction of lateral flows in surface water to wildlife habitat in wetlands resulting from changes in land contours.	• Minimize changes in surface water drainage patterns and obstruction of lateral flows in surface water to wildlife habitat in wetlands.	<ul style="list-style-type: none"><li>• Ensure BMPs are used to maintain current drainage patterns, including:<ul style="list-style-type: none"><li>▪ Minimize paved surfaces and design roads to promote infiltration;</li><li>▪ Limit changes in land contours to the maximum extent possible; and</li><li>▪ Ensure roadway culverts are designed and installed to maintain existing drainage patterns.</li></ul></li><li>• Where the installation of a flow equalizing culvert is proposed, appropriate erosion control measures (i.e., rip rap, seeding) will be installed at the ends of each culvert to prevent erosion which can change land contours.</li></ul>	<ul style="list-style-type: none"><li>• Inspect locations following completion of culvert installations by an Environmental Monitor to ensure no changes in drainage patterns.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.</li></ul></li></ul>
• Reductions in groundwater recharge quantities into wildlife habitat in wetlands due to increases in impervious surfaces.	• Minimize reductions in groundwater recharge.	<ul style="list-style-type: none"><li>• Develop and implement a Spill Prevention and Response Plan outlining steps to prevent and contain any chemicals and to avoid soil contamination. This plan will include, for example:<ul style="list-style-type: none"><li>▪ In the event of a contaminant spill all work will stop in the immediate area until the spill is cleaned up.</li><li>▪ Spill control and containment equipment / materials shall be readily available on site.</li><li>▪ Protocols for access to additional spill clean-up materials if needed.</li><li>▪ Contaminated materials to be handled in accordance with relevant federal and provincial guidelines and standards.</li><li>▪ Including the use of Material Safety Data Sheets (MSDS) which provides information on proper handling of chemicals readily available for the types of chemicals that will be used on-site.</li><li>▪ Proper training of construction staff on associated emergency response and spill clean-up procedures.</li><li>▪ Spills to be cleaned up as soon as possible, with contaminated soils removed to a licenced disposal site, if required.</li><li>▪ Materials contained in spill clean-up kits are restocked as necessary.</li><li>▪ Any soil encountered during excavation that has visual staining or odours, or contains rubble, debris, cinders or other visual evidence of impacts to be analyzed to determine its quality in order to identify the appropriate disposal method.</li><li>▪ To include reporting procedures to meet federal, provincial and local requirements (e.g., reporting spills and verification of clean-up), emergency contact and project management phone numbers.</li></ul></li><li>• Apply the following general mitigation measures to avoid soil contamination:<ul style="list-style-type: none"><li>▪ Ensure machinery is maintained free of fluid leaks.</li><li>▪ Site maintenance, vehicle maintenance, vehicle washing and refuelling to be done on spill pads in specified areas at least 30 m away from wetlands and / or waterbodies.</li><li>▪ Store any stockpiled materials at least 30 m away from wetlands and / or waterbodies.</li><li>▪ Store any potential contaminants (e.g., oil, fuels and chemicals) in designated areas using secondary containment, where necessary.</li></ul></li><li>• Undertake waste management in accordance with relevant federal and provincial guidelines and standards and construction site to be kept clear of garbage and debris.</li><li>• Ensure that wash water used for the cleaning of cement construction materials does not come in contact with the ground. Deposit waste water in a concrete washout container that allows evaporation and hardening for easier disposal or recover and recycle wash water back into cement truck.</li><li>• Minimize paved surfaces and design roads to promote groundwater infiltration.</li><li>• Implement groundwater infiltration techniques to the maximum extent possible. Examples include:<ul style="list-style-type: none"><li>▪ Releasing water to vegetated areas after applying appropriate water quality and temperature controls;</li><li>▪ Lining ditches with permeable material (rather than clay, for example); and</li><li>▪ Groundwater should remain on site and not disposed of off-site (unless contaminated).</li></ul></li><li>• Where possible, direct groundwater discharge water to natural infiltration systems after applying appropriate water quality and temperature controls.</li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids) prior to, during, and post completion of construction.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>▪ In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li></ul></li></ul>

Table 6-2: Potential Effects and Mitigation Measures Associated with Generalized Candidate Important Wildlife Habitat Features

Potential Effect	Performance Objective(s)	Proposed Mitigation Measures	Monitoring Plan and Contingency Measures
<ul style="list-style-type: none"><li>Habitat change and increased mortality to wildlife due to construction dewatering activities and associated dewatering discharge.</li></ul>	<ul style="list-style-type: none"><li>Minimize habitat change and avoid wildlife mortality due to construction dewatering activities.</li></ul>	<ul style="list-style-type: none"><li>During turtle and snake hibernation period (October 15 to April 30; GBBR, n.d.), where dewatering activities may have an effect on hibernation habitat located within wetlands or aquatic features:<ul style="list-style-type: none"><li>Area will be monitored to observe any drawdown; and</li><li>If there is drawdown, stop construction work and determine mitigation appropriate to the site (i.e., redirect water, monitoring rain events) through discussions with a qualified Biologist and Hydrogeologist.</li></ul></li><li>Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine anticipated groundwater taking quantities, groundwater quality and predicted ZOI prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided, and may include where feasible:<ul style="list-style-type: none"><li>Monitor surface water levels in potentially affected groundwater-dependent natural features prior-to and during dewatering activities and compare to site-specific thresholds and early warning indicators for water level drawdown;</li><li>Monitor shallow groundwater levels and vertical hydraulic conductivity in potentially affected groundwater-dependent natural features, where installation of mini-piezometer devices is possible (e.g. areas with a minimum of 40 cm soil depth). Monitor groundwater levels prior-to and during dewatering and compare to site-specific thresholds for groundwater level drawdown;</li><li>Visual inspection of vegetation health during construction; and</li><li>In the event surface water levels and / or groundwater level drawdown exceeds established site-specific thresholds mitigation measures may include where appropriate the diversion of groundwater dewatering discharge to affected feature following appropriate water quality control (e.g. sediment tanks, filter bags, flow diversion, soaker hoses, etc.).</li><li>Limit duration of dewatering to as short a time frame as possible.</li><li>Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls) under specific conditions, which will assist in stopping the infiltration of groundwater into the excavations.</li><li>Construct new water supply wells according to regulatory standards and be operated in a manner to conserve water (i.e., excessive water taking is avoided).</li></ul></li></ul>	<ul style="list-style-type: none"><li>The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids) prior to, during, and post completion of construction.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>Contingency measures including but not limited to the rescue of stranded wildlife will also be developed. A post-construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li></ul></li></ul>

## 6.2.2 Potential Effects on Important Wildlife Habitat Features

This section describes potential environmental effects of the HIWEC on IWH features during its construction, operational and decommissioning phases. The following IWH features were identified within 120 m of the HIWEC location:

- Bat Maternity Colonies;
- Turtle Wintering Areas;
- Reptile Hibernacula;
- Deer Yarding Areas;
- Cliffs and Talus Slopes;
- Precambrian Rock Barrens;
- Sand Barrens;
- Old-growth Forest;
- Bogs;
- Waterfowl Nesting Areas;
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
- Woodland Raptor Nesting Habitat;
- Turtle and Lizard Nesting Areas;
- Seeps and Springs;
- Aquatic Feeding Habitat;
- Amphibian Breeding Habitat (Woodland and Wetland);
- Mast Producing Areas;
- Marsh Bird Breeding Habitat;
- Habitat for Specific SOCC, including:
  - Black Tern;
  - Eastern Wood-pewee;
  - Prairie Warbler;
  - Wood Thrush;
  - Yellow Rail;
  - Horned Clubtail;
  - Mottled Darner;
  - Pine Imperial Moth;
  - Common Five-linked Skink;
  - Eastern Ribbonsnake;
  - Milksnake;
  - Northern Map Turtle; and
  - Snapping Turtle.

Potential negative environmental effects and mitigation measures that apply generally to all IWH features are described in **Table 6-2** above. Additional potential negative environmental effects of the HIWEC on specific IWH features are described in **Table 6-3** below. Where the HIWEC location is proposed within these IWH features or in areas adjacent to IWH features, additional mitigation measures have been identified to address the potential negative environmental effects associated with construction, operation and decommissioning in **Table 6-3** below. The mitigation measures in this table are also described in the Construction Plan Report (**Appendix B** of **Volume A**) and the Description Report (**Appendix A** of **Volume A**).

Note that this section discusses non-Species at Risk (SAR) species. Please refer to **Section 6** for potential effects and proposed mitigation for SAR species.

