

Table 4.7 Evaluation of Candidate Amphibian Woodland Breeding Habitats

Feature ID	2012 Amphibian Survey Results	Pre-construction Monitoring Commitments	Carried Forward to EIS
AWO-26	<p>Surveys targeting non-vocalizing amphibians No amphibians were observed during the egg mass survey. Unknown adult frogs (4) observed during the larval survey.</p> <p>Surveys targeting vocalizing amphibians Spring Peepers (4) heard during the April survey. No amphibians heard calling during the May and June surveys.</p> <p>Well below threshold of 20 calling and lack of amphibians observed indicates that feature is not likely significant.</p>	None required.	No – not Significant Wildlife Habitat
AWO-27	<p>Surveys targeting non-vocalizing amphibians No amphibians were observed during the egg mass survey. Green Frog tadpoles (2), Red-spotted Newt, and an adult American Toad observed during the larval survey.</p> <p>Surveys targeting vocalizing amphibians A chorus of Spring Peepers heard during the April survey. Spring Peepers (7) heard during the May survey. Green Frogs (2) and Grey Tree Frogs (6) were heard during the June survey.</p> <p>Feature likely to contain breeding population of 1 or more target species with at least 20 individuals therefore considered significant.</p>	None required	Yes – confirmed significant
AWO-28	<p>Surveys targeting non-vocalizing amphibians No amphibians were observed during the egg mass and larval survey.</p> <p>Surveys targeting vocalizing amphibians Spring Peepers (3) were heard during the April survey. No amphibians heard during the May and June surveys.</p> <p>Well below threshold of 20 calling and lack of amphibians observed indicates that feature is not likely significant.</p>	None required	No – not Significant Wildlife Habitat
AWO-30	<p>Surveys targeting non-vocalizing amphibians No amphibians were observed during the egg mass survey. Adult Green Frogs (2), American Toad (3) and unknown adults (4) were observed during the larval survey.</p> <p>Surveys targeting vocalizing amphibians A large chorus of Spring Peepers and one Northern Leopard Frog (1) were heard during the April survey. No amphibians were heard during the May and June surveys.</p> <p>Feature likely to contain breeding population of 1 or more target species with at least 20 individuals therefore considered significant.</p>	None required.	Yes – confirmed significant
AWO-33	Not surveyed in 2012.	Pre-construction surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
AWO-34	Not surveyed in 2012.	Pre-construction surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
AWO-35	Not surveyed in 2012.	Pre-construction surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant

4.3.4.5 *Amphibian Wetland Breeding Habitat*

Deciduous swamps identified as candidate amphibian breeding habitats were assessed as Amphibian Woodland Breeding Habitat and described in the section above. A summary of the results of 2012 amphibian call surveys is provided in Table 4.8 for the one candidate amphibian wetland breeding habitat identified (AWE-29). The feature was determined to not be significant and was not carried forward to the EIS.

Table 4.8 Amphibian Breeding Habitat (Wetland)

Feature ID	2011 Amphibian Call Survey Results	Pre-construction Monitoring Commitments	Carried Forward to EIS
AWE-29	<p>Surveys targeting non-vocalizing amphibians One unknown frog observed during egg mass survey. No amphibians were observed during the larval survey.</p> <p>Surveys targeting vocalizing amphibians No calls heard on April, May or June surveys.</p> <p>Well below threshold of 20 calling and lack of amphibians observed indicates that feature is not likely significant.</p>	None required.	No – not Significant Wildlife Habitat

4.3.4.6 *Amphibian Movement Corridors*

Amphibian surveys were conducted in April, May and June 2012. Candidate breeding habitats were identified and evaluated to determine if they contain Significant Wildlife Habitat under the amphibian woodland breeding habitat and amphibian wetland breeding habitat criteria. A total of seven amphibian woodland breeding habitats were carried forward to the EIS, including four confirmed significant features (AWO-14, AWO-25, AWO-27 and AWO-30). No additional amphibian wetland habitats were confirmed or treated as significant.

These significant breeding areas were examined in the context of the landscape by making assumptions about where amphibians are migrating from and also identifying likely movement corridors based on connecting vegetation, riparian links, and nearness of natural areas or context of roads. Narrow strips of vegetation connecting two larger blocks of habitat where at least one contains a significant breeding location could function as a significant amphibian corridor.

One amphibian movement corridor feature, which is associated with a confirmed significant amphibian woodland breeding habitat (AWO-27) in natural area 759, was carried forward to the EIS. The potential movement corridor was identified between this natural area, which contains a large pond, and a woodlot located approximately 100 m to the southeast (natural area 321). Three features were treated as significant amphibian woodland breeding habitats and carried forward to the EIS (AWO-33, AWO-34 and AWO-35), with commitments for additional pre-construction Evaluation of Significance surveys as described in Section 4.2.4.1. Potential effects to amphibian movement corridors associated with these features are also addressed in the EIS.

4.3.4.7 *Turtle Over-wintering Habitat*

Three candidate significant turtle over-wintering habitats (TOW-01, TOW-02 and TOW-03) were assumed to be significant as described in Section 4.2.4.1. These candidate Significant Wildlife Habitats were carried forward to the EIS. The location of these features is shown on Figure 3.6a.

4.3.4.8 *Habitat of Plant Species of Conservation Concern*

Six features (SCP-12, SCP-13, SCP-14, SCP-15, SCP-16 and SCP-17) were determined to be significant based on confirmed observances of Burning Bush, Cream Violet, Field Thistle, Narrow-leaved Sedge and Perfoliate Bellwort during 2011 and 2012 Site Investigations and carried forward to the EIS. The locations of these features are shown on Figure 3.6a.

A total of 11 Candidate Significant Wildlife Habitats (SCP-01, SCP-02, SCP-03, SCP-04, SCP-05, SCP-06, SCP-07, SCP-08, SCP-09, SCP-10, SCP-11) were identified through Site Investigations for Burning Bush, Green Dragon, Hairy Bedstraw, Pawpaw, Round-leaved Groundsel, Round-leaved Hawthorn and Slim-flowered Muhly requiring Evaluation of Significance studies. Results from vascular plant surveys conducted during appropriate times of the year indicated that no plant Species of Conservation Concern were observed in these candidate Significant Wildlife Habitats (Table 4.9). As a result, none of these natural areas were deemed to contain habitat for plant Species of Conservation Concern and thus were not carried forward to the EIS. A detailed list of all vascular plant species observed within each natural area is presented in Appendix H.

4.3.4.9 *Habitat for Bird Species of Conservation Concern*

A summary of the results of woodland breeding bird surveys conducted in five wooded areas where tree removal is proposed in association with the transmission line (SCB-01, SCB-02, SCB-03, SCB-04 and SCB-05) is provided in Table 4.10.

Evidence of breeding Red-Headed Woodpecker was recorded at one location (SCB-03) and a Red-Headed Woodpecker nest was later confirmed within the woodlot. This site was, therefore, identified as Significant Wildlife Habitat for Red-Headed Woodpecker and carried forward to the EIS. The location of this feature is shown on Figure 3.6d.

4.3.4.10 *Habitat of Insect Species of Conservation Concern*

The candidate significant Azure Bluet habitat (SCI-01) was assumed to be significant as described in Section 4.2.4.1. This candidate Significant Wildlife Habitat was carried forward to the EIS. The location of this feature is shown on Figure 3.6b.

Table 4.9 Evaluation of Candidate Habitat for Plant Species of Conservation Concern

Plant Species of Conservation Concern	Feature ID	Confirmed Significant Wildlife Habitat	Candidate Significant Wildlife Habitat	ELC Unit	Date of Vascular Plant Survey	Distance to Project Location	Species Observed	Carried Forward to EIS
Burning Bush (<i>Euonymus atropurpureus</i>) S3 - Vulnerable	SCP-12	326	n/a	FOD5-2	September 22, 2011	>0.1 m (access road)	Yes	Yes – Significant Wildlife Habitat
	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-10	n/a	662	FOD8-1	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-04	n/a	662	FOD5-6	May 31, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-05 SCP-11	n/a	720	FOD6-5 FOD7f	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
SCP-06 SCP-09	n/a	721	FOD6-5 FOD7-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat	
Cream Violet (<i>Viola striata</i>) S3 - Vulnerable	SCP-14	757	n/a	FOD6-5	June 1, 2011	78 m (access road)	Yes	Yes – Significant Wildlife Habitat
Field Thistle (<i>Cirsium discolor</i>) S3 - Vulnerable	SCP-13	198	n/a	CUM1-1	May 17, 2012	>0.1 (access road)	Yes	Yes – Significant Wildlife Habitat
Green Dragon (<i>Arisaema dracontium</i>) S3 - Vulnerable	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-05 SCP-11	n/a	720	FOD6-5 FOD7f	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-06 SCP-09	n/a	721	FOD6-5 FOD7-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
Hairy Bedstraw (<i>Galium pilosum</i>) S3 - Vulnerable	SCP-04	n/a	662	FOD5-6	May 31, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
Harbinger-of-Spring (<i>Erigenia bulbosa</i>) S3? - Vulnerable?	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-10	n/a	648	FOD8-1	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-05 SCP-11	n/a	720	FOD6-5 FOD7f	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
SCP-06 SCP-09	n/a	721	FOD6-5 FOD7-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat	
Pawpaw (<i>Asimina triloba</i>) S3 - Vulnerable	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-05	n/a	720	FOD6-5	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-06 SCP-09	n/a	721	FOD6-5 FOD7-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
Perfoliate Bellwort (<i>Uvularia perfoliata</i>) S1 - Critically Imperiled	SCP-16 SCP-17	375	n/a	FOD6-5 FOM6-1	Oct 5, 2011	29 m (access road)	Yes	Yes – Significant Wildlife Habitat
Narrow-leaved Sedge (<i>Carex amphibola</i>) S2 - Imperiled	SCP-15	189	n/a	FOD9-5	July 13, 2011	178 m (access road)	Yes	Yes – Significant Wildlife Habitat

Table 4.9 Evaluation of Candidate Habitat for Plant Species of Conservation Concern

Plant Species of Conservation Concern	Feature ID	Confirmed Significant Wildlife Habitat	Candidate Significant Wildlife Habitat	ELC Unit	Date of Vascular Plant Survey	Distance to Project Location	Species Observed	Carried Forward to EIS
Round-leaved Groundsel <i>(Packera obovata)</i> S3 - Vulnerable	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-05	n/a	720	FOD6-5	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-06 SCP-09	n/a	721	FOD6-5 FOD7-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
Round-leaved Hawthorn <i>(Crataegus lumaria)</i> S3? - Vulnerable?	SCP-01	n/a	635	CUM1-1	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-02	n/a	637	CUM1-1	May 31, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-07	n/a	648	CUM1-1	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-08	n/a	720	CUM1-1	June 6, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
Slim-flowered Muhly <i>(Muhlenbergia tenuiflora)</i> S2 - Imperiled	SCP-04	n/a	662	FOD5-6	May 31, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat
	SCP-03	n/a	648	FOD9a	June 5, 2012	0 m (transmission line in feature)	No	No – not Significant Wildlife Habitat

Table 4.10 Evaluation of Candidate Significant Wildlife Habitat for Woodland Breeding Bird Species of Conservation Concern