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
Bat Maternity Colonies <sup>1</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Removal of suitable cavity trees in bat maternity colony features.</li><li>• Displacement and / or mortality of nursing female and juvenile bats.</li><li>• Noise and / or light disturbance to bats during construction activities.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance to bat maternity colony habitat.</li><li>• Avoid displacement and / or mortality of nursing female and juvenile bats.</li><li>• Minimize noise and / or light disturbance to bats during construction.</li></ul>	<ul style="list-style-type: none"><li>• Any trees proposed for removal and any suitable rock crevices in areas proposed for blasting during the bat roosting season (April 30 to September 1) will be searched for signs of maternity roosts by a qualified Biologist prior to any construction activities that may affect the habitat.<ul style="list-style-type: none"><li>▪ Searches will initially consist of visual scans of the habitat for signs of use to determine the likelihood of occupancy.</li><li>▪ If habitat assessments confirm that a site is being used, or likely being used, evening exit surveys will be completed to confirm whether individuals are actively using a particular site.</li><li>▪ If an active roost site is found within the construction footprint:<ul style="list-style-type: none"><li>▪ A minimum buffer of 10 m will be implemented around the site. The radius of the buffer will range depending on the species, type of roosting (bachelor or day roosting versus maternity roosting), level of disturbance and landscape context, which will be confirmed by a qualified Biologist experienced in bat ecology. The UTM of the roost location will be recorded, and the limits of the buffer area will be clearly identified.</li><li>▪ Since roost locations regularly move within a season, the removal of trees or blasting can occur once a qualified Biologist provides confirmation that the roost site is no longer being used, providing that disturbance activities occur within 24 hrs as to not allow for re-occupation of the habitat.</li></ul></li><li>▪ If habitat assessments and / or exit surveys indicate a site is not being used, there is no restriction on proposed activity.</li></ul></li><li>• Minimize vegetation removal and limit to within the construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• To prevent the spread of White Nose Syndrome, construction vehicles are to remain within the existing access routes and construction areas.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock), within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Blasting will not be undertaken within vegetated habitats until vegetation has been removed.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<ul style="list-style-type: none"><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>• Possible mortality of bats resulting from operating WTGs.</li><li>• Avoidance behaviour and / or habitat degradation caused by turbine lighting and / or noise.</li><li>• Bat mortality resulting from removal of cavity trees during routine maintenance of access roads, collector lines or transmission line.</li></ul>	<ul style="list-style-type: none"><li>• Minimize risk of WTG related mortality.</li><li>• Minimize disturbance to bat maternity colonies.</li><li>• Avoid bat mortality from vegetation removal during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Utilize a lighting scheme that will minimize continuous lighting and the use of bright lights throughout the HIWEC to minimize attraction of bat to lit structures (Rydell, 1992). Lighting scheme to include the following, where possible, while still fulfilling minimum Transport Canada requirements:<ul style="list-style-type: none"><li>▪ Implement red LED flashing lights on WTGs.</li><li>▪ Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>▪ Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>▪ Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>▪ Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>• Implement a proactive approach to feathering WTG blades below the manufacturer’s recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bat roosting season, from April 30 to September 1. If any trees must be trimmed during the bat roosting season (April 30 to September 1) during the operation of the project, each tree will be searched for signs of maternity roosts by a qualified Biologist prior to vegetation maintenance. If an active maternity roost is found, removal activities will be scheduled after the bat roosting season (April 30 to September 1) or once a qualified biologist has confirmed the tree is no longer being actively used as a roost.<ul style="list-style-type: none"><li>▪ If an active roost site is found, a buffer area will be implemented around the site. The radius of the buffer will vary depending on the species, type of roosting (bachelor or day roosting versus maternity roosting), level of disturbance and landscape context, which will be confirmed by a qualified Biologist experienced in bat ecology. The buffer will have a minimum radius of 10 m and will be applied only when bats are present at the roost site.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Conduct three (3) years of post-construction bat mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>▪ An end of year report, supplemented by an interim technical memo, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bat mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Conduct the following post-construction disturbance effects monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>▪ Pre-construction bat acoustic monitoring surveys completed in 2011 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area;</li><li>▪ Include WTGs adjacent to bat maternity colony features in the post-construction mortality monitoring program; and</li><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bat disturbance effects monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, bat acoustic monitoring surveys indicate notable changes in bat populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p>This minimum buffer is expected to provide protection of the roost site from minor work, such as vegetation clearing and general heavy machinery usage or vehicle operation.</p> <ul style="list-style-type: none"><li>▪ The UTM of the roost location will be recorded, and the limits of the buffer area will be clearly identified. If the qualified Biologist confirms that no bats are using the roost site, vegetation removal can proceed.</li><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as Bats and Bat Habitats: Guidelines for Wind Power Projects (MNRf, 2011b).</li><li>• Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>• Implement adaptive management techniques, such as operational mitigation, as determined appropriate through post-construction monitoring.</li></ul>	<ul style="list-style-type: none"><li>▪ Quantifying changes in local bat populations, as a result of the operation of this Project, will be difficult to determine based on the dramatic population declines of bats as a result of white-nose syndrome. The effects of this disease are already evident when comparing data from 2011 to 2013. Despite this difficulty in quantifying changes that may be attributed to the operating Henvey Inlet Wind Energy Centre, two (2) years of acoustic monitoring will be completed and compared to pre-construction results. Results will be discussed with EC-CWS to determine if additional mitigation measures are warranted through an adaptive management approach.</li><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ Prune any tree limbs or roots using proper arboricultural techniques.</li></ul>
<b>Turtle Wintering Areas<sup>2</sup></b>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of turtles within turtle wintering areas, or moving between turtle wintering areas and other areas.</li><li>• Disturbance to turtles within wintering areas, or moving between turtle wintering areas and other areas.</li><li>• Loss and / or habitat degradation of turtle wintering habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of turtles.</li><li>• Minimize disturbance to turtles.</li><li>• Minimize loss and / or degradation of turtle wintering habitat.</li></ul>	<ul style="list-style-type: none"><li>• Immediately prior to vegetation clearing*, a qualified Biologist will conduct an area search of the proposed vegetation clearing area to ensure no turtles are present;<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all reptiles observed within the construction area during area searches and observe whether the individual(s) vacate the construction area. Should observed non-SAR reptiles (except for nesting turtles) that are encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat by a qualified Biologist / Handler or Environmental Monitor.</li></ul></li><li>• Removal of natural vegetation within suitable turtle hibernating habitat (wetland and aquatic habitat) will be completed by hand from October 15 to April 30 (GBBR, n.d.), when feasible.</li><li>• If vegetation clearing must occur within suitable turtle hibernating habitat (wetland and aquatic habitat) through use of heavy machinery between October 15 to April 30 (GBBR, n.d.), best management practices for heavy machinery usage within wetlands will be used to reduce impact on overwintering turtles. Best management practices may include, but are not limited to, low ground pressure equipment, wide tires, rubberized tracks, swamp mats, lightweight equipment, varying paths (Wetland Stewardship Partnership, 2009), and low tire inflation pressure (Alakukku, <i>et al.</i> 2003).</li><li>• Heavy machinery will be required to cross wetlands during the turtle hibernation period of October 15 to April 30 (GBBR, n.d.). Where these crossings are necessary, heavy machinery will cross at the most narrow crossing location (as deemed reasonable) or as close to the edge as possible within the construction footprint. Best management practices for heavy machinery use in wetlands will also be applied.</li><li>• During the turtle hibernation period (October 15 to April 30; GBBR, date unknown) where dewatering activities may have an effect on hibernation habitat located within wetlands or aquatic features:<ul style="list-style-type: none"><li>▪ Area will be monitored to observe any drawdown; and</li><li>▪ If there is drawdown, stop construction work and determine mitigation appropriate to the site (i.e., redirect water, monitoring rain events) through discussions with a qualified Biologist and Hydrogeologist.</li></ul></li><li>• Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine anticipated groundwater taking quantities, groundwater quality and predicted ZOI prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided, and may include where feasible:<ul style="list-style-type: none"><li>▪ Monitor surface water levels in potentially affected groundwater-dependent natural features prior-to and during dewatering activities and compare to site-specific thresholds and early warning indicators for water level drawdown;</li><li>▪ Monitor shallow groundwater levels and vertical hydraulic conductivity in potentially affected groundwater-dependent natural features, where installation of mini-piezometer devices is possible (e.g. areas with a minimum of 40 cm soil depth). Monitor groundwater levels prior-to and during dewatering and compare to site-specific thresholds for groundwater level drawdown;</li><li>▪ Visual inspection of vegetation health during construction; and</li><li>▪ In the event surface water levels and / or groundwater level drawdown exceeds established site-specific thresholds mitigation measures may include where appropriate the diversion of groundwater dewatering discharge to affected feature following appropriate water quality control (e.g. sediment tanks, filter bags, flow diversion, soaker hoses, etc.).</li></ul></li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids) prior to, during, and post completion of construction.</li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages / designated movement corridors and turtle mortality rates.<ul style="list-style-type: none"><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) when construction is occurring.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Limit duration of dewatering to as short a time frame as possible.</li><li>• Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls) under specific conditions, which will assist in stopping the infiltration of groundwater into the excavations.</li><li>• Develop and implement a Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to turtle habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ No blasting will occur in wetland or open aquatic habitats;</li><li>▪ Blast mats will be used to control debris and sound generated from blasting;</li><li>▪ Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the active period for turtles (April 15 to September 30). If a turtle is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtles considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat.</li><li>▪ Follow proper drilling, explosive handling and loading procedures.</li></ul></li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation activities will be initiated within all temporary construction / decommissioning areas where suitable habitat for turtles is affected to satisfy the habitat requirements (e.g., installation of artificial nesting structures) for these species within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Ecopassages or designated movement corridors will be considered in areas of high turtle activity or abundance, to limit road mortality.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If a turtle is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtles considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat.</li><li>▪ Repair any exclusionary fencing, movement fencing and / or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>▪ In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Contingency measures including but not limited to the rescue of stranded turtles will also be developed. A post-construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider retrofitting a road with an ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<p>to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</p> <ul style="list-style-type: none"><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>▪ A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all construction buildings.</li><li>▪ Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>▪ Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Disturbance to turtles within wintering areas, or moving between turtle wintering areas and other areas.</li><li>• Risk of road mortality to turtles moving between turtle wintering areas and other areas.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance to turtles.</li><li>• Avoid turtle mortality on access roads.</li></ul>	<ul style="list-style-type: none"><li>• Periodically monitor (once in early spring after snow melt and once in summer / fall) to determine if any maintenance or repair is required at all installed ecopassages and repair accordingly to allow for movement corridors in areas where high turtle activity has been identified in order to limit road mortality.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Avoid maintenance of culverts where substrates at or below the frost line are disturbed during the turtle winter hibernation period (October 15 to April 30; GBBR, n.d.) to the extent possible where suitable turtle hibernation habitat within wetlands or aquatic features has been identified. If this is not possible, and under emergency circumstances, a contingency mitigation strategy will be developed in consultation with EC-CWS, which will include:<ul style="list-style-type: none"><li>▪ A qualified Biologist will be on site monitoring emergency maintenance activities should any hibernating turtles be found; and</li><li>▪ In the unlikely case that a turtle is disturbed and brought out of hibernation, EC-CWS will be notified and the individual will be transported immediately to the nearest turtle trauma centre. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined. A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all operations buildings.</li></ul></li><li>• Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Restrict public use of access roads to minimize risk of road mortality and poaching through installation of electronic access gate in coordination with operations staff throughout the site. Security cameras at the entrance and any known turtle nesting sites will also be installed. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li><li>• During the active turtle period (April 15 – September 30), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one of which will be trained to scan for turtles that may be on the road. The trained wildlife spotter will use binoculars (when appropriate) and will continually scan the access road ahead of the vehicle to ensure no turtles are near or on the road. If a turtle is identified on the road, the vehicle will immediately stop and will continue around the turtle at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed. All measures will be taken to ensure the safety of the turtle, which may include moving the turtle to a safe location off the road, and keeping vehicles at a safe distance to limit influence on natural movement behaviour.</li><li>• Conduct the following post-construction monitoring to determine operational impacts, if any, on turtles:<ul style="list-style-type: none"><li>▪ Two (2) years of post-construction turtle behaviour surveys; and</li><li>▪ Prepare a two (2)-year report that will be provided to EC-CWS to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Conduct post-construction disturbance effects monitoring, including:<ul style="list-style-type: none"><li>▪ Pre-construction herpetofauna surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>▪ Turtle monitoring will be conducted following methodology used in pre-construction surveys unless otherwise required through consultation with the appropriate agencies.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo, on an annual basis for the two (2) years of post-construction herpetofauna surveys to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 for a minimum of two (2) years post-construction to monitor turtle mortality rates and the effectiveness of mitigation measures (e.g. ecopassages, speed limits, speed bumps and wildlife crossing signs). This monitoring period encompasses the period when the most vehicle activity will occur on site, albeit still relatively low traffic is expected.<ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages.</li><li>▪ Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) for the first three (3) years that the HIWEC is operational.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo on an annual basis for the two (2) years of post-construction road mortality surveys.</li></ul></li><li>• During the active turtle period (April 15-Septmeber 30) all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot turtles that may be on or near the road.</li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>• Conduct inspections of ecopassages (once in early spring after snow melt and once in summer / fall) during road mortality surveys for a minimum of two (2) years post-construction.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, post-construction herpetofauna surveys indicate notable changes in turtle populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li><li>▪ Analysis of road mortality surveys will determine high use areas and assist in identifying potential locations to consider installation of another ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, specific access roads will be restricted to essential vehicular traffic only. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on life cycle characteristics of the species of which the impact has occurred.</li><li>▪ Analysis of motion-detector camera monitoring of ecopassages will determine whether turtles actively use ecopassages, and may identify locations where modification to culvert design is required.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the operational phase.</li></ul></li></ul>
Reptile Hibernacula <sup>2</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of snakes within reptile hibernacula, or moving between reptile hibernacula and other areas.</li><li>• Disturbance to snakes within reptile hibernacula, or moving between reptile hibernacula and other areas.</li><li>• Loss and / or habitat degradation of reptile hibernacula.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of snakes.</li><li>• Minimize disturbance to snakes.</li><li>• Minimize loss and / or degradation of reptile hibernacula habitat.</li></ul>	<ul style="list-style-type: none"><li>• During the active period for snakes, from April 15 to September 30 (GBBR, n.d.), a trained Rattlesnake Monitor will complete area searches immediately prior to vegetation removal and blasting to identify any snakes or snake activity.<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all reptiles observed within the construction area during area searches and observe whether the individual(s) vacate the construction area. Should observed non-SAR reptiles (except for nesting turtles) that are encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat by a qualified Biologist / Handler or Environmental Monitor.</li></ul></li><li>• Removal of all natural vegetation within suitable nesting habitats is proposed to occur outside the nesting / early neonate season of July 1 to October 15 (Ontario Nature, 2014; COSEWIC, 2008; GBBR, n.d.) within sandy habitats or shorelines</li><li>• If vegetation clearing must occur within suitable snake hibernation habitat (wetland) through the use of heavy machinery between October 15 to April 30 (GBBR, n.d.), best management practices for heavy machinery usage within wetlands will be used to reduce impact on overwintering snakes. Best management practices may include, but are not limited to, low ground pressure equipment, wide tires, rubberized tracks, swamp mats, lightweight equipment, varying paths (Wetland Stewardship Partnership, 2009), and low tire inflation pressure (Alakukku, <i>et al.</i> 2003).</li><li>• Heavy machinery will be required to cross wetlands during the snake hibernation period of October 15 to April 30 (GBBR, n.d.). Where these crossings are necessary, heavy machinery will cross that most narrow crossing location (as deemed reasonable) or as close to the edge as possible within the construction footprint. Best management practices for heavy machinery use in wetlands will also be applied.</li><li>• During the snake hibernation period (October 15 to April 30; GBBR, n.d.) where dewatering activities may have an effect on hibernation habitat located within wetlands or aquatic features:<ul style="list-style-type: none"><li>▪ Area will be monitored to observe any drawdown; and</li><li>▪ If there is drawdown, stop construction work and determine mitigation appropriate to the site (i.e., redirect water, monitoring rain events) through discussions with a qualified Biologist and Hydrogeologist.</li></ul></li><li>• Water levels in wetlands or aquatic features adjacent to snake hibernation sites (or if known to be hydrologically connected) will be taken prior to and during dewatering activities.</li><li>• Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine</li></ul>	<ul style="list-style-type: none"><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors (e.g., Rattlesnake Monitors) will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids)</li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p>anticipated groundwater taking quantities, groundwater quality and predicted ZOI prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided, and may include where feasible:</p> <ul style="list-style-type: none"><li>▪ Monitor surface water levels in potentially affected groundwater-dependent natural features prior-to and during dewatering and compare to site-specific thresholds and early warning indicators for water level drawdown;</li><li>▪ Monitor shallow groundwater levels and vertical hydraulic conductivity in potentially affected groundwater-dependent natural features, where installation of mini-piezometer devices is possible (e.g. areas with a minimum of 40 cm soil depth). Monitor groundwater levels prior-to and during dewatering and compare to site-specific thresholds for groundwater level drawdown;</li><li>▪ Visual inspection of vegetation health during construction; and</li><li>▪ In the event surface water levels and / or groundwater level drawdown exceeds established site-specific thresholds mitigation measures may include where appropriate the diversion of groundwater dewatering discharge to affected feature following appropriate water quality control (e.g. sediment tanks, filter bags, flow diversion, soaker hoses, etc.).</li></ul> <ul style="list-style-type: none"><li>• Limit duration of dewatering to as short a time frame as possible.</li><li>• Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls), under specific conditions, which will assist in stopping the infiltration of groundwater into the excavations.</li><li>• Develop and implement a Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>▪ Suitable blasting timing window;</li><li>▪ Appropriate blasting setbacks to snake habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ No blasting will occur in wetland or open aquatic habitats;</li><li>▪ Blast mats will be used to control debris and sound generated from blasting;</li><li>▪ Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the active period for snakes (April 15 to September 30). If a snake is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting. In the unlikely event that similar habitat is not found within those parameters, the snake will be relocated to the next closest location of similar habitat; and</li><li>▪ Follow proper drilling, explosive handling and loading procedures.</li></ul></li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation activities will be initiated within all temporary construction / decommissioning areas where suitable habitat for snakes is affected to satisfy the habitat requirements (e.g., pile of blast rock, artificial gestation / hibernation structures may be created on site) for these species within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Ecopassages or designated movement corridors will be considered in areas of high snake activity or abundance, to limit road mortality.</li><li>• Install exclusionary fencing during construction / decommissioning within areas (where feasible) of concentrated snake activity to limit road and construction-related mortality.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors (e.g., Rattlesnake Monitors) will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<p>prior to, during, and post completion of construction.</p> <ul style="list-style-type: none"><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages / designated movement corridors and snake mortality rates.<ul style="list-style-type: none"><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for snakes (April 15 to September 30) when construction is occurring.</li><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high snake activity.</li></ul></li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If snakes are encountered during a pre-work search, work will be immediately stopped until a trained snake handler can relocate the snake to an area of similar habitat at least 50 m, but less than 300 m, from the area where the activity is occurring. In the unlikely event that similar habitat is not found within those parameters, the snake will be relocated to the next closest location of similar habitat.</li><li>▪ Repair any exclusionary fencing, movement fencing and / or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>▪ In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Contingency measures including but not limited to the rescue of stranded wildlife will also be developed. A post-construction monitoring program will be implemented to</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<p>evaluate the effectiveness of mitigation measures.</p> <ul style="list-style-type: none"><li>▪ Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider installing an additional ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</li><li>▪ Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>▪ Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Possible snake mortality from vehicles using access roads.</li><li>• Disturbance of hibernating snakes caused by routine maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Minimize snake mortality on access road.</li><li>• Minimize disturbance to reptile hibernacula.</li></ul>	<ul style="list-style-type: none"><li>• Periodically monitor (once in early spring after snow melt and once in summer / fall) to determine if any maintenance or repair is required at all installed ecopassages and repair accordingly to allow for movement corridors in areas where high snake activity has been identified in order to limit road mortality.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Avoid maintenance of culverts where substrates at or below the frost line are disturbed during the snake winter hibernation period (October 15 to April 30; GBBR, n.d.) to the extent possible where suitable snake hibernation habitat within wetlands or aquatic features has been identified. If this is not possible, and under emergency circumstances, a contingency mitigation strategy will be developed in consultation with EC-CWS, which will include:<ul style="list-style-type: none"><li>▪ A qualified Biologist will be on site monitoring emergency maintenance activities should any hibernating snakes be found; and</li><li>▪ In the unlikely case that a snake is disturbed and brought out of hibernation, EC-CWS will be notified and the individual will be transported immediately to the nearest turtle trauma centre. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined. A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all operations buildings.</li></ul></li><li>• Restrict public use of access roads to minimize risk of road mortality through installation of electronic access gate in coordination with operations staff throughout the site. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li><li>• During the active snake period (April 15 – September 30), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one of which will be trained to scan for snakes that may be on the road. The trained wildlife spotter will use binoculars (when appropriate) and will continually scan the access road ahead of the vehicle to ensure no snakes are near or on the road. If a snake is identified on the road, the vehicle will immediately stop and will continue around the snake at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed. All measures will be taken to ensure the safety of the snake, which may include moving the snake to a safe location off the road, and keeping vehicles at a safe distance to limit influence on natural movement behaviour.</li><li>• Conduct the following post-construction monitoring to determine operational impacts, if any, on snakes:</li></ul>	<ul style="list-style-type: none"><li>• Conduct post-construction disturbance effects monitoring, including:<ul style="list-style-type: none"><li>▪ Pre-construction herpetofauna surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the areas of the HIWEC study area.</li><li>▪ Snake monitoring will be conducted following methodology used in 2015 pre-construction surveys unless otherwise required through consultation with the appropriate agencies.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo, on an annual basis for the two (2) years of post-construction herpetofauna surveys to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 for a minimum of two (2) years post-construction to monitor snake mortality rates and the effectiveness of mitigation measures (e.g. ecopassages, speed limits, speed bumps and wildlife crossing signs).<ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high snake activity.</li><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages.</li><li>▪ Motion-sensor cameras will be checked regularly during the active period for snakes (April 15 to September 30) for the first three (3) years that the HIWEC is operational.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo on an annual basis for the two (2) years of post-construction road mortality surveys.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>Two (2) years of post-construction snake behaviour surveys; and</li><li>Prepare a two (2)-year report that will be provided to EC-CWS to determine if additional monitoring and / or mitigation measures are warranted.</li></ul>	<ul style="list-style-type: none"><li>During the active snake period (April 15-Septmeber 30) all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot snakes that may be on or near the road.</li><li>Conduct inspections of ecopassages (once in early spring after snow melt and once in summer / fall) during road mortality surveys for a minimum of two (2) years post-construction.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>In the event that, after two (2) years, herpetofauna surveys indicate notable changes in snake populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li><li>Analysis of road mortality surveys will determine high use areas and assist in identifying potential locations to consider installation of another ecopassage, speed bump, or wildlife crossing sign.</li><li>If road mortality is noted, specific access roads will be restricted to essential vehicular traffic only. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on life cycle characteristics of the species of which the impact has occurred.</li><li>Analysis of motion-detector camera monitoring of ecopassages will determine whether snakes actively use ecopassages, and may identify locations where modification to culvert design is required.</li><li>Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the operational phase.</li><li>Implement an adaptive management plan in the event of snake mortality on access roads, which may include additional restrictions on use of access roads during sensitive timing windows, or the installation of traffic control measures or ecopassages in specific areas. The details of the adaptive management framework will be developed in consultation with EC-CWS.</li></ul></li></ul>
Deer Yarding Areas <sup>1</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>Loss and / or degradation of deer yarding areas resulting from construction activities.</li><li>Disturbance to wintering deer.</li><li>Possible mortality of deer from construction activities.</li></ul>	<ul style="list-style-type: none"><li>Minimize loss and / or degradation of deer yarding areas.</li><li>Minimize disturbance to wintering deer.</li><li>Avoid mortality of deer.</li></ul>	<ul style="list-style-type: none"><li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Even though MNR states that to ensure adequate cover, at least 30% of the deer yarding areas will not be removed (MNRF, 2010), only up to 7% of deer yarding areas will be removed.</li><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li></ul>	<ul style="list-style-type: none"><li>Deer are highly mobile animals that are usually able to move away from areas or periods of disturbance, therefore no monitoring or contingency measures are required. Deer will likely return to these areas when construction disturbance has ended.</li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
	<b>Operation</b> <ul style="list-style-type: none"> <li>Possible mortality of deer moving in / out of deer yarding areas.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid mortality of deer.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li> <li>Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li> <li>Restrict public use of access roads to minimize risk of road mortality and poaching through installation of electronic access gate in coordination with operations staff throughout the site. Security cameras at the entrance will also be installed. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li> </ul>	<ul style="list-style-type: none"> <li>No monitoring or contingency measures required.</li> </ul>
<b>Cliffs and Talus Slopes</b>  Features confirmed important include: <ul style="list-style-type: none"> <li>CL-007</li> </ul> Features treated as important include: <ul style="list-style-type: none"> <li>CL-008</li> </ul>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"> <li>Loss and / or degradation of cliffs and talus slopes resulting from construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize loss and / or degradation of cliffs and talus slopes.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Where possible, avoid construction activities within the boundaries of cliffs and talus slopes.</li> <li>Where construction must occur within cliffs and talus slopes:               <ul style="list-style-type: none"> <li>The topsoil / seedbank (if present) will be stripped prior to construction, preserved during construction and reapplied in suitable rehabilitation areas post construction.</li> <li>Rehabilitation activities will be initiated within all temporary construction / decommissioning areas within one (1) year of the completion of the construction / decommissioning phase. Rehabilitate cliff face by roughening the smoothly blasted edges of the cliff face and leaving talus at the base. The roughened edges will create benches, cracks, crevices and fissures that allow for re-colonization of the cliff (MNFR, 2014).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li> <li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li> <li><b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li> <li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li> <li>If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li> <li>If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li> </ul> </li> </ul>
	<b>Operation</b> <ul style="list-style-type: none"> <li>No effects on cliffs and talus slopes anticipated during operation.</li> </ul>	<ul style="list-style-type: none"> <li>None required.</li> </ul>	<ul style="list-style-type: none"> <li>None required.</li> </ul>	<ul style="list-style-type: none"> <li>No monitoring or contingency measures required.</li> </ul>
<b>Precambrian Rock Barrens</b> Features confirmed important include: <ul style="list-style-type: none"> <li>All 86 features</li> </ul>	<b>Construction / Decommissioning &amp; Operation</b> <ul style="list-style-type: none"> <li>Precambrian rock barrens are abundant and widespread within the HIWEC study area and therefore no mitigation measures, monitoring or contingency measures are required during the construction / decommissioning or operation phases.</li> </ul>			
<b>Sand Barrens</b>  Features confirmed important include: <ul style="list-style-type: none"> <li>SNB-001</li> <li>SNB-002</li> </ul>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"> <li>Loss and / or degradation of sand barrens resulting from construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize loss and / or degradation of sand barrens.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Where possible, avoid construction activities within the boundaries of sand barrens.</li> <li>Site transmission line poles outside the boundaries of sand barren feature SB-002, if possible.</li> <li>Where construction must occur within sand barrens:               <ul style="list-style-type: none"> <li>The topsoil / seedbank will be stripped prior to construction, preserved during construction and reapplied in suitable rehabilitation areas post construction.</li> <li>Avoid the use of heavy machinery within sand barren communities to the extent possible.</li> <li>Rehabilitation activities will be initiated within all temporary construction / decommissioning areas within one (1) year of the completion of the construction / decommissioning phase.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li> <li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li> <li><b>Contingency Measures:</b> <ul style="list-style-type: none"> <li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li> </ul> </li> </ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>• Disturbance and / or degradation of sand barrens during maintenance of the transmission line or access roads.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance and / or degradation of sand barrens during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Avoid the use of heavy machinery within sand barrens during maintenance activities to the extent possible.</li><li>• Pesticides will not be used to maintain vegetation within sand barrens.</li></ul>	<ul style="list-style-type: none"><li>• No monitoring or contingency measures required.</li></ul>
<b>Old-growth Forest</b>  Features treated as important include: <ul style="list-style-type: none"><li>• FO-006</li></ul>	<b>Construction / Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>• No effects on Old-growth Forest anticipated during construction as FO-006 is located 12 m from the HIWEC location and no vegetation removal is proposed in the feature.</li></ul>	<ul style="list-style-type: none"><li>• None required</li></ul>	<ul style="list-style-type: none"><li>• No vegetation removal will occur in the feature and therefore no additional specific mitigation is required.</li></ul>	<ul style="list-style-type: none"><li>• No monitoring or contingency measures required.</li></ul>
<b>Bogs</b>  Features confirmed important include: <ul style="list-style-type: none"><li>• All 70 features</li></ul>	<b>Construction / Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>• Refer to <b>Table 4-1</b> for mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for Important Wetlands.</li></ul>			
<b>Waterfowl Nesting Areas<sup>2</sup></b>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of nesting waterfowl.</li><li>• Disturbance and / or displacement of nesting waterfowl resulting from noise and / or vibration from construction activities.</li><li>• Loss and / or degradation of waterfowl nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of nesting waterfowl.</li><li>• Minimize disturbance and / or displacement of nesting waterfowl.</li><li>• Minimize loss and / or degradation of waterfowl nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the Migratory Birds Convention Act (MBCA):<ul style="list-style-type: none"><li>▪ A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest surveys as required;</li><li>▪ Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ From May 1 to July 28, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period;</li><li>▪ From July 29 to August 31, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above;</li><li>▪ If an active bird nest or confirmed bird nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation; and</li><li>▪ The bird nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to bird habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ Blast mats will be used to control debris generated from blasting;</li><li>▪ Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>▪ Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal and blasting, and as required to ensure compliance with environmental requirements.</li></ul> <p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	<p>arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</p> <ul style="list-style-type: none"><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Disturbance and / or displacement of waterfowl in nesting habitat during operation.</li><li>• Possible mortality of waterfowl resulting from operating WTGs.</li><li>• Possible mortality or disturbance to nesting waterfowl resulting from vegetation clearing during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance and / or displacement of waterfowl from nesting habitat.</li><li>• Minimize risk of WTG related waterfowl mortality.</li><li>• Avoid mortality and minimize disturbance to nesting waterfowl during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Utilize a lighting scheme that will minimize potential risks for bird collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following, where possible:<ul style="list-style-type: none"><li>▪ Implement red LED flashing lights on WTGs.</li><li>▪ Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>▪ Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>▪ Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>▪ Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>• Implement a proactive approach to feathering WTG blades below the manufacturer's recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree),</li></ul>	<ul style="list-style-type: none"><li>• Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>▪ An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Conduct the following post-construction bird disturbance effects monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>▪ Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p>the following mitigation will apply, in accordance with the <i>MBCA</i> and the Wildlife Management Plan:</p> <ul style="list-style-type: none"><li>▪ Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation;</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken; and</li></ul> <ul style="list-style-type: none"><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNRF, 2011a).</li><li>• Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>• Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li></ul>	<p>abundance and diversity continue to be found in the HIWEC study area.</p> <ul style="list-style-type: none"><li>▪ Include WTGs adjacent to waterfowl nesting areas in the post-construction mortality monitoring program.</li><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance effects monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul> <ul style="list-style-type: none"><li>• Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ In the event that, after two (2) years, breeding bird surveys indicate notable changes in bird populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach. Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</li><li>▪ Prune any tree limbs or roots using proper arboricultural techniques.</li></ul></li></ul>
<b>Bald Eagle and Osprey Nesting, Foraging and Perching Habitat<sup>1</sup></b>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of Osprey.</li><li>• Disturbance and / or displacement of Osprey resulting from noise and / or vibration from construction activities.</li><li>• Loss and / or degradation of Osprey nesting, foraging and perching habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of Osprey.</li><li>• Minimize disturbance and /or displacement of Osprey.</li><li>• Minimize loss and / or degradation of Osprey nesting, foraging and perching habitat.</li></ul>	<ul style="list-style-type: none"><li>• If construction activities are scheduled to occur within 300 m of an identified Osprey nests during the critical breeding period April 15 to August 31, the activity of the Osprey nest will be confirmed by a qualified Biologist. Activity surveys would follow the protocol described for pre-construction survey and be completed between April 25 and June 1.<ul style="list-style-type: none"><li>▪ If an active Osprey nest is found, vegetation removal and blasting will not be permitted within 300 m of the nest between April 15 and August 31 or when a qualified Biologist confirms the nest is no longer active, whichever is first, unless behavioural monitoring is completed.</li><li>▪ Vegetation clearing and blasting may proceed up to but not within 150 m of the active nest after June 1 provided that behavioural monitoring is completed by a qualified Biologist during these activities. If extreme agitated behaviour (e.g., if Osprey flies off the nest and doesn’t return within 5 minutes) is observed through behavioural monitoring, then construction activities will be halted for the remainder of the day. Construction activities may resume the following day provided that behavioural monitoring is completed again by a qualified Biologist during these activities. If the same level of agitated behaviour is observed on the second day, then construction activities within 300 m of the nest will be halted until the young have fledged the nest or as otherwise determined through consultation with EC-CWS.</li><li>▪ Construction staff will be notified of the location of the active nest to ensure that they are aware of its location and species awareness training will be delivered.</li></ul></li><li>• The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to bird habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be microsited to select areas where blasting is not required.</li><li>▪ Blast mats will be used to control debris generated from blasting;</li><li>▪ Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li></ul></li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>▪ Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<p>unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</p> <ul style="list-style-type: none"><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ If an active Osprey nest is found, a buffer area will be implemented around the nest. The radius of the buffer will range depending on the level of disturbance and landscape context which will be confirmed by a qualified Avian Biologist (EC, 2014). The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation, however the outer limits of the buffer can be marked (EC, 2014).</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Disturbance and / or displacement of Osprey during operation.</li><li>• Possible mortality of Osprey from operating WTGs.</li><li>• Possible mortality of Osprey resulting from collisions with the transmission line.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance and / or displacement of Osprey.</li><li>• Minimize risk of Osprey mortality from of WTGs, collector lines or the transmission line.</li></ul>	<ul style="list-style-type: none"><li>• Utilize a lighting scheme that will minimize potential risks for bird collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following, where possible:<ul style="list-style-type: none"><li>▪ Implement red LED flashing lights on WTGs.</li><li>▪ Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>▪ Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>▪ Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>▪ Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>• Implement a proactive approach to feathering WTG blades below the manufacturer’s recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree), the following mitigation will apply, in accordance with the <i>MBCA</i> and the Wildlife Management Plan:<ul style="list-style-type: none"><li>▪ Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation; and</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>▪ An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Conduct the following post-construction bird disturbance monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>▪ Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>▪ Include WTGs adjacent to Osprey nests in the post-construction mortality monitoring program.</li><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ In the event that, after two (2) years, breeding bird surveys indicate notable changes in bird populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNR, 2011a).</li><li>• Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>• Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li><li>• Bird diverters / anti-perching devices should be considered in areas of Osprey nests along the on-reserve transmission line to minimize potential collisions.</li></ul>	<p>Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</p> <ul style="list-style-type: none"><li>• Prune any tree limbs or roots using proper arboricultural techniques.</li></ul>
Woodland Raptor Nesting Habitat <sup>2</sup>	<p><b>Construction / Decommissioning</b></p> <ul style="list-style-type: none"><li>• Possible mortality of nesting raptors.</li><li>• Disturbance and / or displacement of nesting raptors resulting from noise and / or vibration from construction activities.</li><li>• Loss and / or degradation of woodland raptor nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of nesting raptors.</li><li>• Minimize disturbance and /or displacement of nesting raptors.</li><li>• Minimize loss and / or degradation of woodland raptor nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the Migratory Birds Convention Act (MBCA):<ul style="list-style-type: none"><li>▪ A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest surveys as required;</li><li>▪ Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ From May 1 to July 28, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period; and</li><li>▪ From July 29 to August 31, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above.</li><li>▪ If an active bird nest or confirmed bird nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The bird nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li><li>• The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to bird habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ Blast mats will be used to control debris generated from blasting;</li><li>▪ Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>▪ Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal and blasting, and as required to ensure compliance with environmental requirements.</li></ul> <p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	
	<b>Operation</b> <ul style="list-style-type: none"><li>Disturbance and / or displacement of nesting raptors during operation.</li><li>Possible mortality of raptors from operating WTGs.</li><li>Possible mortality of raptors resulting from collisions with the transmission line.</li></ul>	<ul style="list-style-type: none"><li>Minimize disturbance and / or displacement of nesting raptors.</li><li>Minimize risk of raptor mortality from of WTGs, collector lines or the transmission line.</li></ul>	<ul style="list-style-type: none"><li>Utilize a lighting scheme that will minimize potential risks for bird collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following, where possible:<ul style="list-style-type: none"><li>Implement red LED flashing lights on WTGs.</li><li>Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>Implement a proactive approach to feathering WTG blades below the manufacturer’s recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree), the following mitigation will apply, in accordance with the <i>MBCA</i> and the <i>Wildlife Management Plan</i>:<ul style="list-style-type: none"><li>Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation;</li></ul></li></ul>	<ul style="list-style-type: none"><li>Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>Conduct the following post-construction bird disturbance monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>Include WTGs adjacent to confirmed raptor nests in the post-construction mortality monitoring program.</li><li>An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>In the event that, after two (2) years, breeding bird surveys indicate notable changes in bird populations, EC-CWS will be</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken; and</li><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNRF, 2011a).</li><li>• Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>• Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li><li>• Bird diverters / anti-perching devices should be considered in areas of confirmed raptor nests along the on-reserve transmission line to minimize potential collisions.</li></ul>	<p>consulted to determine if additional mitigation measures are warranted through an adaptive management approach. Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</p> <ul style="list-style-type: none"><li>▪ Prune any tree limbs or roots using proper arboricultural techniques.</li></ul>
<b>Turtle and Lizard Nesting Areas<sup>3</sup></b>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of turtles within turtle nesting areas, or moving between turtle nesting areas and other areas.</li><li>• Disturbance to turtles within nesting areas, or moving between turtle nesting areas and other areas.</li><li>• Loss and / or habitat degradation of turtle nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of turtles.</li><li>• Minimize disturbance to turtles.</li><li>• Minimize loss and / or degradation of turtle nesting habitat.</li></ul>	<ul style="list-style-type: none"><li>• Site transmission line poles outside the boundaries of the sand barren community associated with turtle nesting feature TLN-001, if possible. Avoid the use of heavy machinery within this feature, to the extent possible.</li><li>• If vegetation* is to be removed between June 1 and September 15 within those areas that provide confirmed and / or likely turtle nesting habitat (i.e., within sandy habitats, shorelines, soil-filled cracks in rock barren, or wetlands where turtle nesting activity has been observed or suitable habitat is within an area with concentrated turtle observations) and that are identified to be cleared for vegetation, the following will be adhered to:<ul style="list-style-type: none"><li>▪ Construction will avoid nesting areas where possible;</li><li>▪ In suitable nesting areas that are unavoidable, exclusionary fencing will be installed around the extent of the construction footprint that overlaps nesting habitat prior to the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.) to prevent turtle nesting activity prior to construction activities;</li><li>▪ Immediately prior to vegetation clearing between June 1 and September 15, a qualified Biologist will search the area to ensure no nests are present;</li><li>▪ In the rare case where construction was initially designed to avoid an area and exclusionary fencing had not been installed prior to the turtle nesting period, a qualified Biologist will complete area searches immediately prior to construction to identify any potential nesting areas and nesting activity during the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.);</li><li>▪ If an active nest or confirmed nesting activity is found, a minimum buffer area of 30 m will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context, which will be confirmed by a qualified Biologist. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked and UTM coordinates will be taken. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation; and</li><li>▪ Once the Biologist has cleared the area, install turtle appropriate exclusionary fencing during construction / decommissioning within areas of concentrated turtle activity to limit road and construction-related mortality.</li></ul></li><li>• Immediately prior to vegetation clearing, a qualified Biologist will conduct an area search of the proposed vegetation clearing area to ensure no reptiles are present;<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all reptiles observed within the construction area during area searches and observe whether the individual(s) vacate the construction area. Should observed non-SAR reptiles (except for nesting turtles) that are encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat by a qualified Biologist / Handler or Environmental Monitor.</li></ul></li><li>• Develop and implement a Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to turtle habitat;</li></ul></li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• If any confirmed, or suspected, turtle nests are identified within the vicinity of the HIWEC location, nest monitoring will be conducted twice per week during the construction and decommissioning phases to monitor the success of the nest and ensure its protection from construction impacts. Surveys will be completed during the turtle nesting / hatching season between June 1 and September 15.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• Visual inspections will occur prior to May 1 to ensure the construction nest site(s) is suitable for turtle nesting activity. If modifications are required, these will be completed prior to the nesting period (May 15-June 30).<ul style="list-style-type: none"><li>▪ To assess the use of the sites by turtles, monitoring of the nest sites will be completed through the use of strategically placed wildlife (game) cameras. These cameras should be activated by a motion-sensor and be able to record still or video evidence during daylight or nighttime (i.e. infrared) hours. Cameras should be left in place for the entire period of May 1 to September 30, and data will be revised at a minimum of weekly during the nesting period (May 15-June</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ No blasting will occur in wetland or open aquatic habitats;</li><li>▪ Blast mats will be used to control debris and sound generated from blasting;</li><li>▪ Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the active period for turtles (April 15 to September 30). If a turtle is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtles considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat.</li><li>▪ Follow proper drilling, explosive handling and loading procedures.</li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Rehabilitation activities will be initiated within all temporary construction / decommissioning areas where suitable habitat for turtles is affected to satisfy the habitat requirements (e.g., installation of artificial nesting structures) for these species within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Ecopassages or designated movement corridors will be considered in areas of high turtle activity or abundance, to limit road mortality.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<p>30) and monthly during the remainder of the monitoring season (July 1 to September 30).</p> <ul style="list-style-type: none"><li>▪ In the event that nesting activity is documented, EC-CWS will be engaged to determine whether additional efforts should be taken to protect nests from predation.</li><li>▪ Monitoring will begin at the installation of nesting sites and will continue until the completion of the third year that the HIWEC is operational.</li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages / designated movement corridors and turtle mortality rates.<ul style="list-style-type: none"><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) when construction is occurring.</li></ul></li><li>• These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist but will be protected by a minimum of 30 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation. The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked and UTM coordinates will be taken.</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation, however the outer limits of the buffer can be marked and UTM co-ordinates will be taken. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation.</li><li>▪ If a turtle is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtles considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat.</li><li>▪ Repair any exclusionary fencing, movement fencing and / or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper</li></ul></li></ul>