Feature ID	Natural Area No.	ELC Unit	Round 1 Survey		Round 2 Survey		Round 3 Survey		Carried Forward to EIS
			Date	Results	Date	Results	Date	Results	
SCB-01	648	FOD8-1 FOD9a	6/7/2012	No bird species of conservation concern observed.	6/21/2012	No bird species of conservation concern observed.	7/4/2012	No bird species of conservation concern observed.	No – not Significant Wildlife Habitat
SCB-02	662	FOD5-6	6/7/2012	No bird species of conservation concern observed.	6/18/2012	No bird species of conservation concern observed.	6/30/2012	No bird species of conservation concern observed.	No – not Significant Wildlife Habitat
SCB-03	720	FOD6-5 FOD7f	5/30/2012	No bird species of conservation concern observed.		Pair of Red-headed Woodpeckers observed within woodlot. Both birds observed together in area with many suitable nesting sites with snags at canopy height. The pair stayed in the same area for 35-40 minutes indicating that the female may be incubation or pre-laying.	7/2/2012	Male Red-headed Woodpecker observed in suitable habitat.	Yes – confirmed Significant Wildlife Habitat
SCB-04	721	FOD6-5 FOD7-1 SWD3-3	6/13/2012	No bird species of conservation concern observed.	6/26/2012	No bird species of conservation concern observed.	7/6/2012	No bird species of conservation concern observed.	No – not Significant Wildlife Habitat
SCB-05	722	SWD3-3	6/13/2012	No bird species of conservation concern observed.	6/26/2012	No bird species of conservation concern observed.	7/6/2012	No bird species of conservation concern observed.	No – not Significant Wildlife Habitat

4.3.4.11 Generalized Candidate Significant Wildlife Habitat

Evaluation of Significance studies are not required for generalized candidate Significant Wildlife Habitat, as described in Appendix D of the Natural Heritage Assessment Guide. The following generalized candidate Significant Wildlife Habitats were confirmed within the 120 m Area of Investigation however not within 120 m of qualifying project infrastructure, and were therefore carried forward to the EIS as generalized candidate Significant Wildlife Habitat:

- Colonial-nesting Bird Breeding Habitat (Tree/Shrub) (natural area 189);
- Waterfowl nesting areas (natural area 209);
- Reptile hibernacula (natural areas 232, 609 and 695);
- Bat maternity colonies (numerous);
- Amphibian woodland breeding habitat (natural areas 209, 210, 232, 236, 245, 255, 258, 266, 269, 280, 309, 342, 375 and 661);
- Amphibian wetland breeding habitat (natural areas 609 and 754);
- Rare vegetation communities (natural area 309);
- Habitat for area sensitive species: interior forest breeding birds (WOD-331);
- Mature forest stands (numerous);
- Turtle nesting habitat (natural area 209);
- Turtle overwintering habitat (natural areas 209, 255, 266, 609, 661 and 754);
- Woodland raptor nesting habitat (Woodland features WOD-117, WOD-131 and WOD-331);
- Seeps and springs (natural areas 232, 249, 267, 266, 273, 280, 309, 369, 609 and 723);
- Habitats of species of conservation concern (numerous).

4.4 Summary of Features Carried Forward to the Environmental Impact Study

Table 4.11 provides a summary of the natural features treated as or confirmed to be Significant or Provincially Significant in the Project Location or within the 120 m Area of Investigation. These features were carried forward to the EIS.

Table 4.11 Summary of Natural Features Carried Forward to the Environmental Impact Study

Feature	Natural Features Carried Forward to the EIS
Wetlands	The following 14 wetland complexes were treated as significant and carried forward to the EIS: <ul style="list-style-type: none"> • WET-006, WET-008, WET-009, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032, WET-038, WET-049 and WET-053.
Woodlands	The following 65 woodlands were determined to be significant and therefore carried forward to the EIS: <ul style="list-style-type: none"> • WOD-001, WOD-012, WOD-018, WOD-023, WOD-026, WOD-028, WOD-032, WOD-033, WOD-034, WOD-047, WOD-049, WOD-053, WOD-054, WOD-060, WOD-063, WOD-064, WOD-068, WOD-070, WOD-076, WOD-087, WOD-093, WOD-101, WOD-103, WOD-104, WOD-106, WOD-109, WOD-112, WOD-113, WOD-114, WOD-117, WOD-118, WOD-120, WOD-129, WOD-130, WOD-131, WOD-133, WOD-134, WOD-135, WOD-136, WOD-137, WOD-145, WOD-146, WOD-149, WOD-154, WOD-158, WOD-176, WOD-180, WOD-191, WOD-200, WOD-210, WOD-227, WOD-231, WOD-251, WOD-278, WOD-286, WOD-289, WOD-295, WOD-300, WOD-301, WOD-303, WOD-306, WOD-309, WOD-313, WOD-328 and WOD-331.
Valleylands	The following valleyland feature was determined to be significant and therefore carried forward to the EIS: <ul style="list-style-type: none"> • VAL-01

Table 4.11 Summary of Natural Features Carried Forward to the Environmental Impact Study

Feature	Natural Features Carried Forward to the EIS
Significant Wildlife Habitat	<p>The following Significant Wildlife Habitats were <i>evaluated and determined to be significant</i> within the 120 m Area of Investigation and within 120 m of qualifying project infrastructure, and were therefore carried forward to the EIS:</p> <ul style="list-style-type: none"> • Bat maternity colonies (BMC-189, BMC-229, BMC-326, BMC-342 and BMC- 757); • Amphibian woodland breeding habitat (AWO-14, AWO-25, AWO-27 and AWO-30); • Habitat for plant species of conservation concern (multiple) (SCP-12, SCP-13, SCP-14, SCP-15, SCP-16 and SCP-17); and, • Habitat for bird species of conservation concern (Red-headed Woodpecker) (SCB-03). <p>The following features were <i>treated as significant</i> for the purpose of this submission and carried forward to the EIS (in some cases, a determination as to whether the mitigation measures described in the EIS will be applied will be made based on the outcome of pre-construction surveys):</p> <ul style="list-style-type: none"> • Waterfowl stopover and staging areas (terrestrial) (WSST-15 and WSST-36); • Reptile hibernacula (RH-01); • Bat maternity colonies (BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358, BMC-372, BMC-648 and BMC-720); • Amphibian woodland breeding habitat (AWO-33, AWO-34 and AWO-35); • Turtle over-wintering habitat (TOW-01, TOW-02 and TOW-03); and, • Habitats of insect species of conservation concern (SCI-01). <p>The following candidate Significant Wildlife Habitats were identified within the 120 m Area of Investigation however not within 120 m of qualifying project infrastructure, and were therefore carried forward to the EIS as generalized candidate Significant Wildlife Habitat:</p> <ul style="list-style-type: none"> • Colonial-nesting Bird Breeding Habitat (Tree/Shrub) (natural area 189); • Waterfowl nesting areas (natural area 209); • Reptile hibernacula (natural areas 232, 609 and 695); • Bat maternity colonies (numerous); • Amphibian woodland breeding habitat (natural areas 209, 210, 232, 236, 245, 255, 258, 266, 269, 280, 309, 342, 375 and 661); • Amphibian wetland breeding habitat (natural areas 609 and 754); • Rare vegetation communities (natural area 309); • Habitat for area sensitive species: interior forest breeding birds (WOD-331); • Mature forest stands (numerous); • Turtle nesting habitat (natural area 209); • Turtle overwintering habitat (natural areas 209, 255, 266, 609, 661 and 754); • Woodland raptor nesting habitat (Woodland features WOD-117, WOD-131 and WOD-331); • Seeps and springs (natural areas 232, 249, 267,266, 273, 280, 309, 369, 609 and 723); and, • Habitats of species of conservation concern (numerous).

5. Environmental Impact Study

5.1 REA Requirements

Under Section 38 (2) of O. Reg. 359/09, an Environmental Impact Study (EIS) must be conducted for all significant natural features that are within 120 m of the Project Location. Under the REA process, the EIS must:

- Identify and assess any negative environmental effects of the project on significant natural features as a result of construction, operation, or decommissioning of the Project;
- Identify appropriate mitigation measures to address any negative environmental effects;
- Identify any residual effects that are expected to remain after mitigation measures are applied;
- Identify the significance of any residual effects;
- Describe how the environmental effects monitoring plan addresses any negative environmental effects; and
- Describe how the construction plan report addresses any negative environmental effects.

The effects and mitigation measures described in this EIS are consistent with the conclusions presented in the draft Goshen Construction Plan Report (AECOM, 2012) and the draft Goshen Design and Operation Report (AECOM, 2012a), the latter including the Environmental Effects Monitoring Plan.

Table 4.5 summarizes the significant natural features that have been carried forward to the EIS during the Natural Heritage Assessment process for the proposed Project. Potential negative effects to these features are addressed herein.

No part of the proposed Project is located within a significant wetland (all wetlands were treated as Provincially Significant); however, vegetation removal for the proposed transmission line will occur within significant woodlands and Significant Wildlife Habitats. The transmission line is also proposed within a significant valleyland feature, although no vegetation removal is required in this feature. As well, various portions of the Project are proposed within 120 m of significant features including wetlands, woodlands, wildlife habitat and valleylands.

The following section (Section 5.2) provides an overview of the proposed Project, as described in the draft Construction Plan Report. The potential effects, mitigation measures, and residual effects on features determined to be significant or treated as significant and therefore carried forward to the EIS are described in Sections 5.3 to 5.8 of this report. Section 5.9 describes how the Construction Plan Report addresses negative environmental effects to significant natural features. Finally, Section 5.10 describes how the environmental effects monitoring plan addresses any negative environmental effect to significant natural features.

5.2 Project Description

5.2.1 Facility Components

For the purpose of this EIS and as shown on Figure 1.2, the major components of the Project are proposed to be:

- Up to 72 GE 1.6-100 Wind Turbine with LNTE generator locations and pad mounted step-up transformers and one GE 1.56-100 Wind Turbine generator location and pad mounted step-up transformer (however, only 63 turbines will be constructed);
- Laydown and storage areas (including temporary staging areas, crane pads and turnaround areas surrounding each wind turbine);

- Temporary electrical service line for the purpose of providing power to the construction trailers located at the laydown area;
- A transformer substation;
- Underground 34.5 kV electrical collection lines to connect the turbines to the proposed transformer substation;
- 115 kV transmission line to run from the proposed transformer substation to a breaker switch station which will connect the electricity generated by the project to the existing Hydro One 115 kV transmission line;
- Turbine access roads;
- Three permanent meteorological towers; and,
- An operations and maintenance building.

The Project components, in addition to the Disturbance Area, as shown on Figure 1.2, occupy approximately 623 hectares (ha) (1,539 acres) of land in the Municipalities of Bluewater and South Huron.

5.2.1.1 Turbine Specifications

The wind turbine technology proposed for this Project is the GE 1.6-100 Wind Turbine with LNTE and one GE 1.56-100 Wind Turbine, with a total project nameplate capacity of 102 MW. The turbines are 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The turbines have a 100 metre (m) rotor diameter with a swept area of 7,854 m²; each blade is connected to the main shaft via the hub. The turbine is mounted on an 80 m tubular steel tower which contains an internal ladder for maintenance access. The turbine will be constructed on a foundation that is approximately 400 m². The foundation consists of poured concrete and steel rebar to provide added strength.

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

A summary of the turbine specifications is provided in Table 5.1 below. Please refer to the Wind Turbine Specification Report for further information.

Table 5.1 Summary of Technical Specifications

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

5.2.1.2 Laydown and Storage Areas

A temporary laydown and storage area will be constructed on privately owned land for the purpose of staging and storing equipment during the construction phase. Activities on this site will include materials storage, equipment refuelling, and construction offices. The construction offices will be serviced by a temporary electrical service line. The area will be approximately 4 ha (10 acres). In addition, a 122 m by 122 m square around each wind turbine will be established for the laydown and assembly of the wind turbine components.

5.2.1.3 *Collection Lines*

The system that connects each turbine to the transformer substation will consist of 34.5 kV electrical collection lines that will be buried approximately 1 m below grade on private property adjacent to the turbine access roads, where feasible. In some locations, the collection lines will be buried within the municipal road right-of-way.

5.2.1.4 *Transformer Substation and Breaker Switch Station*

Approximately 2 to 3 ha in size, the transformer substation will either be located on privately held lands through a lease agreement or on land purchased by Goshen Wind, Inc. The electricity collected via the 34.5 kV underground collection lines will converge at the transformer substation where the electricity will be “stepped-up” to 115 kV for transmission and then routed to a breaker switch station. The breaker switch station will occupy less than 0.4 ha (1 acre) of land and is the connection point with the existing Hydro One 115 kV transmission line. The substation equipment will include an isolation switch, a circuit breaker, a step-up transformer, transmission switch gear, instrument transformers, grounding and metering equipment. All substation grounding equipment will meet the Ontario Electrical Safety Code. The substation will be connected to the existing electrical distribution line to supply power for the control house lighting and equipment.

5.2.1.5 *Electrical Transmission*

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

The interconnection plan for any wind energy centre is subject to study, design and engineering by the Integrated Electricity System Operator which manages the province’s electricity grid, Hydro One which owns the transmission lines, the local distribution company and the Ontario Energy Board, which regulates the industry through the Transmission System Code and the Distribution System Code.

5.2.1.6 *Access Roads*

On-site access roads to each turbine will be constructed to provide an access point to the properties for equipment transport during the construction phase and for maintenance activities during operation. Typically the access roads will be 11 m wide during the construction phase to accommodate the large cranes (with an additional 2 m clearance on each side for travel), and may be reduced in width at the landowner’s request following construction.

5.2.1.7 *Operations and Maintenance Building*

An operations building, approximately 30 m by 15 m in size, will be constructed on privately held lands or an existing suitable structure will be purchased/leased for the purpose of monitoring the day-to-day operations of the wind energy centre and supporting maintenance efforts. A small parking lot will be constructed to accommodate staff vehicles. Prior to the construction phase, a Stormwater Pollution Prevention Study will be conducted to address any potential effects associated with stormwater runoff.

Potable water will be supplied by a well or through the municipal water system and a septic bed will be constructed for the disposal of sewage. The septic bed will be constructed to the minimum size required for the size of the

operation and maintenance building. It is the Project owner's responsibility to ensure proper maintenance of the septic system. The operations and maintenance building, septic system and water supply will be constructed in accordance with applicable municipal and provincial standards.

5.2.1.8 *Permanent Meteorological Tower*

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

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

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

5.2.1.9 *Water Crossings*

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

5.2.2 Construction Activities

The sections below, adapted from the draft Construction Plan Report, summarize the construction phase activities.

5.2.2.1 *Surveying and Geotechnical Study Activities*

Surveys will be required to locate the turbines, crane pads, access roads, electrical lines and the substation. Crews will drive light trucks to reach sites primarily using existing roads. They will then walk the site for the surveying and mark the locations using stakes. For the wind energy centre site, the surveys will typically take one to two days per turbine location.

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

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

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

5.2.2.2 *Land Clearing and Construction of Access Roads*

Access roads will be constructed to transport equipment to the construction sites. There will be a 60 m wide area for construction of the access roads. The construction of the access road will typically require clearing and grubbing of any vegetation, excavation of the topsoil layer and adding a layer of compacted material to a typical thickness of 300 to 600 mm, depending upon site specific geotechnical conditions. Clean granular material (typically "A" or "B" gravel) will be brought to the site as needed and will not be stockpiled onsite. The topsoil will be kept and re-used on site. The access road to each turbine will typically require one to three days of construction time. Depending on the length of the access roads, construction may require approximately 25 trucks of gravel.

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

Once the construction activities have been completed, the granular base of the access roads will be removed and distributed to the landowners, if desired, or removed from the site and disposed of in an approved and appropriate manner. The disturbed area will have the topsoil replaced from stockpiled material and will be reseeded in consultation with the landowner.

Equipment will include, at a minimum, trucks, graders, and bulldozers. Municipal and provincial roads will also be used for transporting equipment, and minor modifications may be required to some of the existing roads (e.g., widening the turning radius) to handle the oversized loads. Any road damages associated with the Project will be repaired prior to the completion of the construction phase. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined below.

5.2.2.3 *Construction of Laydown Areas*

A 4 hectare (10 acre) site will be constructed for the temporary storage of construction material (i.e., no turbine components) and as a site for the construction office trailers. Following clearing and grubbing of any vegetation, the topsoil at the temporary laydown area will be removed and approximately 600 mm of clean compacted crushed gravel will be imported as needed. The excavated topsoil will be re-used on site as feasible. A temporary electrical service line will be connected to the existing distribution line adjacent to the laydown area for the purpose of providing power to the construction office trailers. Construction activities are expected to last approximately one week and will require approximately 100 loads of gravel, and a crew of six people. Following the construction phase, the gravel will be removed from the site or re-used, to be determined in consultation with the landowner. The temporary electrical service line and poles will be removed. The stockpiled topsoil will then be redistributed throughout the temporary laydown area.

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

5.2.2.4 Construction of Turbine Sites and Crane Pads

Prior to construction, the construction area will be cleared and grubbed. In order to provide sufficient area for the laydown of the wind turbine components and its assembly, a 122 m by 122 m square around the wind turbine must be cleared, levelled, and be accessible during the construction phase. The topsoil is typically removed and some soil stabilizing material (i.e., crushed gravel or clean back fill) may need to be added depending upon site specific geotechnical conditions. Where the site laydown areas are close to watercourses, erosion control measures will be implemented, as outlined in section 5.9

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

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

5.2.2.5 Delivery of Equipment

Equipment will be delivered by truck and trailer throughout the construction phase and stored at the temporary lay-down sites surrounding each turbine. A Traffic Management Plan will be developed using MTO Book 7 standards and will be provided to Huron County. Alternative traffic routes will be prepared to address traffic congestion, as needed.

5.2.2.6 Construction of Turbine Foundations

A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m², will be constructed of poured concrete and reinforced with steel rebar to provide strength. The construction timeframe for turbine foundations is three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding rods will be disposed of as hazardous waste by a licensed contractor.

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

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

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

5.2.2.7 *Wind Turbine Assembly and Installation*

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

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

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

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

5.2.2.8 *Construction of Electrical Collector System*

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

- **Pad Mount Transformers:**

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

- **Collection Lines:**

Cables and fibre optics lines (for communications) from each turbine to the transformer substation will be buried and will be located adjacent to the turbine access roads, where feasible. There will be a 20 m wide area for construction of the collection lines. The excavated soil will be stored temporarily and then

reused as backfill. Power conductors will be approximately 0.9 m below grade and the location will be marked. Farming practices will not be affected by the underground cabling due to the depth of the cables and location of the cable beneath the access roads. Equipment will include trenchers or diggers (depending on soil type) and construction will require a crew of six people. The construction timeframe is dependent upon the required length of the lines.

- **Horizontal Directional Drilling:**

Electrical cables may need to be installed using horizontal directional drilling to minimize effects to woodlots or watercourses. Erosion control devices will be installed at the drill location and drill cuttings will be collected and removed from the site for disposal in an approved and appropriate manner. An entrance and exit pit will be excavated on either side of the feature to be bored under. The directional drilling equipment will be set up at the entrance pit and a drill bit attached to rod segments is advanced until it reaches the exit pit. A slurry of bentonite and/or polymer mixed with water will be injected into the hole while drilling to help stabilize the bore hole and reduce friction. Once the drill bit has reached the exit pit the drill bit will be removed and a “reamer” attached and pulled back through the hole to enlarge the bore by 120-150%. The electrical cable will then be installed through the hole. Equipment will include a directional drilling rig and two to three support trucks to carry drilling rods, drilling supplies and cable.

Chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment, and the polymer used for directional drilling.

5.2.2.9 Construction of Electrical Transmission Line

Holes for new transmission line poles are typically augured in the ground using a truck mounted auger device. The poles will then be inserted using special cranes to a typical depth of 1 to 2 m below grade and “dressed” (made ready to accept conductors) using a boom truck. In locations where the transmission line makes a 90-degree turn, guy wires may be used to anchor the corner pole in place. Typically, one crew will install the poles and one crew will dress them. Approximately six construction vehicles (including trucks and a pole loader) and a crew of 12 to 15 people are anticipated for construction of the transmission lines. Twelve to sixteen poles can be installed and dressed in one day. Once the poles are in place and dressed, cables will be strung in place using boom trucks and special cable reel trucks. Finally, any pre-existing poles that are no longer in use will be removed.

The transmission line will be directionally drilled in one location to avoid affecting a Provincially Significant Wetland. Construction will follow the same process described in Section 5.2.2.8 for directionally drilling the collector system.

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

Equipment will include, at a minimum, a truck mounted crane, a drill rig, flatbed trailers and a truck mounted auger. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined below.

5.2.2.10 Construction of Transformer Substation and Breaker Switch Station

During construction of the substation and breaker, topsoil and subsoils will be stripped and stockpiled separately. Stripped topsoil and subsoil will be placed in the temporary storage facility area and topsoil stripped from the substation area will be distributed on other Project properties. An electrical service line of approximately 9 m and

associated poles will be connected to the existing distribution line adjacent to the substation for the purpose of providing house service power to the substation control building. The construction crew will consist of approximately 25 to 40 people and construction is expected to last for about four months. Some packing-material waste may be generated. All recyclable materials will be separated from non-recyclable materials and both streams will be removed from the site and disposed of at an approved and licensed facility.

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

5.2.2.11 Construction of Operation and Maintenance Building

An operations building, approximately 30 m by 15 m in size, will be constructed on privately held lands or an existing suitable structure will be purchased/leased for the purpose of monitoring the day-to-day operations of the wind energy centre and supporting maintenance efforts. A small parking lot will be constructed to accommodate staff vehicles. Prior to the construction phase, a Stormwater Pollution Prevention Study will be conducted to address any potential effects associated with stormwater runoff.

Potable water will be supplied by a well or through the municipal water system and if required, a septic bed will be constructed for the disposal of sewage. The septic bed will be constructed to the minimum size required for the size of the operation and maintenance building. Both will be constructed in accordance with applicable municipal and provincial standards. Construction of the operations building may take up to three months to complete and will require a crew of approximately 10 to 15 people.

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

5.2.2.12 Permanent Meteorological Towers

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

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

5.2.2.13 Clean-up and Reclamation

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

Stripped soil will be replaced and re-contoured in the construction areas and disturbed areas will be re-seeded, as appropriate. Erosion control equipment will be removed once inspections have determined that the threat of erosion

has diminished to the original land use level or lower. High voltage warning signs will be installed at the transformer substation and elsewhere, as appropriate. At the conclusion of construction vehicles and construction equipment will be removed from the site.

5.2.2.14 *Turbine Commissioning*

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

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

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

5.3 **Overview of Potential Negative Environmental Effects**

Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of potential negative effects during construction, operation and decommissioning including, but not limited to, accidental intrusion causing physical damage to vegetation, increased erosion and sedimentation, disturbance to local wildlife through noise or mortality, risk of soil/water contamination, windblown dust, and/or changes in natural drainage patterns and flow volume. Consequently, significant features and functions may be affected through changes in hydrology (i.e. soil moisture) which may lead to potentially adverse changes in vegetation community composition, disturbance to wildlife through noise or physical intrusion, fragmentation of linkages, or increased vulnerability of invasion by non-native species. These effects are expected to be temporary in duration and result in minimal disturbance or mortality, and will be minimized through the application of the specified mitigation measures.

A general discussion of additional potential negative environmental effects specific to different types of project infrastructure is provided below.