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Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<p>arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</p> <ul style="list-style-type: none"><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider retrofitting a road with an ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>▪ A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all construction buildings. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined.</li><li>▪ Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>▪ Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Disturbance to turtles within nesting areas, or moving between turtle nesting areas and other areas.</li><li>• Risk of road mortality to turtles moving between turtle nesting areas and other areas.</li><li>• Disturbance and / or degradation of turtle nesting habitat during maintenance of the transmission line.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance to turtles.</li><li>• Avoid turtle mortality on access roads.</li><li>• Minimize disturbance and / or degradation of turtle nesting habitat during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Periodically monitor (once in early spring after snow melt and once in summer / fall) to determine if any maintenance or repair is required at all installed ecopassages and repair accordingly to allow for movement corridors in areas where high turtle activity has been identified in order to limit road mortality.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Avoid grading as part of access road maintenance during the turtle nesting / hatching period (June 1 to September 15; GBBR, n.d.). If there are serious safety concerns or other circumstances where road maintenance may be required during this period, EC-CWS will be consulted prior to the activity taking place.</li><li>• Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Restrict public use of access roads to minimize risk of road mortality and poaching through installation of electronic access gate in coordination with operations staff throughout the site. Security cameras at the entrance and any known turtle nesting sites will also be installed. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li><li>• Avoid the use of heavy machinery within the sand barren community associated with turtle nesting feature TLN-001 during maintenance activities to the extent possible.</li></ul>	<ul style="list-style-type: none"><li>• Conduct post-construction disturbance effects monitoring, including:<ul style="list-style-type: none"><li>▪ Pre-construction herpetofauna surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>▪ Turtle monitoring will be conducted following methodology used in pre-construction surveys unless otherwise required through consultation with the appropriate agencies.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo, on an annual basis for the two (2) years of post-construction herpetofauna surveys to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 for a minimum of two (2) years post-construction to monitor turtle mortality rates and the effectiveness of mitigation measures (e.g. ecopassages, speed limits, speed bumps and</li></ul>

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Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Pesticides will not be used to maintain vegetation within the sand barren community associated with turtle nesting feature TLN-001.</li><li>• During the active turtle period (April 15 – September 30), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one of which will be trained to scan for turtles that may be on the road. The trained wildlife spotter will use binoculars (when appropriate) and will continually scan the access road ahead of the vehicle to ensure no turtles are near or on the road. If a turtle is identified on the road, the vehicle will immediately stop and will continue around the turtle at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed. All measures will be taken to ensure the safety of the turtle, which may include moving the turtle to a safe location off the road, and keeping vehicles at a safe distance to limit influence on natural movement behaviour.</li></ul>	<p>wildlife crossing signs). This monitoring period encompasses the period when the most vehicle activity will occur on site, albeit still relatively low traffic is expected.</p> <ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages.</li><li>▪ Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) for the first three (3) years that the HIWEC is operational.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo on an annual basis for the two (2) years of post-construction road mortality surveys.</li><li>• During the active turtle period (April 15-Septmeber 30) all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot turtles that may be on or near the road.</li><li>• Conduct inspections of ecopassages (once in early spring after snow melt and once in summer / fall) during road mortality surveys for a minimum of two (2) years post-construction.</li><li>• If any confirmed turtle nests are identified within the vicinity of the HIWEC location, nest monitoring will be conducted twice times per week during the operational phase to monitor the success of the nest and ensure its protection from operational impacts. Surveys will be completed during the turtle nesting / hatching season between June 1 and September 15.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, post-construction herpetofauna surveys indicate notable changes in turtle populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li><li>▪ Analysis of road mortality surveys will determine high use areas and assist in identifying potential locations to consider installation of another ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, specific access roads will be restricted to essential vehicular traffic only. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on life cycle characteristics of the species of which the impact has occurred.</li><li>▪ Analysis of motion-detector camera monitoring of ecopassages will determine whether turtles actively use ecopassages, and may identify locations where modification to culvert design is required.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the operational phase.</li><li>▪ If a nest is identified, it will not be marked using flagging tape or other similar material as this increases the risk of nest predation, however the UTM co-ordinates of the nest will be documented. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation.</li></ul></li></ul>