5.3.1 **Potential Effects of Turbines**

This discussion of the effects arising from turbines assumes a 122 m x 122 m turbine laydown area in which construction activities will occur and construction materials may be stored. The turbines themselves will be installed within the turbine laydown area. Therefore, the turbine laydown area represents the full extent of potential physical disturbance associated with turbine construction. All turbines in the Goshen Wind Energy Centre will be located within agricultural fields. Therefore, no direct loss or fragmentation of significant natural features is expected as a result of turbine installations.

Bird and/or bat mortality resulting from turbine operation is beyond the scope of the Natural Heritage Assessment process. Mitigation, monitoring commitments and contingency measures associated with potential bird and/or bat mortality resulting from wind turbine operation are addressed in the Environmental Effects Monitoring Plan, as

described in the Design and Operation Report for the proposed Project. Birds and bats may also be adversely affected through avoidance behaviour or disturbance caused by noise or lighting during turbine operation. Proposed mitigation measures for disturbance to wildlife resulting from turbine operation are addressed in section 5.8 and in the Environmental Effects Monitoring Plan.

5.3.2 Potential Effects of Access Roads

The effects associated with access roads are related primarily to the 10 to 14 m wide footprint during the construction phase and 11 m to 6 m wide footprint during the operational phase. Access roads will be constructed in existing agricultural fields and outside significant natural features. Therefore, no direct loss or fragmentation of significant natural features is expected as a result of access road construction. The roads do not require removal of natural vegetation except for portions of some hedgerows or treerows between agricultural fields.

Vegetation control during operation may be required where access roads are adjacent to treed natural areas. Trimming of branches will be undertaken using appropriate arboricultural techniques. Access roads may also result in wildlife mortality through direct collision with vehicular traffic or act as barriers to wildlife movement during operation. Refer to section 5.8 for potential effects and proposed mitigation measures.

5.3.3 Potential Effects of Underground Collection Lines

No direct loss or fragmentation of significant natural features is expected as a result of collection line construction. Collection lines will be installed along access roads or existing road rights-of-way where feasible. Where collection lines cross a significant natural feature, the lines will be directionally drilled underneath; thereby no intrusion or vegetation removal will be required. The drilling equipment and the entrance and exit pits will be located 30 m away from the edge of the feature.

There are nine locations where collection lines will be installed via horizontal directional drilling underneath significant natural features. The feature numbers where directional drilling is required, and the approximate width of the feature under which drilling will occur, are listed below:

- Natural area 177 (Woodland 001 and Wetland 006) significant woodland and significant wetland, width 82 m;
- Natural area 198 (Woodland 018 and Wetland 014) significant woodland and significant wetland, width 21 m;
- Natural area 210 (Woodland 032 and Wetland 014) significant woodland and significant wetland, width at two locations 49 m and 122 m;
- Natural area 216 (Woodland 034 and Wetland 014) significant woodland, width 20 m;
- Natural area 236 (Woodland 054 and Wetland 010) significant woodland and significant wetland, width 128 m;
- Natural area 267 (Woodland 101 and Wetland 032) significant woodland and significant wetland, width 49 m;
- Natural area 282 (Woodland 133) significant woodland, width 59 m;
- Natural area 309 (Woodland 191 and Wetland 021) significant woodland and significant wetland, width 139 m; and
- Natural area 375 (Woodland 313 and Wetland 025) significant woodland and significant wetland, width 222 m.

A potential negative effect of horizontal directional drilling is the escape of drilling mud containing bentonite or polymer into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface in the event of a “frac-out”. The escape of drilling mud can adversely affect natural features through soil and/or water contamination. Proposed mitigation measures for this effect are addressed below.

5.3.4 Potential Effects of the Transmission Line

One transmission line is proposed for the Goshen Wind Energy Centre. The location of the proposed transmission line is shown on Figure 1.2. This discussion of the effects arising from the transmission line assumes that vegetation removal for construction of the transmission line will occur within the disturbance area as mapped in this report (between 20 m and 61 m in width), with the exception of the transmission line crossing of wetland feature WET-012, which overlaps with woodland features WOD-104 and WOD-109. At this location, the transmission line will be installed beneath wetland feature WET-012 via horizontal directional drilling.

Vegetation removal is planned for transmission line construction in five significant woodlands (WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200), two significant bat maternity colonies (BMA-648 and BMA-720), three amphibian woodland breeding habitats (AWO-33, AWO-34 and AWO-35), turtle over-winter habitat (TOW-02), and habitat of Red-headed Woodpecker and Azure Bluet, bird and insect species of conservation concern (SCB-03 and SCI-01, respectively). Potential effects of vegetation removal in significant woodlands include the loss of forest cover, creating forest fragmentation, and increasing the amount of forest edges including an increase in invasive weed cover along forest edges. This loss of forest area and fragmentation may have a negative effect on the habitat suitability of the woodland for plant and wildlife species. Vegetation removal in natural areas identified as Significant Wildlife Habitat may displace bats, amphibians or bird species of conservation, or disturb the natural areas such that they become less suitable or unsuitable as habitat for these species. Refer to sections 5.6, 6.8, 5.9, and 5.10 for potential effects and proposed mitigation measures.

5.3.5 Potential Effects of the Substation, Operations Building, Construction Laydown Yard and Meteorological Towers

This discussion of the effects arising from the Substation assumes that a transformer substation measuring 2 to 3 ha in size will be constructed in the location shown on Figure 1.2. An operations building will be constructed on privately held lands or an existing suitable structure will be purchased, and will be used to monitor the day-to-day operations of the wind energy centre and to support maintenance efforts. This discussion of the effects arising from the Operations Building, assumes that a building measuring approximately 30 m by 15 m in size will be constructed in association with the substation, in the location shown on Figure 1.2. Potable water will be supplied by a well or through the municipal water system and a septic bed will be constructed for the disposal of sewage. This discussion of the effects arising from the construction laydown yard assumes a 4 hectare (10 acre) site will be constructed for the temporary storage of construction material. Likewise, this discussion of the effects arising from the Meteorological Towers assumes that three permanent meteorological towers up to 80 m in height will be constructed in the locations shown on Figure 1.2. All of these Project components will be constructed in accordance with applicable municipal and provincial standards.

Since the proposed operations building, substation, construction laydown yard and meteorological towers are located outside of any significant natural features, no direct impacts to these features area anticipated provided that no accidental intrusion occurs into adjacent natural vegetation.

5.4 Overview of Proposed Mitigation Measures

A summary of the general mitigation measures recommended for the construction, operation and decommissioning of all Project infrastructure is provided below. Mitigation measures to address potential negative effects on specific significant natural features are presented in Sections 5.5 to 5.8.

1. Construction Timing

- Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours (7:00 am and 7:00 pm), wherever possible.
- Vegetation removal should occur outside the breeding bird period (May 1 to July 31). Undertake active nest surveys if clearing of vegetation must take place during this period.

2. Natural Areas Protection

- Keep vegetation removal to a minimum and limited to non-significant habitats (e.g., hedgerows).
- For roadside collection line routes, vegetation removal (if any) will be kept to a minimum and will be limited to the road right-of-way.
- Where construction is to occur within 30 m of a naturally vegetated feature (i.e., woodland, wetland, etc.), install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation.
- Trees at risk of being damaged during construction should be pruned through implementation of proper arboricultural techniques.
- Where excavation for construction of access roads or collection lines is conducted within the rooting zone of trees (i.e. within the dripline), proper root pruning measures should be implemented to protect tree roots.

3. Erosion and Sediment Control

- Develop and implement an erosion and sediment control plan before commencement of construction.
- Utilize erosion blankets, erosion control fencing, straw bales, siltation bags, etc. for construction activities within 30 m of a wetland, woodland or water body, to mitigate potential excessive erosion and sedimentation. Extra erosion and sediment control materials should be kept on hand, (i.e., heavy duty silt fencing, straw bales).
- Keep sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated).
- Schedule grading within 30 m of a watercourse or wetland to avoid times of high runoff volumes (spring and fall), wherever possible. Temporarily suspend work if high runoff volume is noted or excessive flows of sediment discharges occur until mitigation measures are in place.
- Re-vegetate temporary roads to pre-construction conditions as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas.

4. Equipment Use

- Ensure machinery is maintained free of fluid leaks.
- Minimize vehicle traffic on exposed soils, avoid compacting or other hardening of natural ground surface, and avoid the movement of heavy machinery on areas with sensitive slopes.

- Where feasible, light vehicles with wide tires having a large surface area (rather than tracked vehicles) and lighter machinery (e.g. hand-held equipment) should be used in and around natural areas.
- Any vehicles used within natural areas should use wide-based tires. Tracked vehicles should be avoided.
- Site maintenance, vehicle washing and refuelling stations where contaminants are handled should be located at least 30 m away from natural features or water bodies. Vehicle refuelling and maintenance should be done on spill collection pads.

5. Grading and Excavation

- Minimize changes in land contours and natural drainage; maintain timing and quantity of flows. Any grading of lands adjacent to natural heritage features should match existing grades at the identified set-back, or buffer from the features.

6. Material Stockpiling and Handling

- Store any stockpiled materials at least 30 m away from a wetland, woodland or water body to prevent deleterious substances from inadvertently discharging to the environment.
- Develop a spill response plan and train staff on associated procedures.
- Maintain emergency spill kits on site.
- Control soil / water contamination through best management practices.
- Dispose of any waste material from construction activities by authorized and approved off-site vendors.

7. Horizontal Directional Drilling

- Conduct all drilling by licensed drillers in accordance with Regulation 903 under *Ontario Water Resources Act*, R.S.O. 1990.
- Set back drill entry and exit pits at least 30 m from natural features (i.e., woodlands, wetlands) or water bodies.
- Collect drill cuttings as they are generated and place in a soil bin or bag for off-site disposal.
- Ensure drill depth is at an appropriate depth below natural features to reduce the risk of a “frac-out”⁷.
- Monitor natural features for signs of surface disturbance.
- Implement the following Contingency Plan in the event of a “frac-out”:
 - Immediately stop all work, including the recycling of drilling mud / lubricant;
 - Monitor “frac-out” for 4 hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain);
 - If the fracture becomes excessively large, engage a spill response team to contain and clean up excess drilling mud in the water;
 - If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. Revegetated areas will be monitored twice per year for two years subsequent to “frac-out” to confirm revegetation is successful; and
 - Document post-cleanup conditions with photographs and prepare “frac-out” incident report describing time, place, actions taken to remediate “frac-out” and measures implemented to prevent recurrence. Provide incident report to MNR and MOE within 30 days of the incident.

7. *Escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface.*

8. Wildlife Protection

- Clearly post construction speed limits. Install and maintain wildlife crossing and speed limit signs on access roads.
- Conduct post-construction bird and bat mortality monitoring for at least 3 years, as per MNR guidelines.
- Implement operational mitigation measures, as per MNR guidelines, should mortality rates surpass the provincial thresholds for birds or bats.
- Only apply herbicides (if required) when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices).
- Only use herbicides (if required) approved for use adjacent to water bodies, riparian buffers, or woodland edges (does not apply to agricultural practices).

9. Dewatering activities (if necessary)

- Control rate and timing of water pumping.
- Pump from deep wells to infiltration galleries adjacent to water bodies or wetlands.
- Restrict taking of water during periods of extreme low flow.
- Install a temporary storage basin to allow water to infiltrate, or use permanent stormwater management facilities as necessary.

10. Impervious Surfaces

- Maintain vegetative buffers around water bodies.
- Control quantity and quality of stormwater discharge using best management practices.

5.5 Significant Wetlands

This section describes potential negative environmental effects of the proposed Project on significant wetlands, as defined in the Natural Heritage Assessment Guide, during the construction, operational and decommissioning phases. Mitigation measures and monitoring commitments to address these potential negative effects are also described herein. Additional details regarding how the Construction Plan Report and Environmental Effects Monitoring Plan address potential negative environmental effects to wetlands, including performance objectives and monitoring methods, are provided in Sections 5.9 and 5.10, respectively.

A total of 14 wetland complexes treated as significant wetlands and assessed under Appendix C of the Natural Heritage Assessment Guide have been identified within the Goshen Wind Energy Centre Project Study Area (Figure 3.3). These wetlands are referred to as "significant wetlands" herein and are treated as Provincially Significant, although complete OWES evaluations have not been undertaken to confirm the significance of wetlands within the 120 m Area of Investigation. No above-ground project infrastructure (including turbines, access roads, collection lines, transmission line, meteorological towers, operations and maintenance building, or transformer substation) is located within significant wetlands and no vegetation clearing will be required in significant wetlands to accommodate the proposed Project. As a result, there will be no direct loss or fragmentation of significant wetlands.

Where construction of access roads or disturbance areas associated with turbine construction are proposed in agricultural fields adjacent to significant wetlands, a minimum 30 m buffer from the wetland edge will be applied, where possible, in which no physical disturbance will be permitted. This buffer will mitigate potential negative environmental effects associated with construction of turbines, and with construction and operation of access roads.

In all locations where construction of turbines or access roads are proposed within 30 m of a significant wetland, an assessment of the current land use and slope was undertaken to determine whether a larger (i.e., 30 m) setback is warranted, based on correspondence with MNR. In all locations where construction of turbines or access roads is

proposed within 30 m of a significant wetland, agricultural lands (i.e. lands outside the natural area boundaries) within the buffer area are currently under intensive agricultural use. These areas adjacent to wetlands treated as significant are therefore already disturbed as a result of agricultural activities including ploughing and other farming practices. An analysis of topographic mapping (1 m contour intervals) was also undertaken to determine whether the land surface slopes toward wetland features where construction activities are proposed within 30 m. There is one location where there is a greater than 5% slope toward a wetland feature, WET-21 (in natural area 274). In this location, a collection line is proposed 5 m from the feature, at a slope of 5.25%, and is located in the right-of-way of Kirkton Road. On the basis of this assessment, a 5 m setback (measured from the dripline of trees, where applicable) was determined to be sufficient to address potential negative effects to wetlands where construction activities will occur within 30 m with the implementation of standard construction mitigation measures including sediment and erosion controls as described in Table 5.2. Additional mitigation measures, including the establishment of a vegetated buffer, are to be implemented where the minimum 5 m setback is applied during construction of access roads.

Collection lines and the transmission line will be installed under seven significant wetlands via directional drilling technique (collection lines: WET-006, WET-010, WET-014, WET-021, WET-025, WET-032; transmission line: WET-012). In order to avoid impacts to significant wetlands associated with directional drilling, entrance and exit pits will be located a minimum of 30 m away from significant wetlands and no physical disturbance within the 30 m buffer will be permitted. This buffer will mitigate potential negative environmental effects associated with use of equipment and machinery for the installation of collection and transmission lines. Additional mitigation measures specific to the underground installation of collection and transmission lines (i.e., “frac-out” response plan), are described in Section 5.4 of this report and in Table 5.2. The wetland features where directional drilling is required, and the approximate distances of significant wetlands under which drilling will occur, are listed below:

- WET-006: distance 82 m;
- WET-010: distance 127 m;
- WET-012: distance 141 m;
- WET-014: distance in three locations 49 m, 20 m and 122 m;
- WET-021: distance 139 m;
- WET-025: distance 222 m; and
- WET-032: distance in two locations 50 m and 59 m.

Potential residual effects on significant wetlands may occur through grading and subsequent changes in surface water flow patterns and/or local hydrology (refer to Section 5.2.2 for a description of construction activities). These changes could potentially affect hydrologic conditions (i.e., soil moisture) which may lead to potentially adverse changes in vegetation community composition. Other potential residual effects on significant wetlands may occur through construction or operational activities that could result in noise disturbances to wildlife, mobilization of dust, or sedimentation and erosion. These potential residual effects are expected to be short-term and temporary in duration and can be mitigated with the application of specified control measures (refer to Table 5.2).

The significance of anticipated residual effects is low provided that the recommended mitigation measures (as described in Table 5.2) are properly implemented and proactively managed throughout the duration of construction and post-construction activities.

5.5.1 Mitigation Measures

Mitigation measures to address potential negative environmental effects of Project construction, operation and decommissioning on significant wetlands are presented in tabular form in Table 5.2, separated by project infrastructure type. This table describes the potential effects, mitigation measures, residual effects anticipated to remain after mitigation measures are applied and the significance of these residual effects, as well as the proposed monitoring plan, as they relate to significant wetlands located within 120 m of the proposed Project.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
Effects of Turbines					
All wetlands within 120 m of turbines or turbine disturbance areas (WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-032 and WET-049)	Construction/Decommissioning <ul style="list-style-type: none"> Accidental intrusion into significant wetlands resulting in damage to wetland form or function. 	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant features. 	<ul style="list-style-type: none"> Maintain 30 m setback from significant wetlands, where possible, or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. Refer to General Mitigation Measures (Section 5.4) for mitigation measures to be applied where construction occurs within 30 m (WET-006, WET-010, WET-011, WET-032, WET-049). 	<ul style="list-style-type: none"> Damage to wetland vegetation form and function, avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Maintain 30 m setback from significant wetlands, where possible, or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install sediment and erosion control fencing along edge of wetland if within 30 m as per Ontario Provincial Standard Specifications (OPSD 219.130). Refer to General Mitigation Measures (Section 5.4) for mitigation measures including sediment and erosion controls to be applied where construction occurs within 30 m (WET-006, WET-010, WET-011, WET-032 and WET-049). 	<ul style="list-style-type: none"> Sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.