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Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
Seeps and Springs <sup>1</sup>	<b>Construction / Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>Refer to the Water Assessment and Water Bodies Report (<b>Appendix H</b> of <b>Volume A</b>) for mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for seeps and springs.</li></ul>			
Aquatic Feeding Habitat <sup>1</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>Loss and / or degradation of aquatic feeding habitats resulting from construction activities.</li><li>Disturbance to moose or deer from construction activities.</li><li>Possible mortality of moose or deer from construction activities.</li></ul>	<ul style="list-style-type: none"><li>Minimize loss and / or degradation of aquatic feeding habitat.</li><li>Minimize disturbance to moose or deer.</li><li>Avoid mortality of moose or deer.</li></ul>	<ul style="list-style-type: none"><li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li></ul>	<ul style="list-style-type: none"><li>Moose and deer are highly mobile animals that are usually able to move away from areas or periods of disturbance, therefore no monitoring is required. Moose and deer will likely return to these areas when construction disturbance has ended.</li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>Possible mortality of moose or deer moving between aquatic feeding habitats and other areas.</li></ul>	<ul style="list-style-type: none"><li>Avoid mortality of moose or deer.</li></ul>	<ul style="list-style-type: none"><li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>Restrict public use of access roads to minimize risk of road mortality and poaching through installation of electronic access gate in coordination with operations staff throughout the site. Security cameras at the entrance and any known turtle nesting sites will also be installed. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li></ul>	<ul style="list-style-type: none"><li>No monitoring or contingency measures required.</li></ul>
<b>Amphibian Breeding Habitat (Woodland and Wetland)</b>  Features confirmed important include: <ul style="list-style-type: none"><li>ABH-001</li><li>ABH-007</li><li>ABH-014</li><li>ABH-045</li><li>ABH-060</li><li>ABH-084</li><li>ABH-085</li><li>ABH-090</li><li>ABH-098</li><li>ABH-108</li><li>ABH-109</li><li>ABH-115</li><li>ABH-160</li></ul> Features treated as important include <sup>1</sup> : <ul style="list-style-type: none"><li>Remaining 58 features (not including those that were confirmed as not important)</li></ul>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>Possible mortality of amphibians within breeding habitat, or moving between breeding habitat and other areas.</li><li>Disturbance to amphibians within breeding habitat, or moving between breeding habitat and other areas.</li><li>Loss and / or habitat degradation of amphibian breeding habitat.</li></ul>	<ul style="list-style-type: none"><li>Avoid mortality of amphibians.</li><li>Minimize disturbance to amphibians.</li><li>Minimize loss and / or degradation of amphibian breeding habitat.</li></ul>	<ul style="list-style-type: none"><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Avoid driving on access roads in proximity to amphibian breeding habitats at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible</li><li>Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>Rehabilitation will be initiated within all temporary construction / decommissioning areas where suitable habitat for amphibians is affected to satisfy the habitat requirements for breeding amphibians within one (1) year of the completion of the construction / decommissioning phase.</li><li>Ecopassages or designated movement corridors should be considered in areas of high amphibian activity or abundance, to limit road mortality.</li></ul>	<ul style="list-style-type: none"><li>If construction must occur at night within 30 m of amphibian breeding habitats between April 1 and June 30 due to a critical phase of construction, work may be permitted if conditions for amphibian breeding are marginal. The Environmental Monitor will track weather conditions and determine if suitable amphibian breeding conditions are present.</li><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Repair any exclusionary fencing, movement fencing and / or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>

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Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
	<b>Operation</b> <ul style="list-style-type: none"><li>Disturbance to amphibians within breeding areas, or moving between breeding areas and other areas.</li><li>Risk of road mortality to amphibians moving between breeding areas and other areas.</li></ul>	<ul style="list-style-type: none"><li>Minimize disturbance to amphibians.</li><li>Avoid amphibian mortality on access roads.</li></ul>	<ul style="list-style-type: none"><li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>Avoid driving on access roads in proximity to amphibian breeding habitats at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible</li><li>Avoid maintenance of culverts where in-water works are required within amphibian breeding habitats during the amphibian breeding season (April 1 to June 30) to the extent possible.</li><li>Maintain speed limit signage (30 km/hr) and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li></ul>	<ul style="list-style-type: none"><li>Pre-construction amphibian surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to found in the HIWEC study area.</li><li>While accessing the site to conduct amphibian surveys, spot checks for road mortality will occur at high activity areas, as determined through pre-construction monitoring.</li><li>The 2-year report will be provided to EC-CWS to determine if additional monitoring and / or mitigation measures are warranted.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>In the event that, after two (2) years, amphibian surveys indicate notable changes in amphibian populations, HIFN and EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li></ul></li></ul>
<b>Mast Producing Areas</b>  Features confirmed important include: <ul style="list-style-type: none"><li>MPA-002</li></ul>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>Permanent removal of mast producing areas.</li></ul>	<ul style="list-style-type: none"><li>Minimize removal of mast producing areas.</li></ul>	<ul style="list-style-type: none"><li>Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required. Fell trees toward the construction footprint area to reduce damage to adjacent vegetation being retained.</li><li>Where excavation for construction of access roads, WTGs or collector lines is required within the rooting zone of trees (i.e., within 1 m of the dripline), implement proper root pruning measures to protect tree roots.</li><li>Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of woodland that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase. Include plantings of mast producing species in rehabilitated areas, if appropriate to local soil conditions. These plants should be sourced from the local gene pool and may consist of local seed or salvaged seedlings.</li></ul>	<ul style="list-style-type: none"><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor.</li><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>No effects on mast producing areas anticipated during operation.</li></ul>	<ul style="list-style-type: none"><li>None required.</li></ul>	<ul style="list-style-type: none"><li>None required.</li></ul>	<ul style="list-style-type: none"><li>No monitoring or contingency measures required.</li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
Marsh Bird Breeding Habitat <sup>2</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of marsh breeding birds.</li><li>• Disturbance and / or displacement of marsh breeding birds resulting from noise and / or vibration from construction activities.</li><li>• Loss and / or degradation of marsh bird breeding habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of marsh breeding birds.</li><li>• Minimize disturbance and / or displacement of marsh breeding birds.</li><li>• Minimize loss and / or degradation of marsh bird breeding habitat.</li></ul>	<ul style="list-style-type: none"><li>• If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the <i>Migratory Birds Convention Act</i> (MBCA):<ul style="list-style-type: none"><li>▪ A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest surveys as required;</li><li>▪ Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ From May 1st to July 28th, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period;</li><li>▪ From July 29th to August 31st, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above.</li><li>▪ If an active bird nest or confirmed bird nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The bird nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li><li>• The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to bird habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ Blast mats will be used to control debris generated from blasting;</li><li>▪ Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>▪ Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal and blasting, and as required to ensure compliance with environmental requirements.</li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>•Disturbance and / or displacement of marsh breeding birds during operation.</li><li>•Possible mortality of marsh breeding birds resulting from operating WTGs.</li><li>•Possible mortality or disturbance to marsh breeding birds resulting from vegetation clearing during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Minimize disturbance and / or displacement of marsh breeding birds.</li><li>• Minimize risk of WTG related marsh breeding bird mortality.</li><li>• Avoid mortality and minimize disturbance to marsh breeding birds during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>• Utilize a lighting scheme that will minimize potential risks for bird collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following, where possible:<ul style="list-style-type: none"><li>▪ Implement red LED flashing lights on WTGs.</li><li>▪ Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>▪ Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>▪ Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>▪ Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>• Implement a proactive approach to feathering WTG blades below the manufacturer’s recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree), the following mitigation will apply, in accordance with the <i>MBCA</i> and the <i>Wildlife Management Plan</i>:<ul style="list-style-type: none"><li>▪ Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation;</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken; and</li></ul></li><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNR, 2011a).</li><li>• Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>• Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li></ul>	<ul style="list-style-type: none"><li>• Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>▪ An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Conduct the following post-construction bird disturbance monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>▪ Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>▪ Include WTGs adjacent to marsh bird breeding habitats in the post-construction mortality monitoring program.</li><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ In the event that, after two (2) years, breeding bird surveys indicate notable changes in bird populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach. Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</li><li>▪ Prune any tree limbs or roots using proper arboricultural techniques</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
Habitat for Avian SOCC (Black Tern, Yellow Rail) <sup>2</sup>	<b>Construction / Decommissioning &amp; Operation</b> Refer to the mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for <b>Marsh Bird Breeding Habitat</b> as described above.			
Habitat for Avian SOCC (Eastern Wood-pewee, Prairie Warbler, Wood Thrush) <sup>2</sup>	<b>Construction / Decommissioning</b> <ul style="list-style-type: none"><li>• Possible mortality of avian SOCC.</li><li>• Disturbance and / or displacement of avian SOCC resulting from noise and / or vibration from construction activities.</li><li>• Loss and / or degradation of avian SOCC habitat.</li></ul>	<ul style="list-style-type: none"><li>• Avoid mortality of avian SOCC.</li><li>• Minimize disturbance and / or displacement of avian SOCC. Minimize loss and / or degradation of avian SOCC habitat.</li></ul>	<ul style="list-style-type: none"><li>• If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the <i>Migratory Birds Convention Act</i> (MBCA):<ul style="list-style-type: none"><li>▪ A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest surveys as required;</li><li>▪ Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ From May 1 to July 28, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period;</li><li>▪ From July 29 to August 31, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above.</li><li>▪ If an active bird nest or confirmed bird nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The bird nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li><li>• The Blasting Plan will include standard BMPs to minimize extent of habitat change, mortality risk and adverse noise and vibration from blasting:<ul style="list-style-type: none"><li>▪ Suitable blasting timing windows;</li><li>▪ Appropriate blasting setbacks to bird habitat;</li><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ Blast mats will be used to control debris generated from blasting;</li><li>▪ Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no wildlife is present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>▪ Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>▪ Follow proper drilling, explosive handling and loading procedures;</li><li>▪ Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>▪ Remove all blasting debris and other associated equipment / products from the blast area.</li></ul></li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr), install speed bumps and post speed limits of 10 km/hr within areas of concentrated wildlife activity and instruct all staff to be vigilant for wildlife while driving on site.</li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>▪ If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors will be present during key construction activities including vegetation removal and blasting, and as required to ensure compliance with environmental requirements.</li></ul> <p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	
	<b>Operation</b> <ul style="list-style-type: none"><li>Disturbance and / or displacement of avian SOCC during operation.</li><li>Possible mortality of avian SOCC resulting from operating WTGs.</li><li>Possible mortality or disturbance to avian SOCC resulting from vegetation clearing during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>Minimize disturbance and / or displacement of avian SOCC.</li><li>Minimize risk of WTG related avian SOCC mortality.</li><li>Avoid mortality and minimize disturbance to avian SOCC during maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>Utilize a lighting scheme that will minimize potential risks for bird collisions, while still fulfilling Transport Canada requirements. Lighting scheme will include the following, where possible:<ul style="list-style-type: none"><li>Implement red LED flashing lights on WTGs.</li><li>Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>Implement a proactive approach to feathering WTG blades below the manufacturer's recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree), the following mitigation will apply, in accordance with the <i>MBCA</i> and the Wildlife Management Plan:<ul style="list-style-type: none"><li>Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada's Nesting Calendar for Zone C3 (EC, 2014b);</li><li>Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation;</li><li>The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken; and</li></ul></li><li>If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird and bat mortality and disturbance monitoring program consistent with <i>Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds</i> (EC-CWS, 2007a), <i>Wind Turbines and Birds A Guidance Document for Environmental Assessment</i> (EC-CWS, 2007b) as well as <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNRF, 2011a).</li><li>Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis.</li><li>Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring.</li></ul>	<ul style="list-style-type: none"><li>Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>Conduct the following post-construction bird disturbance monitoring for two (2) years as described in the EEMP, including:<ul style="list-style-type: none"><li>Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>Include WTGs adjacent to avian SOCC habitat areas in the post-construction mortality monitoring program.</li><li>An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>In the event that, after two (2) years, breeding bird surveys indicate notable changes in bird populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach. Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</li><li>Prune any tree limbs or roots using proper arboricultural techniques.</li></ul></li></ul>

Table 6-3: Potential Effects and Mitigation Measures Associated with Important Wildlife Habitat Features

Important Wildlife Habitat (IWH)	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
Habitat for Insect SOCC (Horned Clubtail, Mottled Darner) <sup>1</sup>	<b>Construction/ Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>Refer to <b>Table 4-1</b> for mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for Important Wetlands.</li></ul>			
Habitat for Insect SOCC (Pine Imperial Moth) <sup>4</sup>	<b>Construction/ Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>This species is relatively common across the Canadian Shield (Dave Beadle, personal communication, September 3, 2015) and its habitat is not limiting within the HIWEC study area. Therefore, no mitigation, monitoring or contingency measures are required during the construction / decommissioning or operation phases.</li></ul>			
Habitat for Turtle and Lizard SOCC (Common Five-lined Skink <sup>4</sup> , Northern Map Turtle <sup>2</sup> , Snapping Turtle <sup>2</sup> )	<b>Construction/ Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>Refer to the mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for <b>Turtle Wintering Areas</b> and <b>Turtle and Lizard Nesting Areas</b> as described above.</li></ul>			
Habitat for Snake SOCC (Eastern Ribbonsnake <sup>2</sup> , Milksnake <sup>2</sup> )	<b>Construction / Decommissioning &amp; Operation</b> <ul style="list-style-type: none"><li>Refer to the mitigation measures, monitoring and contingency measures to be applied during the construction / decommissioning and operations phases for <b>Reptile Hibernacula</b> as described above.</li></ul>			

Footnotes:

- All candidate IWH features were treated as important for the purpose of this NHA. Pre-construction EOI surveys may be completed in 2016 to evaluate the importance of these features. In absence of these pre-construction EOI surveys, features will remain treated as important and mitigation measures and monitoring commitments described herein will apply.
- All candidate IWH features were treated as important for the purpose of the NHA. The importance of some of these features will be confirmed through the analysis of pre-construction EOI survey data. If these features are confirmed not to be important, the mitigation measures and monitoring commitments described herein will not be applied. Pre-construction EOI surveys may also be completed in 2016 to evaluate the importance of the remaining features which cannot be evaluated based on the pre-construction EOI surveys completed to date. In absence of these additional pre-construction EOI surveys, remaining features will remain treated as important and mitigation measures and monitoring commitments described herein will apply..
- Precambrian Rock Barren features were considered as suitable lizard nesting habitat. Refer to Precambrian Rock Barren mitigation measures and monitoring. All candidate Turtle Nesting Area features were treated as important for the purpose of this NHA. Pre-construction EOI surveys may be completed in 2016 to evaluate the importance of these features. In absence of these pre-construction EOI surveys, features will remain treated as important and mitigation measures and monitoring commitments described herein will apply.
- All candidate IWH features were treated as important. No additional pre-construction EOI surveys are required to evaluate the importance of these features. Mitigation measures and monitoring described herein will apply to these features.

## 7. Federal Species at Risk

Species listed as Endangered and Threatened under Schedule 1 of SARA require protection and are included in this section. In addition, these species may require permits and / or authorization administered by EC-CWS if the proposed HIWEC negatively affects the species or its habitat. Permit requirements, if any, will be determined in consultation with EC-CWS. There is no provincial requirement or guidance for completing an NHA on Federal Species at Risk (SAR); however, these species are included here and duplicated in the main body of the EA Report.

A total of 14<sup>2</sup> Federal SAR were carried forward to the EIS, including:

- Canada Warbler;
- Common Night Hawk;
- Eastern Whip-poor-will;
- Kirtland's Warbler;
- Olive-sided Flycatcher;
- Blanding's Turtle;
- Eastern Musk Turtle;
- Eastern Foxsnake;
- Eastern Hog-nosed Snake;
- Massasauga Rattlesnake;
- Little Brown Bat;
- Northern Myotis; and
- Tri-coloured Bat.

Mitigation measures to address potential negative environmental effects of construction, operation and decommissioning of the HIWEC on Federal Species at Risk are presented in **Table 7-1**. This table describes the potential effects, performance objectives, mitigation measures, proposed monitoring plan and contingency measures, as they relate to Federal SAR.