8. Additional details including contingency measures are provided in section 5.9 (construction plan) and section 5.10 (environmental effects monitoring plan) of this report.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
	<ul style="list-style-type: none"> ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. <p>Operation</p> <ul style="list-style-type: none"> • Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant). 	<ul style="list-style-type: none"> • Minimize soil/water contamination. • No off-site contamination of soil or no contamination of groundwater or surface water. 	<ul style="list-style-type: none"> • Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features. • Refer to General Mitigation Measures (Section 5.4) for mitigation measures. • Control soil / water contamination through Best Management Practices (refer to Section 5.4). • Ensure machinery arrives on site in a clean, washed condition and is maintained free of fluid leaks. • Develop a spill response plan and train staff on associated procedures and maintain emergency spill kits on site. • Dispose of any waste material from maintenance activities by authorized and approved off-site vendors. 	<ul style="list-style-type: none"> • Soil and water contamination avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result. • Soil / water contamination minimized through the application of mitigation measures. • Low likelihood and limited magnitude of effects on surface water and groundwater as a result. 	<ul style="list-style-type: none"> • Periodic monitoring during active construction to ensure compliance. • Conduct regular site inspections and monitoring by a designated on-site Environmental Monitor(s). • In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken.
Effects of Access Roads					
<p>All wetlands within 120 m of access road disturbance areas (WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032 and WET-049)</p>	<p>Construction/Decommissioning</p> <ul style="list-style-type: none"> • Accidental intrusion into significant wetlands resulting in damage to wetland form or function. 	<ul style="list-style-type: none"> • Minimize potential for accidental intrusion into significant features. 	<ul style="list-style-type: none"> • Maintain 30 m setback from significant wetlands, where possible or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). • Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Refer to General Mitigation Measures (Section 5.4) for mitigation measures to be applied where construction occurs within 30 m (WET-006, WET-011, WET-012, WET-021 and WET-025). 	<ul style="list-style-type: none"> • Damage to vegetation avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> • Periodic monitoring during active construction to ensure compliance.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Maintain 30 m setback from significant wetlands, where possible, or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install sediment and erosion control fencing along edge of wetland if within 30 m as per Ontario Provincial Standard Specifications (OPSD 219.130). Refer to General Mitigation Measures (Section 5.4) for mitigation measures to be applied where construction occurs within 30 m (WET-006, WET-011, WET-012, WET-021 and WET-025). 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	<ul style="list-style-type: none"> Minimize soil/water contamination. 	<ul style="list-style-type: none"> Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features. Refer to General Mitigation Measures (Section 5.4) for mitigation measures to be applied where construction occurs within 30 m (WET-006, WET-011, WET-012, WET-021 and WET-025). 	<ul style="list-style-type: none"> Soil and water contamination avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance. Conduct daily inspections of construction equipment for leaks / spills.
	<p>Operation</p> <ul style="list-style-type: none"> Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation. 	<ul style="list-style-type: none"> No effects to soil moisture and species composition of vegetation. 	<ul style="list-style-type: none"> Minimize paved surfaces and design roads to promote infiltration. 	<ul style="list-style-type: none"> Effects to soil moisture and species composition of vegetation minimized through application of mitigation measures. Low likelihood and limited magnitude of effects as a result. 	<ul style="list-style-type: none"> Inspect locations within 30 m of wetlands following completion of access roads to ensure no grade changes.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
Wetlands where the minimum 5 m setback will be applied (WET-006 and WET-011)	Construction/Decommissioning <ul style="list-style-type: none"> Increased dust accumulation on peripheral wetland vegetation, causing damage to wetland plants. 	<ul style="list-style-type: none"> Minimize dust accumulation on peripheral vegetation. 	<ul style="list-style-type: none"> Use of water as a dust suppressant along areas where construction is located within 5 m of a significant wetland. 	<ul style="list-style-type: none"> Accumulation of dust on peripheral vegetation avoided or minimized through the application of mitigation measures. Residual effects likely however limited magnitude of effect as a result given the application of mitigation measures. 	<ul style="list-style-type: none"> Daily monitoring when active construction is occurring within 5 m of a significant wetland by an Environmental Monitor.
	<ul style="list-style-type: none"> Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation. 	<ul style="list-style-type: none"> No effects to soil moisture and species composition of vegetation. 	<ul style="list-style-type: none"> Ensure Best Management Practices are used to maintain current drainage patterns. 	<ul style="list-style-type: none"> Changes in surface water drainage patterns avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Daily monitoring when active construction is occurring within 5 m of a significant wetland by an Environmental Monitor.
	<ul style="list-style-type: none"> Increased potential for sediment and erosion. 	<ul style="list-style-type: none"> Reduce sediment and erosion. 	<ul style="list-style-type: none"> Installation of heavy-duty sediment fencing and hay bales where appropriate as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> Increased sedimentation and erosion avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Daily monitoring when active construction is occurring within 5 m of a significant wetland by an Environmental Monitor.
	Operation <ul style="list-style-type: none"> Potential introduction of invasive species into wetlands communities. 	<ul style="list-style-type: none"> Minimize species invasion into wetland communities. 	<ul style="list-style-type: none"> A restoration plan should be implemented to re-vegetate the 5 m buffer between the access road and wetland. This should include the 1 year application of an approved herbicide (as per the Ausable Bayfield Conservation Authority) to eradicate invasive species followed by the cultivation and seeding of the area with a native seed mix as well as the planting of native shrubs along the edge consistent with existing wetland vegetation composition. 	<ul style="list-style-type: none"> Introduction of invasive species avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Monitoring of re-vegetated areas to ensure survival of re-vegetated area. Should seed mix and/or plantings not survive, additional seeding and/or plantings will take place.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
Effects of Underground Collection Lines					
All wetlands within 120 m of collection line disturbance areas (WET-006, WET-008, WET-009, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025 and WET-032)	Construction/ Decommissioning <ul style="list-style-type: none"> Potential for unplanned intrusion into wetlands in event of equipment malfunction due to directional drilling. 	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant wetlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Where feasible, wetland crossings will be within existing right-of-ways adjacent to wetland areas. Where wetlands cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. Locate entrance and exit pits at least 30 m from wetland edge. Install protective fencing around vegetation to prevent accidental damage. Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a "frac-out". Restore drilling sites to pre-construction conditions once construction is complete. Develop and implement an emergency spills plan outlining steps to contain any chemicals and avoid contamination of adjacent wetland features. As part of this plan, "frac-out" provisions will be provided. Installation of sediment fencing as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> Risk of unplanned intrusion into wetland due to directional drilling minimized through the use of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Install heavy duty sediment and erosion control fencing around vegetation to prevent accidental damage as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
	<ul style="list-style-type: none"> Risk of sedimentation or erosion into significant wetlands when directionally drilling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation from directional drilling. 	<ul style="list-style-type: none"> Where wetlands cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. Locate entrance and exit pits at least 30 m from wetland edge. Install protective fencing around vegetation to prevent accidental damage. Locate entrance and exit pits at least 30 m from wetland edge. Install protective fencing around vegetation to prevent accidental damage. Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a "frac-out". 	<ul style="list-style-type: none"> Risk of sedimentation or erosion into wetland due to directional drilling minimized through the use of mitigation measures. Moderate likelihood; however, if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.
	<ul style="list-style-type: none"> Risk of soil / water contamination from spills during directional drilling. 	<ul style="list-style-type: none"> Minimize soil/water contamination during directional drilling. 	<ul style="list-style-type: none"> Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features. Locate entrance and exit pits at least 30 m from wetland edge. Install protective fencing around vegetation to prevent accidental damage. Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a "frac-out". 	<ul style="list-style-type: none"> Risk of soil and water contamination into wetland due to directional drilling minimized through the use of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.
<p>Operation</p> <ul style="list-style-type: none"> No effects on significant wetlands during operation. 		<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant wetlands during operation. 	<ul style="list-style-type: none"> None required.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
Effects of the Transmission Line					
All wetlands within 120 m of transmission line disturbance areas (WET-012, WET-038 and WET-053)	Construction/Decommissioning <ul style="list-style-type: none"> Increased potential for unintended damage to adjacent vegetation due to proximity of transmission line to significant wetlands, small size of the right-of-way and constrained work area. 	<ul style="list-style-type: none"> Reduce damage to adjacent significant wetlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Limit vegetation removal within significant wetlands to the existing right-of-way. Establish 30 m setback to significant wetlands from new pole locations, where possible. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> Damage to vegetation avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Risk of sedimentation or erosion into significant wetlands from excavation. 	<ul style="list-style-type: none"> Minimize sediment and erosion into significant wetlands. 	<ul style="list-style-type: none"> Install sediment and erosion control fencing along edge of wetland within 30 m of transmission line footprint as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> Increased sedimentation and erosion avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Risk of soil / water contamination from spills during construction. 	<ul style="list-style-type: none"> Minimize soil/water contamination. 	<ul style="list-style-type: none"> Develop and implement an emergency spills plan outlining steps to contain any spills to avoid contamination of adjacent wetland features. 	<ul style="list-style-type: none"> Soil and water contamination avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	Operation <ul style="list-style-type: none"> No effects on significant wetlands during operation. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant wetlands during operation. 	<ul style="list-style-type: none"> None required.
Wetland where the transmission line will be installed via directional drilling (WET-12)	Construction/Decommissioning <ul style="list-style-type: none"> Potential for unplanned intrusion into wetlands in event of equipment malfunction due to directional drilling. 	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant wetlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Where wetlands cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. Locate entrance and exit pits at least 30 m from wetland edge. Install protective fencing around vegetation to prevent accidental damage. 	<ul style="list-style-type: none"> Risk of unplanned intrusion into wetland due to directional drilling minimized through the use of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
			<ul style="list-style-type: none"> • Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a “frac-out”. • Restore drilling sites to pre-construction conditions once construction is complete. • Develop and implement an emergency spills plan outlining steps to contain any chemicals and avoid contamination of adjacent wetland features. As part of this plan, “frac-out” provisions will be provided. • Installation of sediment fencing as per Ontario Provincial Standard Specifications (OPSD 219.130). 		
	<ul style="list-style-type: none"> • Increased erosion, sedimentation and turbidity resulting from clearing and grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> • Minimize erosion, sedimentation and turbidity from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> • Install heavy duty protective fencing around vegetation to prevent accidental damage as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> • Risk of erosion, sedimentation and turbidity into wetland minimized through the use of mitigation measures. • Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> • Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> • Risk of sedimentation or erosion into significant wetlands when directionally drilling. 	<ul style="list-style-type: none"> • Minimize erosion, sedimentation and turbidity during directionally drilling. 	<ul style="list-style-type: none"> • Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. • Where wetlands cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. • Locate entrance and exit pits at least 30 m from wetland edge. • Install protective fencing around vegetation to prevent accidental damage. • Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a “frac-out”. • Restore drilling sites to pre-construction conditions once construction is complete. 	<ul style="list-style-type: none"> • Risk of sedimentation into wetland due to directional drilling minimized through the use of mitigation measures. • Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> • Monitor directional drilling for the duration of such activities to ensure that “frac-out” or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
			<ul style="list-style-type: none"> • Develop and implement an emergency spills plan outlining steps to contain any chemicals and avoid contamination of adjacent wetland features. As part of this plan, “frac-out” provisions will be provided. • Installation of sediment fencing as per Ontario Provincial Standard Specifications (OPSD 219.130). 		
	<ul style="list-style-type: none"> • Risk of soil / water contamination from spills during directional drilling. 	<ul style="list-style-type: none"> • Minimize soil/water contamination. 	<ul style="list-style-type: none"> • Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. • Where wetlands cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. • Locate entrance and exit pits at least 30 m from wetland edge. • Install protective fencing around vegetation to prevent accidental damage. • Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a “frac-out”. • Restore drilling sites to pre-construction conditions once construction is complete. • Develop and implement an emergency spills plan outlining steps to contain any chemicals and avoid contamination of adjacent wetland features. As part of this plan, “frac-out” provisions will be provided. • Installation of sediment fencing as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> • Risk of soil and water contamination into wetland due to directional drilling minimized through the use of mitigation measures. • Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> • Monitor directional drilling for the duration of such activities to ensure that “frac-out” or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater.
	<p>Operation</p> <ul style="list-style-type: none"> • No effects on significant wetlands during operation. 	<ul style="list-style-type: none"> • None required. 	<ul style="list-style-type: none"> • None required. 	<ul style="list-style-type: none"> • No effects on significant wetlands during operation. 	<ul style="list-style-type: none"> • None required.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
Effects of the Operations Building, Substation, Construction Laydown Yard, Breaker Switch Station and Meteorological Towers					
All wetlands within 120 m of the above noted infrastructure (WET-053)	Construction/ Decommissioning <ul style="list-style-type: none"> Risk of accidental intrusion by construction vehicles entering site, which is minimized due to location of breaker switch station in relation the wetland. 	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant wetlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 30 m setback from significant wetlands, where possible, or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> Accidental intrusion by construction vehicles avoided through use of mitigation. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effects as a result. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	Operation <ul style="list-style-type: none"> Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance personnel). 	<ul style="list-style-type: none"> No off-site contamination of soil or no contamination of groundwater or surface water. 	<ul style="list-style-type: none"> Control soil / water contamination through best management practices. Ensure machinery arrives on site in a clean, washed condition and is maintained free of fluid leaks. Develop a spill response plan and train staff on associated procedures and maintain emergency spill kits on site. Site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features including water bodies and significant woodlands, wetlands, and wildlife habitat. Implement vehicle and equipment cleaning procedures and practices to 	<ul style="list-style-type: none"> Soil / water contamination minimized through the application of mitigation measures. Low likelihood and limited magnitude of effects on surface water and groundwater as a result. 	<ul style="list-style-type: none"> Conduct regular site inspections and monitoring by a designated on-site Environmental Monitor(s). In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken.

Table 5.2 Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁸
			<p>minimize or eliminate the discharge of pollutants from vehicle/ equipment cleaning operations to watercourses or natural areas.</p> <ul style="list-style-type: none"> • Store any stockpiled materials away from natural features to prevent deleterious substances from inadvertently discharging to the environment. • Dispose of any waste material from maintenance activities by authorized and approved off-site vendors. • Only apply herbicides (if required) when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices). • Only use herbicides (if required) approved for use adjacent to water bodies, riparian buffers, or woodland edges (does not apply to agricultural practices). 		

5.6 Significant Woodlands

This section describes potential negative environmental effects of the proposed Project on significant woodlands, as defined in the Natural Heritage Assessment Guide, during the construction, operational and decommissioning phases. Mitigation measures and monitoring commitments to address these potential negative effects are also described herein. Additional details regarding how the Construction Plan Report and Environmental Effects Monitoring Plan address negative environmental effects, including performance objectives and monitoring methods, are provided in Sections 5.9 and 5.10, respectively.

A total of 65 woodlands meeting the criteria for significant woodlands under the Natural Heritage Assessment Guide have been identified within the Goshen Wind Energy Centre Project Study Area (refer to Figure 3.4). Five woodlands will be affected by clearing of vegetation for the transmission line (WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200). No other above-ground project infrastructure is proposed within significant woodlands. The significant woodland features where vegetation removal is required, and the area of the feature that will be removed, are listed below:

- WOD-120: up to 541 m² of FOD8-1 and 2,030 m² of FOD9a;
- WOD-134: up to 3,535 m² of FOD5-6;
- WOD-164: up to 2,780 m² of SWD3-3;
- WOD-180: up to 8,997 m² of FOD7-1, 535 m² of FOD6-5, and 119 m² of SWD 3-3; and,
- WOD-200: up to 1,102 m² of FOD7f and 8,982 m² FOD6-5.

Where construction activities are proposed in agricultural fields adjacent to significant woodlands a 30 m buffer from the woodland edge will be applied, where possible, in which no physical disturbance will be permitted. This buffer will mitigate potential negative environmental effects associated with construction and operation.

In all locations where construction of turbines or access roads is proposed within 30 m of a significant woodland, an assessment of the current land use and slope was undertaken to determine whether a larger setback is warranted. All agricultural lands (i.e. lands outside the natural area boundaries) within the buffer area are currently under intensive agricultural use. These areas adjacent to significant woodlands are therefore disturbed as a result of agricultural activities including ploughing and other farming practices. An analysis of topographical mapping (1 m contour intervals) was also undertaken to determine whether the land surface slopes toward woodland features wherever construction activities are proposed within 30 m. There are three locations where construction activities area proposed within 30 m of a significant woodland and the ground slopes towards the feature. A collection line is located at the western end of WOD-129, 5 m from the feature at a slope of 5.25%. Here, the collection line is located in the right-of-way of Kirkton Road, and is therefore not considered to have any significant effect to WOD-129 during the construction, decommissioning and operational phases of the Project, provided standard mitigation measures are followed (as described in Table 5.3 below). Two turbine construction disturbance areas are located within 30 m of significant woodlands. The construction disturbance area for Turbine 11 is located 27 m from WOD-306 on a 4.6 % slope, and the construction disturbance area for Turbine 12 is located 26 m from WOD-026 on a 5 % slope. No significant effect to WOD-306 or WOD-026 is anticipated as the infrastructure is negligibly closer to the features than 30 m, provided standard mitigation measures are followed (as described in Table 5.3 below).