2. *Records of Species At Risk considered to be restricted are not being made public due to the threat of poaching experienced by these species. These records will be provided under a separate cover to the Ministry of Natural Resources and Forestry (MNR) and / or Environment Canada – Canadian Wildlife Service (EC-CWS) for permitting purposes.*

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
<p><b>Avian SAR</b></p> <p><b>Canada Warbler</b> (<i>Cardellina canadensis</i>)</p> <p><b>Common Nighthawk</b> (<i>Chordeiles minor</i>)</p> <p><b>Eastern Whip-poor-will</b> (<i>Antrostomus vociferus</i>)</p> <p><b>Kirtland’s Warbler</b> (<i>Setophaga kirtlandii</i>)</p> <p><b>Olive-sided Flycatcher</b> (<i>Contopus cooperi</i>)</p>	<p><b>Construction / Decommissioning</b></p> <ul style="list-style-type: none"><li>Habitat change, including possible damage or destruction of avian SAR residences or avian SAR habitat.</li><li>Changes in behaviour, due to disturbance of SAR.</li><li>Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>Minimize loss and / or fragmentation of avian SAR habitat.</li><li>Minimize habitat avoidance and / or noise disturbance to avian SAR.</li><li>Avoid mortality of avian SAR.</li></ul>	<ul style="list-style-type: none"><li>If vegetation must be removed* during the overall bird nesting season of April 1 to August 31, the following mitigation will apply, in accordance with the <i>MBCA</i>:<ul style="list-style-type: none"><li>A qualified Avian Biologist will be on-site during clearing activities to oversee vegetation removal and conduct nest and nest activity surveys as required;</li><li>Within complex habitats**, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada’s Nesting Calendar for Zone C3 (EC, 2014b);</li><li>From April 1 to April 30, nest and nesting activity searches will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>From May 1 to July 28, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above. Vegetation clearing will not occur within complex habitats during this period;</li><li>From July 29 to August 31, nest and nesting activity searches will be conducted by a qualified Biologist in simple habitat immediately prior to vegetation clearing as described above;</li><li>If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation; and</li><li>The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken.</li></ul></li><li>Develop and implement a SAR Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>Blasting will only occur in areas that have already been cleared of vegetation;</li><li>Where feasible, the construction footprint will be micrositied to select areas where blasting is not required;</li><li>Blast mats will be used to control debris generated from blasting;</li><li>Prior to blasting, a qualified Biologist will conduct an area search of the proposed blasting area to ensure no bird SAR or nests are present (e.g. ground-nesting birds) the day of blasting, as close to the blasting time as safety considerations will allow;</li><li>Ensure wildlife (e.g. birds flying over) are not in the blasting zone prior to detonation. If wildlife is encountered in the blasting zone, postpone detonation until the wildlife has vacated the area;</li><li>Follow proper drilling, explosive handling and loading procedures;</li><li>Implement safe handling and storage procedures for all materials, including soluble substances used for blasting; and</li><li>Remove all blasting debris and other associated equipment/products from the blast area.</li></ul></li><li>Minimize vegetation removal and limit to within the construction footprint area. The construction footprint will be clearly defined. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>The construction footprint will be micrositied within the larger permitted HIWEC location to construct project infrastructure, such as roads, away from SAR habitats and residences and complex habitats, where possible, by a qualified Biologist. Micrositing will include notation of potential Kirtland Warbler’s Habitat (e.g. Jack Pine stands at a height of 1.5 to 5 m). If this is not possible, appropriate timing windows, clearing restrictions, and nest buffers will be applied (see above).</li><li>WTG T23 will be dropped from the final HIWEC layout of 91 WTGs that will ultimately be built.</li><li>Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase. In order to enhance insect prey populations preferred by bird SAR, specifically Canada Warbler and Olive-sided Flycatcher, planting plans for the rehabilitated areas as part of the Rehabilitation Plan will include flowering herbaceous plants that are known to occur within HIWEC study area. Although it is not possible to calculate the area of temporary disturbance associated with access roads due to micrositing and site-specific conditions, the temporary disturbance area associated with WTG construction / decommissioning is approximately 17.3 ha.</li><li>Conduct dust suppression (i.e., spraying water on access roads and work areas) during dry conditions to minimize dust generation on vegetation. In the event that dust accumulates on leaves of plants, which may reduce photosynthesis, water will be used to wash dust off of vegetation.</li><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.<ul style="list-style-type: none"><li>In emergency circumstances where construction / decommissioning activities must occur at night during the breeding bird season (April 1 to August 31), a lighting scheme will be used to minimize potential risks to bird SAR and will include the following:</li></ul></li></ul>	<ul style="list-style-type: none"><li>Surveys to confirm Kirtland’s Warbler use of habitat within the greater landscape will be completed between May 7 to July 7 in 2016 by the same team of qualified Avian Biologists that conducted the 2015 breeding bird surveys following the standard methods outlined in the <i>Search Protocol for Kirtland’s Warbler</i> (Kirtland’s Warbler Recover Team, 2012). The following two surveys will be conducted:<ul style="list-style-type: none"><li>A survey will be conducted within the area in the vicinity of the 2015 observed occurrence of Kirtland’s Warbler within the HIWEC study area.</li><li>Additional surveys will be conducted in suitable habitats for Kirtland’s Warbler where they occur within areas that are publicly accessible along the Georgian Bay Shoreline.</li></ul></li><li>The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>A qualified Biologist or trained Environmental Monitor will drive along the existing access roads and monitor for SAR each morning and afternoon. Should a SAR be encountered, steps outlined in the Sighting Response Protocol will be followed.</li><li>Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>The Environmental Monitor is to ensure speed limits are posted and communicated to project staff.</li><li>With respect to the Sighting Response Plan, the Environmental Monitor to ensure the species observation log is kept up to date, procedures are followed and reporting is submitted to EC, as required.</li><li><b>Contingency Measures:</b><ul style="list-style-type: none"><li>Repair any barrier fencing / boundary delineation materials if damaged, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>If any accidental damage to habitat occurs, rehabilitation will occur as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>▪ Lighting or spotlights will be directed downward, temporary and kept to a minimum.</li><li>• Clearly post speed limit signs along access roads (20 km/hr) and instruct all staff to be vigilant for wildlife while driving on site. Where possible, restrict driving on-site to daytime hours (sunrise to sunset) during the breeding bird season (April 1 to August 31).</li><li>• Develop and implement a Sighting Response Protocol in the Wildlife Management Plan which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ Details on what to do if SAR are encountered: immediate stop in construction activity within 10 m of an observation of a SAR until a qualified Biologist can confirm the species has vacated the construction disturbance footprint. In lieu of calling a Biologist, work can be resumed after a 24 hr period if no evidence of the species exists within the immediate area of previous observation. If the species still exists within the immediate area after 24 hr, a qualified Biologist will be contacted to provide appropriate direction;</li><li>▪ For animals in immediate danger, handling procedures will be established for designated personnel (i.e., Environmental Monitor, qualified Biologist) in the event that a SAR needs to be moved out of potential harm;</li><li>▪ Maintain a species observation log to track species observations during the construction / decommissioning phase of the project so that adaptive management can be applied based on species concentrations;</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR; and</li><li>▪ Reporting procedures (e.g., frequency to HIFN and EC-CWS).</li></ul></li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with possible species encounters.</li><li>• The following mitigation measures will be implemented with respect to the Environmental Monitor:<ul style="list-style-type: none"><li>▪ An Environmental Monitor will be on site during all construction activities;</li><li>▪ An Environmental Monitor will be present during all blasting activities (to review the site prior to and during blasting activities, and ensure compliance with the SAR Blasting Plan;</li><li>▪ Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements;</li><li>▪ Environmental Monitors will also complete daily, weekly and monthly monitoring of general and specific activities/measures (such as monitoring ecopassages and culverts to ensure that no debris is compromising their use, effectiveness of erosion and sedimentation control measures, fuel storage tanks etc.); and</li><li>▪ Environmental Monitors will also keep daily logs of their activities and note any non-compliance issues. Any non-compliance issues will be provided to the General Contractor for immediate follow-up.</li></ul></li></ul> <p><i>*Note: Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p> <p><i>**Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	<ul style="list-style-type: none"><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ Should any mortality occur outside in areas where speed bumps have not already been installed, consideration will be given to installing additional speed bumps or speed limit signs in the immediate vicinity of areas of SAR mortality.</li><li>▪ Should there be a SAR mortality, the related procedures that are followed will be reviewed and enhanced, if necessary, to provide further SAR protection.</li><li>▪ If any of the requirements or procedures of the Sighting Response Protocol related to staff understanding or implementation are not effective or appropriate for specific circumstances, the Environmental Team will discuss and revise the Protocol accordingly. The Environmental Team is made up of the environmental specialists from the General Contractor and HIW.</li></ul>
	<b>Operation</b> <ul style="list-style-type: none"><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>• Minimize habitat avoidance and /or noise disturbance to avian SAR.</li><li>• Minimize mortality of avian SAR.</li></ul>	<ul style="list-style-type: none"><li>• Utilize a lighting scheme that will minimize continuous lighting and the use of bright lights through the HIWEC to reduce confusion to bird SAR and minimize attraction to lit structures. Lighting scheme to include the following, where possible, while still fulfilling minimum Transport Canada requirements:<ul style="list-style-type: none"><li>▪ Implement red LED flashing lights on WTG;</li><li>▪ Light WTGs and permanent meteorological / communication towers to the minimum federal standards;</li><li>▪ Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction;</li><li>▪ Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum; and</li><li>▪ Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>• Implement a proactive approach to feathering WTG blades below the manufacturer's recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bird nesting season, from April 1 to August 31 (EC, 2014b). If this is not possible (e.g., hazard tree), the following mitigation will apply, in accordance with the <i>MBCA</i> and the Wildlife Management Plan:</li></ul>	<ul style="list-style-type: none"><li>• Conduct three (3) years of post-construction bird mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>▪ An end of year report, supplemented by an interim technical memo during the migratory / breeding bird season of each surveyed year, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bird mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Conduct the following post-construction bird disturbance monitoring for two (2) years:<ul style="list-style-type: none"><li>▪ Pre-construction breeding bird surveys completed in 2015, as well as 12 other representative sites at varying distances from the HIWEC location, will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.</li><li>▪ Pre-construction crepuscular bird surveys completed in 2015 will be repeated annually for two (2) years post-construction to</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>▪ Within complex habitats*, removal of all vegetation is proposed to occur outside the core bird nesting season of May 1 to July 28, when a minimum of 60% of nesting activity occurs in each of the three (3) habitat types, as per Environment Canada's Nesting Calendar for Zone C3 (EC, 2014b);</li><li>▪ Nest surveys will be conducted by a qualified Biologist in areas defined as simple habitat* immediately prior to vegetation clearing and will include searching around the general vicinity of areas proposed for vegetation clearing, including within 10 m. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001);</li><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity until a qualified Biologist has confirmed the nest is no longer active. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist (EC, 2014b), but will protect a minimum area of 10 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from nearby activities, such as vegetation clearing and heavy machinery or vehicle operation;</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked (EC, 2014b) and Universal Transverse Mercator (UTM) coordinates will be taken; and</li><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Clearly post speed limit signs along access roads (both 10 and 20 km/hr), install speed bumps within areas of concentrated wildlife activity, and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• During the breeding bird season (April 1 to August 31), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one of which will be trained to scan for bird SAR that may be on the road, and will use binoculars (when appropriate). The trained wildlife spotter will continually scan the access road ahead of the vehicle to ensure no bird SAR are roosting or nesting on the road or shoulder. If a bird SAR is identified on the road, the vehicle will immediately stop and will continue around the bird at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed.</li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with species that may be encountered.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ For animals in immediate danger, handling procedures will be established for site personnel in the event that a SAR needs to be moved out of potential harm (i.e. off a road);</li><li>▪ Maintain a species observation log to track species observations during the operational phase of the project so that adaptive management can be applied based on species concentrations;</li><li>▪ All operations staff will be required to report any bird SAR mortality or bird activity on roads to the appropriate staff; and</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li></ul></li><li>• The following mitigation measures regarding post-construction monitoring will be implemented:<ul style="list-style-type: none"><li>▪ Develop and implement a follow-up and monitoring plan as per Environment Canada guidelines which includes a post-construction bird mortality and disturbance monitoring program consistent with <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNRF, 2011a);</li><li>▪ Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis;</li><li>▪ Implement adaptive management techniques, such as operational mitigation as determined appropriate through post-construction monitoring; and</li><li>▪ Report confirmed Species at Risk mortalities during post-construction monitoring to HIFN and EC-CWS within 48 hrs of confirmed species identification.</li></ul></li></ul> <p><i>*Note: Complex habitats refer to habitats that contain a variety of individual nesting sites in a range of habitats. For instance, forest and shrub-dominated communities may contain nesting spots within the canopy, sub-canopy, shrub layer and ground layer, where identification of active nests may be difficult. Simple habitats refer to habitats that contain few likely nesting spots or a homogenous community where identification of active nests can be completed with confidence. For instance, open rock barrens or other sparsely vegetated habitats may be considered simple habitats, depending on site-specific vegetation cover.</i></p>	<p>ensure similar species abundance and diversity continue to be found in the HIWEC study area.</p> <ul style="list-style-type: none"><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bird disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li><li>• Conduct the post-construction bird disturbance monitoring for Kirtland's Warbler for three (3) years following the protocol for Monitoring Known Kirtland's Warbler Occurrences (Section 3.3) as described in the <i>Protocol for Searching and Monitoring Kirtland's Warbler in Canada</i> (Kirtland's Warbler Recovery Team 2010), if presence of this species is confirmed during the 2016 pre-construction surveys within the HIWEC study area.<ul style="list-style-type: none"><li>▪ If Kirtland's Warbler is not recorded during the first two (years) of post-construction monitoring, the third year of monitoring will not be completed;</li><li>▪ Results of the first two (2) years of post-construction monitoring for Kirtland's Warbler will be incorporated in the end of year report for the two (2) years of post-construction bird disturbance monitoring an annual basis as identified above. An additional standalone, end of year report will be provided to EC-CWS for the additional third year of monitoring for Kirtland's Warbler.</li></ul></li><li>• Daily monitoring of areas where active vegetation removal is occurring will be conducted by the Environmental Monitor.</li><li>• During the breeding bird season (April 1 to August 31), all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot bird SAR that may be on the road.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If mortality of Common Nighthawk is recorded during the three (3) years of post-construction mortality monitoring, adaptive management measures will be determined by a qualified avian Biologist and HIW (e.g., potential turbine curtailment at dusk and dawn during the breeding bird season for Common Nighthawk).</li><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ In the event that, after two (2) years, breeding bird and crepuscular surveys indicate notable changes in bird populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach. Specific details of the adaptive management framework will be developed in consultation with EC-CWS during the permitting phase and documented in the Environmental Protection Plan.</li><li>▪ Prune any tree limbs or roots using proper arboricultural techniques</li><li>▪ Any documented road mortality of a bird SAR will trigger consideration of contingency measures and adaptive management. The selected approach will be based on the specific circumstances that contributed to the observed impact on the species and will be determined by a qualified Biologist for the purpose of further mitigating against potential impacts to the species.</li><li>▪ Should any mortality occur in areas where speed bumps have not already been installed, consideration will be given to installing additional speed bumps or speed limit signs in the immediate vicinity of areas of SAR mortality.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
<p><b><u>Turtle SAR</u></b></p> <p><b>Blanding’s Turtle</b> (<i>Emydoidea blandingii</i>)</p> <p><b>Eastern Musk Turtle</b> (<i>Sternotherus odouratus</i>)</p>	<p><b>Construction / Decommissioning</b></p> <ul style="list-style-type: none"><li>• Habitat change, including possible damage or destruction of turtle SAR residences or turtle SAR habitat.</li><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>• Minimize loss and / or fragmentation of turtle SAR habitat.</li><li>• Minimize habitat avoidance and / or noise disturbance to turtle SAR.</li><li>• Avoid mortality of turtle SAR.</li></ul>	<ul style="list-style-type: none"><li>• If vegetation* is to be removed between June 1 and September 15 within those areas that provide confirmed and / or likely turtle nesting habitat (i.e., within sandy habitats, shorelines, soil-filled cracks in rock barren, or wetlands where turtle nesting activity has been observed or suitable habitat is within an area with concentrated turtle observations) and that are identified to be cleared for vegetation, the following will be adhered to:<ul style="list-style-type: none"><li>▪ Construction will avoid nesting areas where possible;</li><li>▪ In suitable nesting areas that are unavoidable, exclusionary fencing will be installed around the extent of the construction footprint that overlaps nesting habitat prior to the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.) to prevent turtle nesting activity prior to construction activities;</li><li>▪ Immediately prior to vegetation clearing between June 1 and September 15, a qualified Biologist will search the area to ensure no nests are present;</li><li>▪ In the rare case where construction was initially designed to avoid an area and exclusionary fencing had not been installed prior to the turtle nesting period, a qualified Biologist will complete area searches immediately prior to construction to identify any potential nesting areas and nesting activity during the turtle nesting / hatching period of June 1 to September 15 (GBBR, n.d.);</li><li>▪ If an active nest or confirmed nesting activity is found, a minimum buffer area of 30 m will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context, which will be confirmed by a qualified Biologist. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation.</li><li>▪ The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked and UTM coordinates will be taken. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation; and</li><li>▪ Once the Biologist has cleared the area, install turtle appropriate exclusionary fencing during construction / decommissioning within areas of concentrated turtle activity to limit road and construction-related mortality.</li></ul></li><li>• Construction activities will not occur within 30 m of any confirmed turtle nest during the period of June 1 to September 15 (GBBR n.d.).</li><li>• Immediately prior to vegetation clearing*, a qualified Biologist will conduct an area search of the proposed vegetation clearing area to ensure no turtle SAR are present;<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all turtles observed within the construction area during area searches and observe whether the individual(s) vacate the construction area. Should observed turtle(s) (except for nesting turtles) that are encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat at least 50 m, but less than 300 m to where they were found by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtle SAR considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat. All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li></ul></li><li>• Removal of natural vegetation within suitable turtle hibernating habitat (wetland and aquatic habitat) will be completed by hand from October 15 to April 30 (GBBR, n.d.), when feasible;</li><li>• If vegetation clearing must occur within suitable turtle hibernating habitat (wetland and aquatic habitat) through use of heavy machinery between October 15 to April 30 (GBBR, n.d.), best management practices for heavy machinery usage within wetlands will be used to reduce impact on overwintering turtles. Best management practices may include, but are not limited to, low ground pressure equipment, wide tires, rubberized tracks, swamp mats, lightweight equipment, varying paths (Wetland Stewardship Partnership, 2009), and low tire inflation pressure (Alakukku, <i>et al.</i> 2003); and</li><li>• Heavy machinery will be required to cross wetlands during the turtle hibernation period of October 15 to April 30 (GBBR, n.d.). Where these crossings are necessary, heavy machinery will cross at the most narrow crossing location (as deemed reasonable) or as close to the edge as possible within the construction footprint. Best management practices for heavy machinery use in wetlands will also be applied.</li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• The construction footprint will be micrositied within the larger permitted HIWEC location to construct project infrastructure, such as roads, away from SAR habitats and residences and complex habitats, where possible, by a qualified Biologist. If this is not possible, appropriate timing windows, clearing restrictions, and nest buffers will be applied (see above).</li><li>• Rehabilitation activities will be initiated within all temporary construction / decommissioning areas where suitable habitat for turtle SAR is affected to satisfy the habitat requirements (e.g., installation of artificial nesting structures) for these species within one (1) year of the completion of the construction / decommissioning phase. Although it is not possible to calculate the area of temporary disturbance associated with access roads due to micrositing and site-specific conditions, the temporary disturbance area associated with WTG construction / decommissioning is approximately 17.3 ha.</li><li>• Stockpile areas placed prior to June 30 (turtle egg laying period; GBBR, n.d.) will be assessed by a qualified Biologist to determine if they are suitable turtle nesting habitat, and exclusionary fencing will be installed where necessary. Stockpiles placed after June 30 do not require assessment or installation of exclusionary fencing as this is after the typical period for turtle egg laying.</li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during construction activities and conduct daily inspections during vegetation removal, dewatering and blasting, and as necessary during other activities to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• A qualified Biologist or trained Environmental Monitor will drive along the existing access roads and monitor for SAR each morning and afternoon. Should a SAR be encountered, steps outlined in the Sighting Response Protocol will be followed.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• If any confirmed, or suspected, turtle nests are identified within the vicinity of the HIWEC location, nest monitoring will be conducted twice per week during the construction and decommissioning phases to monitor the success of the nest and ensure its protection from construction impacts. Surveys will be completed during the turtle nesting / hatching season between June 1 and September 15.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• Visual inspections will occur prior to May 1 to ensure the construction nest site(s) is suitable for turtle nesting activity. If modifications are required, these will be completed prior to the nesting period (May 15-June 30).<ul style="list-style-type: none"><li>▪ To assess the use of the sites by turtles, monitoring of the nest sites will be completed through the use of strategically placed wildlife (game) cameras. These cameras should activated by a motion-sensor and be able to record still or video evidence during daylight or nighttime (i.e. infrared) hours. Cameras should be left in place for the entire period of May 1 to September 30, and data will be revised at a minimum of weekly during the nesting period (May 15-June 30) and monthly during the remainder of the monitoring season (July 1 to September 30).</li><li>▪ In the event that nesting activity is documented, EC-CWS will be engaged to determine whether additional efforts should be taken to protect nests from predation.</li><li>▪ Monitoring will begin at the installation of nesting sites and will continue until the completion of the third year that the HIWEC is operational.</li></ul></li><li>• Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids) prior to, during, and post completion of construction.</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• A minimum of 12 artificial nesting mounds within the HIWEC study area. Artificial nesting mounds will be created strategically throughout the site (without additional disturbance) by using a method developed by Paterson, <i>et al.</i> (2013) that combines a mixture of gravel (60%) and sand (40%) into a pile that is approximately 6 m across and 0.5 m high. Nest mounds will be preferentially placed within 100 m of a habitat that contains open aquatic features. Mounds will also be placed in areas where turtle observations have occurred on the same side of the access road as the open aquatic habitat. Specific mound sizes and locations will be developed through a more detailed site-specific evaluation of suitable habitat. Consideration will be given to ensure that nest mounds are not adversely impacting other important habitats. Artificial nest mounds will be created once appropriate equipment is able to reach the selected locations. As such, some road creation will be required prior to the implementation of artificial nest mounds.</li><li>• Develop and implement a SAR Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ No blasting will occur in wetland or open aquatic habitats;</li><li>▪ Blast mats will be used to control debris and sound generated from blasting;</li><li>▪ Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the active period for turtles (April 15 to September 30). If a turtle SAR is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtle SAR considered in this report (Milam and Melvin, 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat. All required permits under Section 73(2) of SARA will be obtained prior to handling SAR; and</li><li>▪ Follow proper drilling, explosive handling and loading procedures.</li></ul></li><li>• During the turtle hibernation period (October 15 to April 30; GBBR, n.d.) where dewatering activities may have an effect on hibernation habitat located within wetlands or aquatic features:<ul style="list-style-type: none"><li>▪ Area will be monitored to observe any drawdown; and</li><li>▪ If there is drawdown, stop construction work and determine mitigation appropriate to the site (i.e., redirect water, monitoring rain events) through discussions with a qualified Biologist and Hydrogeologist.</li></ul></li><li>• Water levels in wetlands or aquatic features adjacent to turtle hibernation sites (or if known to be hydrologically connected) will be taken prior to and during dewatering activities.</li><li>• Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine anticipated groundwater taking quantities, groundwater quality and predicted ZOI prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided, and may include where feasible:<ul style="list-style-type: none"><li>▪ Monitor surface water levels in potentially affected groundwater-dependent natural features prior-to and during dewatering activities and compare to site-specific thresholds and early warning indicators for water level drawdown;</li><li>▪ Monitor shallow groundwater levels and vertical hydraulic conductivity in potentially affected groundwater-dependent natural features, where installation of mini-piezometer devices is possible (e.g. areas with a minimum of 40 cm soil depth). Monitor groundwater levels prior-to and during dewatering and compare to site-specific thresholds for groundwater level drawdown;</li><li>▪ Visual inspection of vegetation health during construction; and</li><li>▪ In the event surface water levels and / or groundwater level drawdown exceeds established site-specific thresholds mitigation measures may include where appropriate the diversion of groundwater dewatering discharge to affected feature following appropriate water quality control (e.g. sediment tanks, filter bags, flow diversion, soaker hoses, etc.).</li></ul></li><li>• Limit duration of dewatering to as short a time frame as possible.</li><li>• Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls) under specific conditions, which will assist in stopping the infiltration of groundwater into the excavations.</li><li>• Ecopassages, or designated movement corridors, will be installed in areas of high turtle activity or abundance to limit road mortality, in areas where constructability allows the installation of these structures. Fourteen (14) ecopassages will be installed using large corrugated steel or box culverts designs. In addition, two (2) clear-span bridges will also be installed within the HIWEC study area to facilitate turtle movement between habitats without crossing over a road.</li><li>• Motion-sensor cameras will also be installed at each ecopassage to document the use of ecopassages by turtle SAR.