Collection lines and transmission lines will be installed under significant woodlands via directional drilling techniques in eleven locations (Collection Line: WOD-001, WOD-018, WOD-032, WOD-034, WOD-054, WOD-101, WOD-133, WOD-191, and WOD-313, Transmission Line: WOD-104 and WOD-109). In order to avoid impacts to significant woodlands associated with directional drilling, entrance and exit pits will be located a minimum of 30 m away from significant woodlands and no physical disturbance within the 30 m buffer will be permitted. This buffer will mitigate potential negative environmental effects associated with use of equipment and machinery for the installation of

collection and transmission lines. Additional mitigation measures specific to the underground installation of collection and transmission lines, i.e., “frac-out” response plan, are shown in described in Section 5.4 of this report and in Table 5.2 below. The woodland features where directional drilling is required, and the approximate distance of significant woodlands under which drilling will occur, are listed below:

- WOD-001: 80 m;
- WOD-018: 21 m;
- WOD-032: 42 m, 121 m (two locations);
- WOD-034: 20 m;
- WOD-054: 128 m;
- WOD-101: 48 m;
- WOD-133: 59 m;
- WOD-191: 140 m;
- WOD-313: 220 m;
- WOD-104: 13 m; and,
- WOD-109: 60 m.

5.6.1 Mitigation Measures

Mitigation measures to address potential negative environmental effects of Project construction, operation and decommissioning on significant woodlands are presented in tabular format in Table 5.3. This table describes the potential effects, mitigation measures, residual effects expected to remain after mitigation measures are applied and the significance of these residual effects, as well as the proposed monitoring plan, as they relate to significant woodlands located within 120 m of the proposed Project.

Table 5.3 Potential Effects on Significant Woodlands and Mitigation Measures

Significant Woodland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁹
Effects of Turbines					
All woodlands within 120 m of turbines or turbine disturbance areas (WOD-001, WOD-012, WOD-018, WOD-026, WOD-033, WOD-034, WOD-053, WOD-054, WOD-060, WOD-063, WOD-068, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-137, WOD-146, WOD-227, WOD-231, WOD-251, WOD-278, WOD-289, WOD-295, WOD-300, WOD-306, WOD-309, WOD-328)	Construction/ Decommissioning	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 5 m setback from significant woodlands, measured from the dripline of trees. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> Loss or fragmentation of woodland habitat or habitat function avoided or minimized. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Accidental intrusion into significant woodlands resulting in damage to trees. 				
All woodlands within 120 m of access road disturbance areas (WOD-012, WOD-018, WOD-026, WOD-032, WOD-033, WOD-047, WOD-049, WOD-053, WOD-054, WOD-064, WOD-068, WOD-070, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-146, WOD-149, WOD-158, WOD-227, WOD-231, WOD-251, WOD-289, WOD-300, WOD-306, WOD-309, WOD-313, WOD-328, WOD-331)	Construction/ Decommissioning	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 5 m setback from significant woodlands, measured from the dripline of trees. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> No loss or fragmentation of woodland habitat or habitat function. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Accidental intrusion into significant woodlands resulting in damage to trees. 				
Effects of Access Roads					
All woodlands within 120 m of access road disturbance areas (WOD-012, WOD-018, WOD-026, WOD-032, WOD-033, WOD-047, WOD-049, WOD-053, WOD-054, WOD-064, WOD-068, WOD-070, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-146, WOD-149, WOD-158, WOD-227, WOD-231, WOD-251, WOD-289, WOD-300, WOD-306, WOD-309, WOD-313, WOD-328, WOD-331)	Construction/ Decommissioning	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 5 m setback from significant woodlands, measured from the dripline of trees. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> No loss or fragmentation of woodland habitat or habitat function. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Accidental intrusion into significant woodlands resulting in damage to trees. 				
Effects of Access Roads					
All woodlands within 120 m of access road disturbance areas (WOD-012, WOD-018, WOD-026, WOD-032, WOD-033, WOD-047, WOD-049, WOD-053, WOD-054, WOD-064, WOD-068, WOD-070, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-146, WOD-149, WOD-158, WOD-227, WOD-231, WOD-251, WOD-289, WOD-300, WOD-306, WOD-309, WOD-313, WOD-328, WOD-331)	Construction/ Decommissioning	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 5 m setback from significant woodlands, measured from the dripline of trees. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> No loss or fragmentation of woodland habitat or habitat function. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Accidental intrusion into significant woodlands resulting in damage to trees. 				

9. Additional details including contingency measures are provided in section 5.9 (construction plan) and section 5.10 (environmental effects monitoring plan) of this report.

Table 5.3 Potential Effects on Significant Woodlands and Mitigation Measures

Significant Woodland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁹
Effects of Underground Collection Lines					
All woodlands within 120 m of collection line disturbance areas (WOD-012, WOD-028, WOD-023, WOD-032, WOD-033, WOD-034, WOD-047, WOD-049, WOD-054, WOD-064, WOD-070, WOD-087, WOD-093, WOD-103, WOD-114, WOD-117, WOD-118, WOD-126, WOD-129, WOD-131, WOD-158, WOD-176, WOD-227, WOD-231, WOD-286, WOD-295, WOD-301, WOD-303, WOD-313, WOD-328)	Construction/ Decommissioning <ul style="list-style-type: none"> Accidental intrusion into significant woodlands resulting in damage to trees. 	<ul style="list-style-type: none"> Minimize accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Install protective fencing around vegetation to prevent accidental damage. 	<ul style="list-style-type: none"> No loss or fragmentation of woodland habitat or habitat function. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	Operation <ul style="list-style-type: none"> No effects on significant woodlands during operation. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant woodlands during operation. 	<ul style="list-style-type: none"> None required.
Woodlands where collection lines will be installed via directional drilling beneath woodlands (WOD-001, WOD-018, WOD-032, WOD-034, WOD-054, WOD-101, WOD-133, WOD-191, and WOD-313)	Construction/ Decommissioning <ul style="list-style-type: none"> Potential for unplanned intrusion into woodlands in event of equipment malfunction due to directional drilling under significant woodlands. 	<ul style="list-style-type: none"> Minimize direct effects on significant woodlands. 	<ul style="list-style-type: none"> Locate entrance and exit pits at least 30 m from woodland edge. Ensure drill depth is at an appropriate depth below woodland to reduce the risk of a “frac-out”. 	<ul style="list-style-type: none"> Risk of unplanned intrusion into woodland due to directional drilling minimized through the use of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor during active drilling.
	<ul style="list-style-type: none"> Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	<ul style="list-style-type: none"> Minimize soil/water contamination. 	<ul style="list-style-type: none"> Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland features. Refer to General Mitigation Measures (Section 5.4) for mitigation measures. 	<ul style="list-style-type: none"> Soil and water contamination avoided or minimized through application of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.

Table 5.3 Potential Effects on Significant Woodlands and Mitigation Measures

Significant Woodland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁹
	Operation • No effects on significant woodlands during operation.	• None required.	• None required.	• No effects on significant woodlands during operation.	• None required.
Effects of the Transmission Line					
Woodlands where transmission line will be installed via directional drilling beneath woodlands (WOD-104 and WOD-109)	Construction/ Decommissioning • Potential for unplanned intrusion into woodlands in event of equipment malfunction due to directional drilling under significant woodlands.	• Minimize direct effects on significant woodlands.	• Locate entrance and exit pits at least 30 m from woodland edge. • Ensure drill depth is at an appropriate depth below woodland to reduce the risk of a “frac-out”.	• Risk of unplanned intrusion into woodland due to directional drilling minimized through the use of mitigation measures. • Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions.	• Monitor during active drilling.
	• Risk of soil or water contamination resulting from accidental spills of fuel, etc.	• Minimize soil/water contamination.	• Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland features. • Refer to General Mitigation Measures (Section 5.4) for mitigation measures.	• Soil and water contamination avoided or minimized through application of mitigation measures. • Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions.	• Periodic monitoring during active construction to ensure compliance.
	Operation • No effects on significant woodlands during operation.	• None required.	• None required.	• No effects on significant woodlands during operation.	• None required.
All woodlands within 120 m of transmission line disturbance areas (WOD-093, WOD-104, WOD-109, WOD-112, WOD-113, WOD-120, WOD-130, WOD-135, WOD-145, WOD-154, WOD-200 and WOD-210)	Construction/ Decommissioning • Increased potential for unintended damage to adjacent vegetation (i.e., damage to roots or branches) due to proximity of transmission line to significant woodlands.	• Minimize accidental intrusion into and/or damage to significant woodlands.	• Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. • Maintain 30 m setback from significant woodland, where possible, or a minimum 5 m setback (measured from the dripline of trees or woodland edge if trees are absent). • Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation.	• Accidental damage to vegetation within significant woodlands will be minimized through the application of mitigation measures. • Low likelihood and limited magnitude of effect as a result, except in woodlands where vegetation removal is proposed (see below).	• Periodic monitoring during active construction to ensure compliance.

Table 5.3 Potential Effects on Significant Woodlands and Mitigation Measures

Significant Woodland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁹
	<p>Operation</p> <ul style="list-style-type: none"> No effects on significant woodlands during operation. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant woodlands during operation. 	<ul style="list-style-type: none"> None required.
<p>Woodlands where vegetation removal is proposed (WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200)</p>	<p>Construction/ Decommissioning</p> <ul style="list-style-type: none"> Clearing of vegetation for transmission line in significant woodlands resulting in loss of forest cover, including: <ul style="list-style-type: none"> WOD-120: up to 541 m² of FOD8-1 and 2,030 m² of FOD9a WOD-134: up to 3,535 m² of FOD5-6 WOD-164: up to 2,780 m² of SWD3-3 WOD-180: up to 8,997 m² of FOD7-1, 535 m² of FOD6-5, and 119 m² of SWD 3-3 WOD-200: up to 1,102 m² of FOD7f and 8,982 m² FOD6-5 	<ul style="list-style-type: none"> Minimize loss of forest cover over time. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Establish an area of forest equal in area to the cleared area (up to 2.86 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). Refer to section 5.8 for additional timing constraints related to wildlife. Clearly stake area to be cleared. Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained. Limit size of machines entering significant woodlands to minimize soil compaction. Removal of tree limbs on adjacent trees being retained should be carried out under supervision of an Arborist or Forester. Damaged tree roots should be cut clean as soon as possible and exposed roots covered in approved topsoil. This work to be carried out under supervision of an Arborist or Forester. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Moderate residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance. Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization).
	<p>Operation</p> <ul style="list-style-type: none"> Clearing of vegetation for maintenance of the transmission line, resulting in accidental damage to woodlands and disturbance to wildlife. 	<ul style="list-style-type: none"> Minimize accidental damage to significant woodlands. 	<ul style="list-style-type: none"> Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). Undertake active nest surveys if clearing vegetation must take place during this period. Clearly stake area to be cleared. Limit size of machines to minimize soil compaction. 	<ul style="list-style-type: none"> Minimal effects on significant woodlands during maintenance. 	<ul style="list-style-type: none"> Removal of tree limbs on adjacent trees being retained should be carried out under supervision of an Arborist or Forester.

Table 5.3 Potential Effects on Significant Woodlands and Mitigation Measures

Significant Woodland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ⁹
	<ul style="list-style-type: none"> Loss of forest cover (up to 2.86 ha) through vegetation clearing in significant woodlands. 	<ul style="list-style-type: none"> No loss of forest cover over time. 	<ul style="list-style-type: none"> Establish an area of forest equal in area to the cleared area (up to 2.86 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Loss of forest cover minimized through afforestation over time. Moderate residual effects. 	<ul style="list-style-type: none"> Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization).
	<ul style="list-style-type: none"> Disturbance to vegetation from herbicide spraying for maintenance of the transmission line. 	<ul style="list-style-type: none"> Minimize disturbance to vegetation. 	<ul style="list-style-type: none"> Minimize aerial extent of herbicide spraying along transmission line. Only apply herbicides when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices). 	<ul style="list-style-type: none"> Operational effects considered negligible 	<ul style="list-style-type: none"> As appropriate, and following the schedule for the application of herbicides, a certified Arborist should be present on site during the application of herbicides along the transmission line.
Effects of the Operations Building, Substation, Construction Laydown Yard, Breaker Switch Station and Meteorological Towers					
All woodlands within 120 m of the above noted infrastructure (WOD-093, WOD-103, WOD-133 and WOD-210)	Construction/ Decommissioning	<ul style="list-style-type: none"> Minimize accidental intrusion into significant woodlands. 	<ul style="list-style-type: none"> Refer to General Mitigation Measures (Section 5.4) for standard mitigation measures. Maintain 5 m minimum setback from significant woodlands where a 30 m setback is not possible, measured from dripline of trees. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. 	<ul style="list-style-type: none"> No loss or fragmentation of woodland habitat or habitat function. Negligible residual effects. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	Operation	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant woodlands during operation. 	<ul style="list-style-type: none"> None required.
	<ul style="list-style-type: none"> No effects on significant woodlands during operation. 				