</li><li>• Movement fencing will be installed on either side of the ecopassage, providing site-specific conditions allow installation, to encourage the use of the ecopassage. Chain-link fencing, in combination with geotextile fabric or wire meshing will be used to provide a barrier to juveniles, as this is the most effective type of movement fencing for turtles (McIntosh Perry, 2013). Fencing will be constructed to be 60 cm in height. An overhanging lip of 10-20 cm on the species side should be used to prevent turtles from climbing the fence. Fences should be installed with a turn-around at the ends to assist in redirecting turtles away from any fence openings. Curving the fence inward may help to reduce access to these locations. Fencing should be buried into the ground / soil mounded along bottom edge, where possible. If not possible, flush to the rock so that individuals can not fit underneath.</li></ul>	<ul style="list-style-type: none"><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages/designated movement corridors and turtle mortality rates.<ul style="list-style-type: none"><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) when construction is occurring.</li><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>▪ All construction staff will be required to report to the Environmental Monitor any turtle SAR mortality or turtle activity on roads, as per the Sighting Response Protocol.</li></ul></li><li>• With respect to the Sighting Response Plan, the Environmental Monitor to ensure the species observation log is kept up to date, procedures are followed and reporting is submitted to EC, as required.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If an active nest or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context which will be confirmed by a qualified Biologist but will be protected by a minimum of 30 m surrounding the nest. This minimum buffer is expected to provide protection of the nest from minor work, such as vegetation clearing, access road creation, and general heavy machinery usage or vehicle operation. The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation; however, the outer limits of the buffer can be marked and UTM coordinates will be taken.</li><li>▪ The nest itself will not be marked using flagging tape or other similar material as this increases the risk of nest predation, however the outer limits of the buffer can be marked and UTM co-ordinates will be taken. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation.</li><li>▪ If a turtle SAR is encountered during a pre-blast search, it will be relocated to an area of similar habitat at least 50 m, but less than 300m, from the area proposed for blasting by a trained turtle handler. A distance of 300 m represents the approximate distance of the home range of the turtle SAR considered in this report (Milam and Melvin 2001). In the unlikely event that similar habitat is not found within those parameters, the turtle will be relocated to the next closest location of similar habitat. All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li><li>▪ Repair any exclusionary fencing, movement fencing and /or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr) and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ Details on what to do if SAR are encountered: immediate stop in construction activity within 10 m of an observation of a SAR until a qualified Biologist can confirm the species has vacated the construction disturbance footprint. In lieu of calling a Biologist, work can be resumed after a 24 hr period if no evidence of the species exists within the immediate area of previous observation. If the species still exists within the immediate area after 24 hr, a qualified Biologist will contacted to provide appropriate direction;</li><li>▪ For animals in immediate danger, handling procedures will be established for designated personnel (i.e., Environmental Monitor, qualified Biologist) in the event that a SAR needs to be moved out of potential harm;</li><li>▪ Maintain a species observation log to track species observations during the construction / decommissioning phase of the HIWEC so that adaptive management can be applied based on species concentrations;</li><li>▪ All construction staff will be required to report to the Environmental Monitor any turtle SAR mortality or turtle activity on roads;</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR; and</li><li>▪ Reporting procedures (e.g., frequency to HIFN and EC-CWS).</li></ul></li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with possible species encounters.</li><li>• The following mitigation measures will be implemented with respect to the Environmental Monitor:<ul style="list-style-type: none"><li>▪ An Environmental Monitor will be on site during all construction activities;</li><li>▪ An Environmental Monitor will be present during all blasting activities (to review the site prior to and during blasting activities, and ensure compliance with the SAR Blasting Plan;</li><li>▪ Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements;</li><li>▪ Environmental Monitors will also complete daily, weekly and monthly monitoring of general and specific activities / measures (such as monitoring ecopassages and culverts to ensure that no debris is compromising their use, effectiveness of erosion and sedimentation control measures, fuel storage tanks etc.); and</li><li>▪ Environmental Monitors will also keep daily logs of their activities and note any non-compliance issues. Any non-compliance issues will be provided to the General Contractor for immediate follow-up.</li></ul></li></ul> <p><i>*Vegetation removal will be conducted utilizing a feller buncher where vegetation will be cut close to the root and laid down along the side of the removal area. Trees / shrubs will be de-limbed and hauled off-site on a skidder.</i></p>	<ul style="list-style-type: none"><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>▪ In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Contingency measures including but not limited to the rescue of stranded turtles will also be developed. A post-construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Any documented road mortality of a turtle SAR will trigger consideration of contingency measures and adaptive management. The selected approach will be based on the specific circumstances that contributed to the observed impact on the species and will be determined by a qualified Biologist for the purpose of further mitigating against potential impacts to the species.</li><li>▪ Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider retrofitting a road with an ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>▪ A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all construction buildings. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined.</li><li>▪ Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>▪ Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>▪ Should there be a SAR mortality, the related procedures that are followed will be reviewed and revised, if necessary, to provide SAR protection.</li><li>▪ If any of the requirements or procedures of the Sighting Response Plan related to staff understanding or implementation are not effective or appropriate for specific circumstances, the Environmental Team will discuss and revise the Protocol accordingly. The Environmental Team is made up of the environmental specialists from the General Contractor and HIW.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm or harassment)).</li></ul>	<ul style="list-style-type: none"><li>• Minimize habitat avoidance and / or noise disturbance to turtle SAR.</li><li>• Avoid mortality of turtle SAR.</li></ul>	<ul style="list-style-type: none"><li>• Periodically monitor (once in early spring after snow melt and once in summer / fall) to determine if any maintenance or repair is required at all installed ecopassages and repair accordingly to allow for movement corridors in areas where high turtle activity has been identified in order to limit road mortality.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Avoid grading as part of access road maintenance during the turtle nesting / hatching period (June 1 to September 15; GBBR, n.d.). If there are serious safety concerns or other circumstances where road maintenance may be required during this period, EC-CWS will be consulted prior to the activity taking place.</li><li>• Avoid maintenance of culverts where substrates at or below the frost line are disturbed during the turtle winter hibernation period (October 15 to April 30; GBBR, n.d.) to the extent possible where suitable turtle hibernation habitat within wetlands or aquatic features has been identified. If this is not possible, and under emergency circumstances, a contingency mitigation strategy will be developed in consultation with EC-CWS, which will include:<ul style="list-style-type: none"><li>▪ A qualified Biologist will be on site monitoring emergency maintenance activities should any hibernating turtle SAR be found; and</li><li>▪ In the unlikely case that a turtle is disturbed and brought out of hibernation, EC-CWS will be notified and the individual will be transported immediately to the nearest turtle trauma centre. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined. A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all operations buildings.</li></ul></li><li>• Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Restrict public use of access roads to minimize risk of road mortality and poaching through installation of electronic access gate in coordination with operations staff throughout the site. Security cameras at the entrance and any known turtle nesting sites will also be installed. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li><li>• A long-term anti-poaching strategy, including a communication protocol for detecting and reporting suspected poaching activity within HIWEC, will be developed as part of the SAR Management Plan.</li><li>• During the active turtle period (April 15 – September 30), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one (1) of which will be trained to scan for turtle SAR that may be on the road. The trained wildlife spotter will use binoculars (when appropriate) and will continually scan the access road ahead of the vehicle to ensure no turtle SAR are near or on the road. If a turtle SAR is identified on the road, the vehicle will immediately stop and will continue around the turtle at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed. All measures will be taken to ensure the safety of the turtle, which may include moving the turtle to a safe location off the road, and keeping vehicles at a safe distance to limit influence on natural movement behaviour.</li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with species that may be encountered.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ For animals in immediate danger, handling procedures will be established for site personnel in the event that a SAR needs to be moved out of potential harm (i.e. off a road);</li><li>▪ Maintain a species observation log to track species observations during the operational phase of the project so that adaptive management can be applied based on species concentrations;</li><li>▪ All operations staff will be required to report any turtle SAR mortality or turtle activity on roads to the appropriate staff; and</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li></ul></li><li>• Conduct the following post-construction monitoring to determine operational impacts, if any, on turtle SAR:<ul style="list-style-type: none"><li>▪ Two (2) years of post-construction turtle behaviour surveys;</li><li>▪ Prepare a two (2)-year report that will be provided to EC-CWS to determine if additional monitoring and / or mitigation measures are warranted; and</li></ul></li><li>• Report confirmed Species at Risk observed during post-construction monitoring to HIFN and EC-CWS.</li></ul>	<ul style="list-style-type: none"><li>• Pre-construction herpetofauna surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the HIWEC study area.<ul style="list-style-type: none"><li>▪ Turtle monitoring will be conducted following methodology used in pre-construction surveys unless otherwise required through consultation with the appropriate agencies.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo, on an annual basis for the two (2) years of post-construction herpetofauna surveys to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 for a minimum of two (2) years post-construction to monitor turtle mortality rates and the effectiveness of mitigation measures (e.g. ecopassages, speed limits, speed bumps and wildlife crossing signs). This monitoring period encompasses the period when the most vehicle activity will occur on site, albeit still relatively low traffic is expected.<ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high turtle activity.</li><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages.</li><li>▪ Motion-sensor cameras will be checked regularly during the active period for turtles (April 15 to September 30) for the first three (3) years that the HIWEC is operational.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo on an annual basis for the two (2) years of post-construction road mortality surveys.</li></ul></li><li>• During the active turtle period (April 15-Septmeber 30) all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot turtle SAR that may be on or near the road.</li><li>• Conduct inspections of ecopassages (once in early spring after snow melt and once in summer / fall) during road mortality surveys for a minimum of two (2) years post-construction.</li><li>• If any confirmed turtle nests are identified within the vicinity of the HIWEC Location, nest monitoring will be conducted twice times per week during the operational phase to monitor the success of the nest and ensure its protection from operational impacts. Surveys will be completed during the turtle nesting / hatching season between June 1 and September 15.</li><li>• With respect to the Sighting Response Plan, operations staff to ensure the species observation log is kept up to date and that procedures are followed.</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, post-construction herpetofauna surveys indicate notable changes in turtle populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li><li>▪ Any documented road mortality of a turtle SAR will trigger consideration of contingency measures and adaptive management.</li><li>▪ Analysis of road mortality surveys will determine high use areas and assist in identifying potential locations to consider installation of another ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, specific access roads will be restricted to essential vehicular traffic only. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on life cycle characteristics of the species of which the impact has occurred.</li><li>▪ Analysis of motion-detector camera monitoring of ecopassages will determine whether turtle SAR actively use ecopassages, and may identify locations where modification to culvert design is required.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the operational phase.</li><li>▪ If a nest is identified, it will not be marked using flagging tape or other similar material as this increases the risk of nest predation, however the UTM co-ordinates of the nest will be documented. Through consultation with EC-CWS, a protective cage may be placed over the nest to protect it from predation.</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR. Individuals will be handled by qualified Biologists.</li><li>▪ If any of the requirements or procedures of the Sighting Response Plan related to staff understanding or implementation are not effective or appropriate for specific circumstances, the operations staff will discuss</li></ul></li></ul>
<p><b><u>Snake SAR</u></b></p> <p><b>Eastern Foxsnake (Georgian Bay population)</b> (<i>Pantherophis gloydi</i> pop. 1)</p> <p><b>Eastern Hog-nosed Snake</b> (<i>Heterodon platirhinos</i>)</p> <p><b>Massasauga Rattlesnake (Great Lakes / St. Lawrence population)</b> (<i>Sistrurus catenatus</i> pop. 1)</p>	<p><b>Construction/Decommissioning</b></p> <ul style="list-style-type: none"><li>• Habitat change, including possible damage or destruction of snake SAR residences or snake SAR habitat.</li><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm or harassment).</li></ul>	<ul style="list-style-type: none"><li>• Minimize loss and / or fragmentation of snake SAR habitat.</li><li>• Minimize habitat avoidance and / or noise disturbance to snake SAR.</li><li>• Avoid mortality of snake SAR.</li></ul>	<ul style="list-style-type: none"><li>• During the active period for snakes, from April 15 to September 30 (GBBR, n.d.), a trained Rattlesnake Monitor will complete area searches immediately prior to vegetation removal and blasting to identify any snake SAR or snake activity.<ul style="list-style-type: none"><li>▪ Field crews will immediately stop work for all snakes observed within the construction area and observe whether the individual(s) vacate the construction area. Should observed snake(s) encountered within the construction area not vacate the construction area, they will be relocated to an area of similar habitat at least 50 m, but less than 300 m, from the area where the activity is occurring by a trained snake handler. In the unlikely event that similar habitat is not found within those parameters, the snake will be relocated to the next closest location of similar habitat.</li></ul></li><li>• Removal of all natural vegetation within suitable nesting habitats is proposed to occur outside the nesting / early neonate season of July 1 to October 15 (Ontario Nature, 2014; COSEWIC, 2008; GBBR, n.d.) within sandy habitats or shorelines.</li><li>• Removal of natural vegetation within suitable snake hibernation habitat (wetland habitat) will be completed by hand from October 15 to April 30 (GBBR, n.d.), when feasible.</li><li>• If vegetation clearing must occur within suitable snake hibernation habitat (wetland habitat) through the use of heavy machinery between October 15 to April 30 (GBBR, n.d.), best management practices for heavy machinery usage within wetlands will be used to reduce impact on overwintering snakes. Best management practices may include, but are not limited to, low ground pressure equipment, wide tires, rubberized tracks, swamp mats, lightweight equipment, varying paths (Wetland Stewardship Partnership, 2009), and low tire inflation pressure (Alakukku, <i>et al.</i> 2003).</li><li>• Heavy machinery will be required to cross wetlands during the snake hibernation period of October 15 to April 30 (GBBR, n.d.). Where these crossings are necessary, heavy machinery will cross that most narrow crossing location (as deemed reasonable) or as close to the edge as possible within the construction footprint. Best management practices for heavy machinery use in wetlands will also be applied.</li><li>• Minimize vegetation removal and limit to within the identified construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each</li></ul>	<ul style="list-style-type: none"><li>• An Environmental Monitor will be on site during all construction activities. Additional Environmental Monitors (e.g., Rattlesnake Monitors) will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• A qualified Biologist or trained Environmental Monitor will drive along the existing access roads and monitor for SAR each morning and afternoon. Should a SAR be encountered, steps outlined in the Sighting Response Protocol will be followed.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p>provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</p> <ul style="list-style-type: none"><li>• The construction footprint will be micrositied within the larger permitted HIWEC location to construct project infrastructure, such as roads, away from SAR habitats and residences and complex habitats, where possible, by a qualified Biologist. If this is not possible, appropriate timing windows and clearing restrictions will be applied (see above).</li><li>• Where possible, avoid construction activities within the boundaries of suitable nesting habitat for Eastern Hog-nosed Snake.</li><li>• Site transmission line poles outside the boundaries of suitable nesting habitat for Eastern Hog-nosed Snake, if possible.</li><li>• Rehabilitation activities will be initiated within all temporary construction / decommissioning areas where suitable habitat for snake SAR is affected to satisfy the habitat requirements (e.g.; pile of blast rock, artificial gestation / hibernation structures may be created on site) for these species within one (1) year of the completion of the construction / decommissioning phase. Although it is not possible to calculate the area of temporary disturbance associated with access roads due to micrositing and site-specific conditions, the temporary disturbance area associated with WTG construction / decommissioning is approximately 17.3 ha.</li><li>• A minimum of 24 gestation sites for Massasauga Rattlesnake and ten (10) hibernation sites for Eastern Hog-nosed Snake and Eastern Foxsnake will be established throughout the HIWEC study area. Although preference will be for these habitats to be located away from access roads, consideration will be given to the potential disturbance associated with using machinery to transport the rock. Each location will be placed within 1 km of a habitat suitable for hibernation and gestation sites, and locations will be preferentially chosen to occur in areas where potential hibernation / gestation sites were removed during construction. Where reasonable, created gestation sites will be on the same side of the HIWEC infrastructure as the hibernation habitat to limit the need for the individuals to occur around HIWEC infrastructure.<ul style="list-style-type: none"><li>▪ HIW will utilize blast rocks to create suitable gestation, basking, and retreat sites for Massasauga Rattlesnake;</li><li>▪ Artificial snake hibernacula will be constructed in a south-facing, well-drained area (Long Point Land Trust, n.d.; USFWS, 2006); and</li><li>▪ Artificial hibernacula will consist of a large hole / pit dug to below the frost line and within approximately 2 m of the water table. The hole will be then filled with layers of rubble (rocks, concrete rubble, timber, bricks) and placed in such a way to create multiple chambers at various depths wherein snakes can hibernate (Long Point Land Trust, n.d.; USFWS, 2006).</li><li>▪ Brush piles will also be placed around the edge of the created artificial hibernaculas.</li></ul></li><li>• During the snake hibernation period (October 15 to April 30; GBBR, n.d.) where dewatering activities may have an effect on hibernation habitat located within wetlands or aquatic features:<ul style="list-style-type: none"><li>▪ Area will be monitored to observe any drawdown; and</li><li>▪ If there is drawdown, stop construction work and determine mitigation appropriate to the site (i.e., redirect water, monitoring rain events) through discussions with a qualified Biologist and Hydrogeologist.</li></ul></li><li>• Water levels in wetlands or aquatic features adjacent to snake hibernation sites (or if known to be hydrologically connected) will be taken prior to and during dewatering activities.</li><li>• Conduct a Detailed Water Taking Assessment based on geotechnical investigation results to determine anticipated groundwater taking quantities, groundwater quality and predicted ZOI prior to construction. Based on this assessment site-specific mitigation measures and a monitoring program for groundwater dependent natural features within the anticipated ZOI will be provided, and may include where feasible:<ul style="list-style-type: none"><li>▪ Monitor surface water levels in potentially affected groundwater-dependent natural features prior-to and during dewatering and compare to site-specific thresholds and early warning indicators for water level drawdown;</li><li>▪ Monitor shallow groundwater levels and vertical hydraulic conductivity in potentially affected groundwater-dependent natural features, where installation of mini-piezometer devices is possible (e.g. areas with a minimum of 40 cm soil depth). Monitor groundwater levels prior-to and during dewatering and compare to site-specific thresholds for groundwater level drawdown;</li><li>▪ Visual inspection of vegetation health during construction; and</li><li>▪ In the event surface water levels and / or groundwater level drawdown exceeds established site-specific thresholds mitigation measures may include where appropriate the diversion of groundwater dewatering discharge to affected feature following appropriate water quality control (e.g. sediment tanks, filter bags, flow diversion, soaker hoses, etc.).</li></ul></li><li>• Limit duration of dewatering to as short a time frame as possible.</li><li>• Limit dewatering quantities by implementing targeted groundwater cut-offs (i.e., slurry trench walls), under specific conditions, which will assist in stopping the infiltration of groundwater into the excavations.</li><li>• Develop and implement a SAR Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>▪ Blasting will only occur in areas that have already been cleared of vegetation;</li><li>▪ Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>▪ No blasting will occur in wetland or open aquatic habitats;</li><li>▪ Blast mats will be used to control debris and sound generated from blasting;</li><li>▪ Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the active period for snakes (April 15 to September 30). If a snake SAR is encountered during a pre-blast search, it will be relocated to an</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• Visual inspections will occur prior to May 1 to ensure the constructed gestation or hibernacula sites are suitable for snake nesting activity. If modifications are required, these will be completed prior to the nesting period (May 15-June 30).</li><li>• Water levels of wetlands or aquatic features experiencing dewatering activities will be monitored to observe any drawdown. Monitoring will include taking pre-, during and post-dewatering levels at the feature.</li><li>• Develop and implement a detailed monitoring program to effectively assess impacts to wetlands through monitoring wells installed as required in accordance with the Detailed Water Taking Assessment, within the predicted ZOI for changes in wetland water level and / or water quality (i.e. suspended solids) prior to, during, and post completion of construction.</li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 during the construction and decommissioning phases to monitor the effectiveness of ecopassages / designated movement corridors and snake mortality rates.<ul style="list-style-type: none"><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages. Motion-sensor cameras will be checked regularly during the active period for snakes (April 15 to September 30) when construction is occurring.</li><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high snake activity.</li><li>▪ All construction staff will be required to report to the Environmental Monitor any snake SAR mortality or snake activity on roads, as per the Sighting Response Protocol.</li></ul></li><li>• With respect to the Sighting Response Protocol, the Environmental Monitor to ensure the species observation log is kept up to date, procedures are followed and reporting is submitted to EC, as required.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ If snake SAR are encountered during a pre-work search, work will be immediately stopped until a trained snake handler can relocate the snake to an area of similar habitat at least 50m, but less than 300m, from the area where the activity is occurring. A distance of 300m is well within the home range of the snake SAR considered in this report (Rowell 2012, COSEWIC 2008b, Parks Canada Agency 2013). In the unlikely event that similar habitat is not found within those parameters, the snake will be relocated to the next closest location of similar habitat.</li><li>▪ Repair any exclusionary fencing, movement fencing and /or barrier fencing / boundary materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff, or construction personnel.</li><li>▪ Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<p>area of similar habitat at least 50 m, but less than 300 m, from the area proposed for blasting. In the unlikely event that similar habitat is not found within those parameters, the snake will be relocated to the next closest location of similar habitat; and</p> <ul style="list-style-type: none"><li>▪ Follow proper drilling, explosive handling and loading procedures.</li><li>• Ecopassages, or designated movement corridors, will be installed in areas of high snake activity or abundance to limit road mortality, in areas where constructability allows the installation of these structures. Fourteen (14) ecopassages will be installed using large corrugated steel or box culverts designs. In addition, two (2) clear-span bridges will also be installed within the HIWEC study area to facilitate snake movement between habitats without crossing over a road.</li><li>• Motion-sensor cameras will also be installed at each ecopassage to document the use of ecopassages by snake SAR.</li><li>• Movement fencing will be installed on either side of the ecopassage, providing site-specific conditions allow installation, to encourage the use of the ecopassage by snake SAR. Chain-link fencing, in combination with geotextile fabric or wire meshing will be used (McIntosh Perry, 2013). Fencing will be constructed to be 60 cm in height. An overhanging lip of 10-20 cm on the species side should be used to prevent snakes from climbing the fence. Fences should be installed with a turn-around at the ends to assist in redirecting snakes away from any fence openings. Curving the fence inward may help to reduce access to these locations. Fencing should be buried into the ground / soil mounded along bottom edge where possible. If not possible, flush to the rock so that individuals can not fit underneath.</li><li>• Install exclusionary fencing around the extent of the construction footprint that is adjacent to concentrated Massasauga activity during construction / decommissioning within areas (where feasible), to limit road and construction-related mortality.</li><li>• All construction vehicles and equipment that are parked overnight or left idle for over 1 hour within the HIWEC study area between April 1 and November 30 will be surveyed for the presence of snakes before ignition.</li><li>• Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Clearly post speed limit and wildlife crossing signs along access roads (20 km/hr) and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ Details on what to do if SAR are encountered: immediate stop in construction activity within 10 m of an observation of a SAR until a qualified Biologist can confirm the species has vacated the construction disturbance footprint. In lieu of calling a Biologist, work can be resumed after a 24 hr period if no evidence of the species exists within the immediate area of previous observation. If the species still exists within the immediate area after 24 hr, a qualified Biologist will contacted to provide appropriate direction;</li><li>▪ For animals in immediate danger, handling procedures will be established for designated personnel (i.e., Environmental Monitor, qualified Biologist) in the event that a SAR needs to be moved out of potential harm;</li><li>▪ Maintain a species observation log to track species observations during the construction / decommissioning phase of the HIWEC so that adaptive management can be applied based on species concentrations;</li><li>▪ All construction staff will be required to report to the Environmental Monitor any snake SAR mortality or snake activity on roads;</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR; and</li><li>▪ Reporting procedures (e.g., frequency to HIFN and EC-CWS).</li></ul></li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with possible species encounters.</li><li>• The following mitigation measures will be implemented with respect to the Environmental Monitor:<ul style="list-style-type: none"><li>▪ An Environmental Monitor will be on site during all construction activities;</li><li>▪ An Environmental Monitor will be present during all blasting activities (to review the site prior to and during blasting activities, and ensure compliance with the SAR Blasting Plan;</li><li>▪ Additional Environmental Monitors (e.g., Rattlesnake Monitors) will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements;</li><li>▪ Environmental Monitors will also complete daily, weekly and monthly monitoring of general and specific activities/measures (such as monitoring ecopassages and culverts to ensure that no debris is compromising their use, effectiveness of erosion and sedimentation control measures, fuel storage tanks etc.); and</li><li>▪ Environmental Monitors will also keep daily logs of their activities and note any non-compliance issues. Any non-compliance issues will be provided to the General Contractor for immediate follow-up.</li></ul></li></ul>	<ul style="list-style-type: none"><li>▪ If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction/ decommissioning phase.</li><li>▪ If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>▪ If modifications to created gestation sites are required as identified through visual inspections, these will be completed prior to the nesting period (May 15-June 30).</li><li>▪ If there is drawdown, stop construction work and confirm that the drawdown is due to dewatering. If this is confirmed, then determine mitigation appropriate to the site (e.g., redirect water or monitor rain events to see if water will be replenished) through discussions with a qualified Biologist and Hydrogeologist.</li><li>▪ In the event of a reduction in wetland water level and / or water quantity (i.e. suspended solids), corrective measures will be undertaken in accordance with the recommendations of the Detailed Water Taking Assessment. Contingency measures including but not limited to rescue of stranded wildlife will also be developed. A post construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Contingency measures including but not limited to the rescue of stranded wildlife will also be developed. A post-construction monitoring program will be implemented to evaluate the effectiveness of mitigation measures.</li><li>▪ Any documented road mortality of a snake SAR will trigger consideration of contingency measures and adaptive management. The selected approach will be based on the specific circumstances that contributed to the observed impact on the species and will be determined by a qualified Biologist for the purpose of further mitigating against potential impacts to the species.</li><li>▪ Analysis of road mortality surveys, as well as Species Encounter Reports will determine high use areas and assist in identifying potential locations to consider installing an additional ecopassage, speed bump, or wildlife crossing sign.</li><li>▪ If road mortality is noted, consideration will be given to closing specific access road segments to all non-essential vehicular traffic. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on the specific circumstances under which the impact has occurred.</li><li>▪ If a mortality of Eastern Foxsnake is observed, movement fencing will be increased to 200 cm in height to prohibit Eastern Foxsnake from gaining access to the road (MNRF, 2013).</li><li>▪ Signage will be considered to raise awareness and alert vehicle drivers that wildlife may be crossing the road using wildlife crossing signs. If implemented, signage will be placed at least 10 m from the ecopassage openings to maintain the natural appearance.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the construction phase.</li><li>▪ Additional site-specific mitigation measures may be identified through ongoing analysis of monitoring results and will be considered in an adaptive management approach in consultation with EC-CWS.</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>▪ Should there be a SAR mortality, the related procedures that are followed will be reviewed and revised, if necessary, to provide SAR protection.</li><li>▪ If any of the requirements or procedures of the Sighting Response Plan related to staff understanding or implementation are not effective or appropriate for specific circumstances, the Environmental Team will discuss and revise the Protocol accordingly. The Environmental Team is made up of the environmental specialists from the General Contractor and HIW.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>• Minimize habitat avoidance and / or noise disturbance to snake SAR.</li><li>• Avoid mortality of snake SAR.</li></ul>	<ul style="list-style-type: none"><li>• Periodically monitor (once in early spring after snow melt and once in summer / fall) to determine if any maintenance or repair is required at all installed ecopassages and repair accordingly to allow for movement corridors in areas where high snake activity has been identified in order to limit road mortality.</li><li>• Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>• Avoid maintenance of culverts where substrates at or below the frost line are disturbed during the snake winter hibernation period (October 15 to April 30; GBBR, n.d.) to the extent possible where suitable snake hibernation habitat within wetlands or aquatic features has been identified. If this is not possible, and under emergency circumstances, a contingency mitigation strategy will be developed in consultation with EC-CWS, which will include:<ul style="list-style-type: none"><li>▪ A qualified Biologist will be on site monitoring emergency maintenance activities should any hibernating snake SAR be found; and</li><li>▪ In the unlikely case that a snake is disturbed and brought out of hibernation, EC-CWS will be notified and the individual will be transported immediately to the nearest turtle trauma centre. Through the permitting process, alternative wildlife trauma centres and / or rehabilitation centres closer to the HIWEC will be examined. A map and directions to the nearest turtle trauma centre and wildlife rehabilitation centre will be posted in all operations buildings.</li></ul></li><li>• Maintain speed limit (both 10 and 20 km/hr), wildlife crossing signs, and speed bumps installed along access roads and instruct all staff to be vigilant for wildlife while driving on site.</li><li>• Restrict public use of access roads to minimize risk of road mortality through installation of electronic access gate in coordination with operations staff throughout the site. It is the intent of HIFN to regulate the use of the HIWEC and HIFN I.R. #2 by members of HIFN and non-members. Gates will be installed at the entrances to the HIWEC and patrolling will be conducted. Currently, the site is monitored by HIFN and the MNRF.</li><li>• During the active snake period (April 15 – September 30), all maintenance and biological crews (which will encompass the vast majority of vehicle traffic on access roads) will consist of two (2) people, one (1) of which will be trained to scan for snake SAR that may be on the road. The trained wildlife spotter will use binoculars (when appropriate) and will continually scan the access road ahead of the vehicle to ensure no snake SAR are near or on the road. If a snake SAR is identified on the road, the vehicle will immediately stop and will continue around the snake at a very low speed (e.g. less than 5 km/h), if there is enough room to safely proceed. All measures will be taken to ensure the safety of the snake, which may include moving the snake to a safe location off the road, and keeping vehicles at a safe distance to limit influence on natural movement behaviour.</li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with species that may be encountered.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ For animals in immediate danger, handling procedures will be established for site personnel in the event that a SAR needs to be moved out of potential harm (i.e. off a road);</li><li>▪ Maintain a species observation log to track species observations during the operational phase of the project so that adaptive management can be applied based on species concentrations;</li><li>▪ All operations staff will be required to report any snake SAR mortality or snake activity on roads to the appropriate staff; and</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li></ul></li><li>• Conduct the following post-construction monitoring to determine operational impacts, if any, on snake SAR:<ul style="list-style-type: none"><li>▪ Two (2) years of post-construction snake behaviour surveys;</li><li>▪ Prepare a two (2)-year report that will be provided to EC-CWS to determine if additional monitoring and / or mitigation measures are warranted; and</li></ul></li><li>• Report confirmed Species at Risk observed during post-construction monitoring to HIFN and EC-CWS.</li></ul>	<ul style="list-style-type: none"><li>• Pre-construction herpetofauna surveys completed in 2015 will be repeated annually for two (2) years post-construction to ensure similar species abundance and diversity continue to be found in the areas of the HIWEC study area.<ul style="list-style-type: none"><li>▪ Snake monitoring will be conducted following methodology used in 2015 pre-construction surveys unless otherwise required through consultation with the appropriate agencies.</li><li>▪ Each created gestation or hibernacula site will be added as a snake monitoring location and will be assessed following the same methods, frequency and for the same duration as identified above.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo, on an annual basis for the two (2) years of post-construction herpetofauna surveys to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>• Road mortality surveys will be conducted twice a week from April 1 to October 31 for a minimum of two (2) years post-construction to monitor snake mortality rates and the effectiveness of mitigation measures (e.g. ecopassages, speed limits, speed bumps and wildlife crossing signs).<ul style="list-style-type: none"><li>▪ These surveys will consist of a combination of incidental observations while driving along access roads and targeted walking surveys at areas of high snake activity.</li><li>▪ In combination with road mortality surveys, motion-sensor cameras will be installed within each ecopassage in an effort to quantify movement activities and species use of the ecopassages.</li><li>▪ Motion-sensor cameras will be checked regularly during the active period for snakes (April 15 to September 30) for the first three (3) years that the HIWEC is operational.</li><li>▪ An end of year report will be provided to EC-CWS, supplemented by an interim technical memo on an annual basis for the two (2) years of post-construction road mortality surveys.</li></ul></li><li>• During the active snake period (April 15-Septmeber 30) all maintenance and biological crews will consist of two (2) people, one (1) of which will be trained to spot snake SAR that may be on or near the road.</li><li>• Conduct inspections of ecopassages (once in early spring after snow melt and once in summer / fall) during road mortality surveys for a minimum of two (2) years post-construction.</li><li>• With respect to the Sighting Response Plan, operations staff to ensure the species observation log is kept up to date and that procedures are followed.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, herpetofauna surveys indicate notable changes in snake populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted.</li><li>▪ Any documented road mortality of a snake SAR will trigger consideration of contingency measures and adaptive management.</li><li>▪ Analysis of road mortality surveys will determine high use areas and assist in identifying potential locations to consider installation of another ecopassage, speed bump, or wildlife crossing sign.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>▪ If road mortality is noted, specific access roads will be restricted to essential vehicular traffic only. Essential vehicular traffic will include any traffic required to meet permitting obligations or maintain infrastructure in good working order. The duration of access road closure will be determined by a qualified Biologist and will be based on life cycle characteristics of the species of which the impact has occurred.</li><li>▪ Analysis of motion-detector camera monitoring of ecopassages will determine whether snake SAR actively use ecopassages, and may identify locations where modification to culvert design is required.</li><li>▪ Reduced speed limits will be considered in any area where road mortality is apparent or in other areas identified as high-use through observations during the operational phase.</li><li>▪ Implement an adaptive management plan in the event of snake SAR mortality on access roads, which may include additional restrictions on use of access roads during sensitive timing windows, or the installation of traffic control measures or ecopassages in specific areas. The details of the adaptive management framework will be developed in consultation with EC-CWS.</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR. Individuals will be handled by qualified Biologists.</li><li>▪ If any of the requirements or procedures of the Sighting Response Plan related to staff understanding or implementation are not effective or appropriate for specific circumstances, the operations staff will discuss and revise the Protocol accordingly.</li></ul>
<p><b>Bat SAR</b></p> <p><b>Little Brown Bat</b> (<i>Myotis lucifugus</i>)</p> <p><b>Northern Myotis</b> (<i>Myotis septentrionalis</i>)</p> <p><b>Tri-colored Bat</b> (<i>Perimyotis subflavus</i>)</p>	<p><b>Construction/ Decommissioning</b></p> <ul style="list-style-type: none"><li>• Habitat change, including possible damage or destruction of bat SAR residences or bat SAR habitat.</li><li>• Changes in behaviour, due to disturbance of SAR.</li><li>• Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>• Minimize loss and / or fragmentation of bat SAR habitat.</li><li>• Minimize habitat avoidance and / or noise disturbance to bat SAR.</li><li>• Avoid mortality of bat SAR.</li></ul>	<ul style="list-style-type: none"><li>• Any trees proposed for removal and any suitable rock crevices in areas proposed for blasting during the bat roosting season (April 30 to September 1) will be searched for signs of maternity roosts by a qualified Biologist prior to any construction activities that may affect the habitat.<ul style="list-style-type: none"><li>▪ Searches will initially consist of visual scans of the habitat for signs of use to determine the likelihood of occupancy.</li><li>▪ If habitat assessments confirm that a site is being used, or likely being used, evening exit surveys will be completed to confirm whether individuals are actively using a particular site.</li><li>▪ If an active roost site is found within the construction footprint:<ul style="list-style-type: none"><li>▪ A minimum buffer of 10 m will be implemented around the site. The radius of the buffer will range depending on the species, type of roosting (bachelor or day roosting versus maternity roosting), level of disturbance and landscape context, which will be confirmed by a qualified Biologist experienced in bat ecology. The UTM of the roost location will be recorded, and the limits of the buffer area will be clearly identified.</li><li>▪ Since roost locations regularly move within a season, the removal of trees or blasting can occur once a qualified Biologist provides confirmation that the roost site is no longer being used, providing that disturbance activities occur within 24 hrs as to not allow for re-occupation of the habitat.</li><li>▪ If habitat assessments and / or exit surveys indicate a site is not being used, there is no restriction on proposed activity.</li></ul></li></ul></li><li>• Minimize vegetation removal and limit to within the construction footprint. The construction footprint will be clearly defined prior to vegetation removal. Delineation will be in the form of flagging tape, wooden stakes and / or silt fence barriers that will each provide clear identification of the construction limits. With respect to the latter (silt fence barriers), these will be implemented if sedimentation control is also required.</li><li>• The construction footprint will be micrositied within the larger permitted HIWEC location to construct project infrastructure, such as roads, away from SAR habitats and residences and complex habitats, where possible, by a qualified Biologist. If this is not possible, appropriate timing windows and clearing restrictions will be applied (see above).</li><li>• To prevent the spread of White Nose Syndrome, construction vehicles are to remain within the existing access routes and construction areas.</li><li>• Rehabilitation will be initiated within all temporary construction / decommissioning areas as appropriate to the type of habitat that was removed (e.g., replant forested areas using native stock) within one (1) year of the completion of the construction / decommissioning phase. Although it is not possible to calculate the area of temporary disturbance associated with access roads due to micrositing and site-specific conditions, the temporary disturbance area associated with WTG construction / decommissioning is approximately 17.3 ha.</li></ul>	<ul style="list-style-type: none"><li>• The Environmental Monitor will be on-site during all construction activities and conduct daily inspections during key construction activities, such as vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements.</li><li>• An Environmental Monitor will be present during key blasting activities (to review the site prior to blasting activities, prior to blasting and during blasting) to ensure compliance with the Blasting Plan.</li><li>• Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Regular Environmental Monitoring and routine inspections will be undertaken to ensure vegetation removal occurs within the delineated construction footprint.</li><li>• A qualified Biologist or trained Environmental Monitor will drive along the existing access roads and monitor for SAR each morning and afternoon. Should a SAR be encountered, steps outlined in the Sighting Response Protocol will be followed.</li><li>• Confirmation of delineation of the construction footprint will be completed by the Environmental or Engineering Monitor as per construction drawings.</li><li>• Monitoring of the rehabilitation activities will be completed annually for the first three (3) years between July and September to confirm vegetation has established.</li><li>• With respect to the Sighting Response Plan, the Environmental Monitor to ensure the species observation log is kept up to date, procedures are followed and reporting is submitted to EC-CWS, as required.</li><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ Repair any barrier fencing / boundary delineation materials, if damaged or otherwise not functioning properly, as identified by the Environmental Monitor, project staff or construction personnel.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>Following the construction phase, erect a minimum of ten (10) artificial roosting structures within the HIWEC study area, which may include bat houses and / or artificial bark. The number of artificial roosting structures should equal the number of cavity trees removed up to a maximum of 30 structures. The location of artificial roosting structures will be preferentially chosen for areas away from operational WTGs, but may include locations around the substation, along portions of the access road, or in other areas of the Project Area away from any infrastructure. Specific locations will be determined in consultation with EC. Suitable off-site locations will also be considered, such as other Reserve Lands or through collaborations with Ontario Parks or other conservation organizations.</li><li>Develop and implement a SAR Blasting Plan, that might include, but will not be limited to:<ul style="list-style-type: none"><li>Blasting will only occur in areas that have already been cleared of vegetation;</li><li>Where feasible, the construction footprint will be micrositied to select areas where blasting is not required.</li><li>No blasting will occur in wetland or open aquatic habitats;</li><li>Blast mats will be used to control debris and sound generated from blasting;</li><li>Pre-blast species searches will be completed by a qualified Biologist prior to any blasting activity that occurs during the bat roosting season (April 30 to September 1) to ensure no bat SAR are present; and</li><li>Follow proper drilling, explosive handling and loading procedures.</li></ul></li><li>Conduct construction and decommissioning activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li><li>Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>Details on what to do if SAR are encountered: immediate stop in construction activity within 10 m of an observation of a SAR until a qualified Biologist can confirm the species has vacated the construction disturbance footprint. In lieu of calling a Biologist, work can be resumed after a 24 hr period if no evidence of the species exists within the immediate area of previous observation. If the species still exists within the immediate area after 24 hr, a qualified Biologist will be contacted to provide appropriate direction;</li><li>For animals in immediate danger, handling procedures will be established for designated personnel (i.e., Environmental Monitor, qualified Biologist) in the event that a SAR needs to be moved out of potential harm;</li><li>Maintain a species observation log to track species observations during the construction / decommissioning phase of the HIWEC so that adaptive management can be applied based on species concentrations;</li><li>All required permits under Section 73(2) of SARA will be obtained prior to handling SAR; and</li><li>Reporting procedures (e.g., frequency to HIFN and EC-CWS).</li></ul></li><li>Post SAR Fact Sheets in areas where on-site staff can become familiar with possible species encounters.</li><li>The following mitigation measures will be implemented with respect to the Environmental Monitor:<ul style="list-style-type: none"><li>An Environmental Monitor will be on site during all construction activities;</li><li>An Environmental Monitor will be present during all blasting activities (to review the site prior to and during blasting activities, and ensure compliance with the SAR Blasting Plan;</li><li>Additional Environmental Monitors will be present during key construction activities including vegetation removal, dewatering and blasting, and as required to ensure compliance with environmental requirements;</li><li>Environmental Monitors will also complete daily, weekly and monthly monitoring of general and specific activities/measures (such as monitoring ecopassages and culverts to ensure that no debris is compromising their use, effectiveness of erosion and sedimentation control measures, fuel storage tanks etc.); and</li></ul></li><li>Environmental Monitors will also keep daily logs of their activities and note any non-compliance issues. Any non-compliance issues will be provided to the General Contractor for immediate follow-up.</li></ul>	<ul style="list-style-type: none"><li>Prune any perimeter tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to EC-CWS.</li><li>If any accidental damage to habitat occurs, rehabilitation will be initiated, as appropriate to the type of habitat that was accidentally removed, within one (1) year of the completion of the construction / decommissioning phase.</li><li>If, after three (3) years, vegetation has not established, additional rehabilitation activities will be undertaken in areas that remain deficient of established vegetation.</li><li>If any of the requirements or procedures related to staff understanding or implementation are not effective or appropriate for specific circumstances, the Environmental Team will discuss and revise the Protocol accordingly. The Environmental Team is made up of the environmental specialists from the General Contractor and HIW.</li></ul>
	<p><b>Operation</b></p> <ul style="list-style-type: none"><li>Changes in behaviour, due to disturbance of SAR.</li><li>Changes in mortality (including harm and harassment).</li></ul>	<ul style="list-style-type: none"><li>Minimize habitat avoidance and /or noise disturbance to bat SAR.</li><li>Minimize mortality of bat SAR.</li></ul>	<ul style="list-style-type: none"><li>Utilize a lighting scheme that will minimize continuous lighting and the use of bright lights throughout the HIWEC to minimize attraction of bat SAR to lit structures (Rydell, 1992). Lighting scheme to include the following, where possible, while still fulfilling minimum Transport Canada requirements:<ul style="list-style-type: none"><li>Implement red LED flashing lights on WTGs.</li><li>Light WTGs and permanent meteorological / communication towers to the minimum federal standards.</li><li>Ground-level lights (i.e. buildings, WTG bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction.</li><li>Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum.</li><li>Any internal nacelle lighting will only be used when occupied.</li></ul></li><li>Implement a proactive approach to feathering WTG blades below the manufacturer's recommended cut-in speed. Feathering refers to the act of pitching WTG blades by 90°, parallel to the wind or turning the WTG nacelle so that the blades are facing away from the wind.</li><li>Conduct maintenance activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible.</li></ul>	<ul style="list-style-type: none"><li>Conduct three (3) years of post-construction bat mortality monitoring as described in the EEMP.<ul style="list-style-type: none"><li>An end of year report, supplemented by an interim technical memo, outlining the methods employed and the results of monitoring will be prepared and submitted to EC-CWS on an annual basis for the three (3) years of bat mortality monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul></li><li>Monitoring as part of the Operational Mitigation Plan will occur at a minimum frequency of monthly visits to each WTG, from May to September for the first three (3) years that the HIWEC is operational and every five (5) years thereafter.</li><li>Pre-construction bat acoustic monitoring surveys completed in 2011 will be repeated annually for two (2) years post-construction to</li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
			<ul style="list-style-type: none"><li>• Vegetation trimming will be limited to areas that have been previously cleared during construction.</li><li>• Schedule trimming of any necessary vegetation removal during routine maintenance activities to occur outside of the overall bat roosting season, from April 30 to September 1. If any trees must be trimmed during the bat roosting season (April 30 to September 1) during the operation of the project, each tree will be searched for signs of maternity roosts by a qualified Biologist prior to vegetation maintenance. If an active maternity roost is found, removal activities will be scheduled after the bat roosting season (April 30 to September 1) or once a qualified biologist has confirmed the tree is no longer being actively used as a roost.<ul style="list-style-type: none"><li>▪ If an active roost site is found, a buffer area will be implemented around the site. The radius of the buffer will vary depending on the species, type of roosting (bachelor or day roosting versus maternity roosting), level of disturbance and landscape context, which will be confirmed by a qualified Biologist experienced in bat ecology. The buffer will have a minimum radius of 10 m and will be applied only when bats are present at the roost site. This minimum buffer is expected to provide protection of the roost site from minor work, such as vegetation clearing and general heavy machinery usage or vehicle operation.</li><li>▪ The UTM of the roost location will be recorded, and the limits of the buffer area will be clearly identified. If the qualified Biologist confirms that no bats are using the roost site, vegetation removal can proceed.</li></ul></li><li>• If any suitable hazard tree, such as a tree which poses an immediate safety risk to individuals and / or a risk to the functionality of HIWEC equipment, is identified, the tree may be removed at any time through consultation with EC-CWS. The need for additional mitigation measures or permits in these circumstances will be addressed on a site-specific basis.</li><li>• Post SAR Fact Sheets in areas where on-site staff can become familiar with species that may be encountered.</li><li>• Develop and implement a Sighting Response Protocol, which will include:<ul style="list-style-type: none"><li>▪ All on-site staff will receive formal training about SAR that may be encountered within the HIWEC, including how to recognize each SAR and the proper procedure to follow if SAR is encountered;</li><li>▪ For animals in immediate danger, handling procedures will be established for site personnel in the event that a SAR needs to be moved out of potential harm (i.e. off a road);</li><li>▪ Maintain a species observation log to track species observations during the operational phase of the project so that adaptive management can be applied based on species concentrations;</li><li>▪ All operations staff will be required to report any bat SAR mortality or bat activity on roads to the appropriate staff; and</li><li>▪ All required permits under Section 73(2) of SARA will be obtained prior to handling SAR.</li></ul></li><li>• The following mitigation measures regarding post-construction monitoring will be implemented:<ul style="list-style-type: none"><li>▪ Develop and implement a follow-up and monitoring plan, which includes a post-construction bat mortality and disturbance monitoring program consistent with <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i> (MNRF, 2011b);</li><li>▪ Report the findings of the post-construction monitoring program to HIFN and EC-CWS as required on an annual basis;</li><li>▪ Implement adaptive management techniques, such as operational mitigation, as determined appropriate through post-construction monitoring; and</li><li>▪ Report confirmed Species at Risk mortalities during post-construction monitoring to HIFN and EC-CWS within 48 hrs of a confirmed species identification.</li></ul></li><li>• Develop and implement an Operational Mitigation Plan that addresses site-specific responses to observed bat SAR mortality. This plan will devise specific thresholds at which specific steps will be taken by Henvey Inlet Wind to progressively minimize the potential impact to bat SAR.</li></ul>	<p>ensure similar species abundance and diversity continue to be found in the HIWEC study area.</p> <ul style="list-style-type: none"><li>▪ An end of year report will be provided to EC-CWS, on an annual basis for the two (2) years of post-construction bat disturbance monitoring to determine if additional monitoring and / or mitigation measures are warranted.</li></ul> <ul style="list-style-type: none"><li>• All artificial roosting structures established within the HIWEC study area will be monitored for signs of use at least twice per year for the first three (3) years after installation, with surveys once in each of May and June.<ul style="list-style-type: none"><li>▪ At a minimum, each roost structure will be examined for signs of use. These surveys can occur at any time of day and will utilize flashlights or low-light cameras to look for occupancy. Other signs, such as guano, will also be considered to determine occupancy. If any sign of occupancy is noted, an evening survey* will be completed, combining the use of an ultrasound detector with visual observations to collect information on both abundance and species.</li></ul></li><li>▪ If off-site locations are utilized, other monitoring arrangements may be established; however Henvey Inlet Wind will offer resources to complete a monitoring program that is at least equivalent to on-site locations.</li><li>▪ Qualified Biologists monitoring artificial roosting structures will take the appropriate precautions (i.e., disinfect all equipment and clothing) before and after each monitoring event to prevent the spread of White-Nose Syndrome as described, and where applicable, in the <i>Decontamination of Equipment and Clothing to Prevent the Spread of White-Nose Syndrome (the causal fungus: Pseudogymnoascus destructans) in Canada</i> (CWHC, 2014).</li><li>▪ Any evidence of White-nose Syndrome detected during these monitoring events will be reported to MNRF in accordance with the <i>Ontario's White-nose Syndrome Response Plan</i> (MNRF, 2015c).</li></ul> <ul style="list-style-type: none"><li>• With respect to the Sighting Response Plan, operations staff to ensure the species observation log is kept up to date and that procedures are followed.</li></ul> <p><i>*The completion of visual evening surveys will be subject to Health and Safety considerations for completing evening monitoring. Alternate approaches, including low-light video cameras, will be considered, where reasonable.</i></p> <ul style="list-style-type: none"><li>• <b>Contingency Measures:</b><ul style="list-style-type: none"><li>▪ In the event that, after two (2) years, bat acoustic monitoring surveys indicate notable changes in bat populations, EC-CWS will be consulted to determine if additional mitigation measures are warranted through an adaptive management approach.</li><li>▪ Quantifying changes in local bat populations, as a result of the operation of this Project, will be difficult to determine based on the dramatic population declines of bat SAR as a result of white-nose syndrome. The effects of this disease are already evident when comparing data from 2011 to 2013. Despite this difficulty in quantifying changes that may be attributed to the operating Henvey Inlet Wind Energy Centre, two (2) years of acoustic monitoring will be completed and compared to pre-construction results. Results will be discussed with EC-CWS to determine if additional mitigation measures are warranted through an adaptive management approach.</li></ul></li></ul>

Table 7-1: Proposed Mitigation Measures Associated with Potential Effects to Federal Species at Risk

Federal SAR	Potential Effects	Performance Objectives	Mitigation Measures	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"><li>▪ Consider changes in WTG operations (e.g., changes in cut-in speed, selective shutdown of specific WTGs at key times of year or under certain weather conditions) during periods of high mortality.</li><li>▪ No contingency measures are specifically required as the Operational Mitigation Plan itself has incorporated adaptive management and numerous contingency measures to progressively increase operational mitigation in the unlikely event that bat SAR mortalities continue to be observed.</li><li>▪ Prune any tree limbs or roots using proper arboricultural techniques.</li><li>▪ Any documented road mortality of a bat SAR will trigger consideration of contingency measures and adaptive management. The selected approach will be based on the specific circumstances that contributed to the observed impact on the species and will be determined by a qualified Biologist for the purpose of further mitigating against potential impacts to the species.</li><li>▪ If any of the requirements or procedures of the Sighting Response Plan related to staff understanding or implementation are not effective or appropriate for specific circumstances, the operations staff will discuss and revise the Protocol accordingly.</li></ul>

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