5.7 Significant Valleylands

This section describes potential negative environmental effects of the proposed Project on significant valleylands, as defined in the Natural Heritage Assessment Guide, during the construction, operational, and decommissioning phases. Mitigation measures and monitoring commitments to address these potential negative effects are also described herein. Additional details regarding how the construction plan report and environmental effects monitoring plan address negative environmental effects, including performance objectives and monitoring methods, are provided in Sections 5.9 and 5.10, respectively.

The transmission line is the only Project component proposed within the single significant valleyland boundary (Figure 3.5). The location of the transmission line crossing of the significant valleyland feature corresponds with the crossing of wetland feature WET-12; therefore, this crossing will be undertaken via directional drilling where natural vegetation occurs. The portions of this crossing located more than 30 m from the wetland boundaries will consist of an above-ground transmission line. The following project components are within 120 m of the significant valleyland: Turbine 67, underground collection lines and access roads. Potential effects from the construction, operation and decommissioning of these project components on significant valleylands are presented in tabular format in Table 5.4. A summary of those potential effects is provided below.

5.7.1 Mitigation Measures

Mitigation measures to address potential negative environmental effects of Project construction, operation and decommissioning on significant valleylands are presented in tabular format in Table 5.4. This table describes the potential effects, mitigation measures, residual effects expected to remain after mitigation measures are applied and the significance of these residual effects, as well as the proposed monitoring plan, as they relate to significant valleylands located within 120 m of the proposed Project.

Table 5.4 Potential Effects on Significant Valleylands and Mitigation Measures

Significant Valleyland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹⁰
Effects of Turbines					
VAL-02	Construction/ Decommissioning • Risk of sedimentation and erosion due to proximity to construction.	• Minimize erosion and sedimentation.	<ul style="list-style-type: none"> Minimize the area and duration of soil exposure. Minimize vehicle traffic on exposed soils and avoid the use of heavy machinery on slopes. Utilize erosion control fencing and keep in place until disturbed areas are stabilized. Schedule grading within 30 m of feature to avoid times of high runoff during spring and fall where possible. Suspend work during periods of excessive flows. Store stockpiled materials away from feature to prevent substances from inadvertently entering feature. 	<ul style="list-style-type: none"> Erosion or sedimentation into valleyland feature will be avoided through mitigation. Low likelihood and limited magnitude of effects as a result. 	• Periodic monitoring during active construction to ensure compliance.
	• Changes to surface water hydrology.	• Minimize changes to surface water hydrology.	<ul style="list-style-type: none"> Limit changes in land contours. Maintain streams and timing and quantity of flow. 	<ul style="list-style-type: none"> Changes in surface water drainage patterns and obstruction of lateral flows avoided through mitigation measures. Low likelihood and limited magnitude of effects as a result. 	• Inspect locations following completion of construction to ensure no grade changes.
	Operation • No effects on significant valleyland during operation.	• None required.	• None required.	• No effects on significant valleylands during operation.	• None required.
Effects of Access Roads					
VAL-02	Construction/ Decommissioning • No effects to valleyland feature due to distance from proposed access road (approximately 35 m).	• None required.	• No additional site specific mitigation measures required.	• No effects to valleyland feature.	• None required.
	Operation • Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation.	• No effects to soil moisture and species composition of vegetation.	<ul style="list-style-type: none"> Implement infiltration techniques to the maximum extent possible. Minimize paved surfaces and design roads to promote infiltration. 	<ul style="list-style-type: none"> Effects to soil moisture and species composition of vegetation minimized through the application of mitigation measures. Low likelihood and limited magnitude of effects as a result. 	• None required.

10. Additional details including contingency measures are provided in section 5.9 (construction plan) and section 5.10 (environmental effects monitoring plan) of this report.

Table 5.4 Potential Effects on Significant Valleylands and Mitigation Measures

Significant Valleyland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹⁰
Effects of Underground Collection Lines					
VAL-02	Construction/ Decommissioning • No effects to feature due to distance from construction (approximately 35 m)	• None required	• None required	• No effects on significant valleyland during construction/ decommissioning.	• None required
	Operation • No effects to feature during operation.	• None required	• None required	• No effects on significant valleyland during operation.	• None required
Effects of the Transmission Line					
VAL-02	Construction/ Decommissioning • Risk of sedimentation and erosion due to construction within valleyland boundaries.	• Minimize sedimentation and erosion.	<ul style="list-style-type: none"> Minimize the area and duration of soil exposure. Minimize vehicle traffic on exposed soils avoid the use of heavy machinery on slopes. Utilize erosion control fencing where potential sedimentation, and keep in place until disturbed areas are stabilized. Schedule grading within 30 m of feature to avoid times of high runoff during spring and fall where possible. Suspend work during periods of excessive flows. Store stockpiled materials away from naturally vegetated portion of feature to prevent substances from inadvertently entering feature. 	<ul style="list-style-type: none"> Erosion or sedimentation into valleyland feature avoided through mitigation. Low likelihood and limited magnitude of effects as a result. 	• Periodic monitoring during active construction to ensure compliance.
	• Changes to surface water hydrology	• Minimize changes to surface water hydrology.	• Limit changes in land contours.	<ul style="list-style-type: none"> Change to surface water hydrology avoided or minimized. Low likelihood and limited magnitude of effects as a result. 	• Periodic monitoring during active construction to ensure compliance.
	Operation • Risk of soil / water contamination from oil, gas etc. during maintenance activities.	• No off-site contamination of soil or no contamination of groundwater or surface water.	• Develop and implement an emergency spills plan outlining steps to contain any spills during maintenance activities to avoid contamination of valleyland habitats.	• Operational effects considered negligible.	<ul style="list-style-type: none"> Conduct regular site inspections and monitoring by a designated on-site Environmental Monitor(s). In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken.

Table 5.4 Potential Effects on Significant Valleylands and Mitigation Measures

Significant Valleyland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹⁰
Effects of the Operations Building, Substation, Construction Laydown Yard, Breaker Switch Station and Meteorological Towers					
VAL-02	Construction/ Decommissioning <ul style="list-style-type: none"> No effects to feature due to distance from construction. 	<ul style="list-style-type: none"> None required 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant valleylands during construction/ decommissioning. 	<ul style="list-style-type: none"> None required.
	Operation <ul style="list-style-type: none"> No effects to feature during operation. 	<ul style="list-style-type: none"> None required 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No effects on significant valleylands during operation. 	<ul style="list-style-type: none"> None required.

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5.8 Significant Wildlife Habitat

This section describes potential negative environmental effects of the proposed Project on Significant Wildlife Habitat, as defined in the Natural Heritage Assessment Guide, during the construction, operational and decommissioning phases. Mitigation measures and monitoring commitments to address these potential negative effects are also described herein. Additional details regarding how the construction plan report and environmental effects monitoring plan address negative environmental effects, including performance objectives and monitoring methods, are provided in Sections 5.9 and 5.10, respectively.

The following Significant Wildlife Habitats were either evaluated and confirmed to be significant or treated as significant, and occur within 120 m of Project infrastructure:

- Bat maternity colonies (BMC-189, BMC-229, BMC-326, BMC-757, BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-342, BMC-352, BMC-358, BMC-372, BMC-648 and BMC-720);
- Amphibian woodland breeding habitat (AWO-14, AWO-25, AWO-27, AWO-30, AWO-33, AWO-34 and AWO-35);
- Habitat for plant species of conservation concern (multiple) (SCP-12, SCP-13, SCP-14, SCP-15, SCP-16 and SCP-17);
- Habitat for bird species of conservation concern (Red-headed Woodpecker) (SCB-03);
- Waterfowl (Tundra Swan) stopover and staging areas (WSST-15 and WSST-36);
- Reptile hibernacula (RH-01); and,
- Turtle over-wintering habitat (TOW-01, TOW-02, and TOW-03); and,
- Habitat for Insect Species of Conservation Concern (Azure Bluet) (SCI-01).

Vegetation removal is planned for transmission line construction in two significant bat maternity colonies (BMC-648 and BMC-720), three amphibian woodland breeding habitats (AWO-33, AWO-34 and AWO-35), one turtle over-wintering habitat (TOW-02), habitat for Azure Bluet - an insect species of conservation concern (SCI-01), and breeding habitat of Red-headed Woodpecker - a bird species of conservation concern (SCB-03). Potential effects of vegetation removal in these Significant Wildlife Habitats include the loss of forest cover and fragmentation. This loss of forest area and fragmentation may have a negative effect on the habitat suitability of the woodland for wildlife species. Vegetation removal in natural areas identified as Significant Wildlife Habitat may displace bats, amphibians or bird species of conservation, or disturb the natural areas such that they become less suitable or unsuitable as habitat for these species. No other above-ground project infrastructure is proposed within Significant Wildlife Habitat.

Bird and/or bat mortality resulting from turbine operation is beyond the scope of the Natural Heritage Assessment process. Mitigation, monitoring commitments and contingency measures associated with potential bird and/or bat mortality resulting from wind turbine operation are addressed in the Environmental Effects Monitoring Plan, as described in the Design and Operation Report for the proposed Project.

Negative effects of wind turbine operation on Significant Wildlife Habitat include the potential for disturbance or disruption to wildlife resulting from noise or vibration emitted from turbines. There is limited literature on the effects of wind turbine disturbance, based on sound and/or vibration, on wildlife. Potential effects include the masking of auditory signals such as amphibian calls and alarm calls. Those studies that have been conducted appear to show little or no behavioural impact of wind turbines on various bird species, although this apparent lack of evidence may also reflect deficiencies in the type or intensity of monitoring (Kingsley and Whittam, 2007). Other studies suggest the behaviour of some wildlife species can be influenced by active turbine operation, for example squirrels may exhibit elevated levels of vigilance and caution (Kikuchi, 2008). It is assumed, but not certain, that behavioural change is caused by noise rather than other factors (Rabin *et al*, 2006). Other studies suggest that because noise

from sources other than turbines, such as traffic, is documented to have negative effects on certain wildlife species at varying distances from the noise source, turbines are likely to have similar effects (U.S. Fish & Wildlife Service, date unavailable). Population-level effects of behavioural change due to noise, as well as definitive setback distances, largely remain to be explored.

The MNR has assessed various types of significant wildlife habitat and identified those types that may be affected by turbine operation, including noise and vibration (Natural Heritage Assessment Guide, Appendix D). Where these habitats occur within 120 m of a proposed turbine location, post-construction monitoring for disturbance effects will occur.

Risks to amphibian woodland breeding habitats, reptile hibernacula and turtle over-wintering habitats are primarily the result of sensitivity of amphibians, snakes and turtles to road mortality associated with migrating between breeding pond/hibernacula/over-wintering sites and their main home range. Amphibians move mostly at night and in particular rainy nights and that is when the greatest mortality would occur. Once construction is complete, traffic is expected to be very light and rarely at night; therefore road mortality is not expected to be significant enough at any location to warrant the use of culverts and drift fences to direct amphibian movements under roads.

Studies into the impacts of wind turbines on Tundra Swan migration are still in the preliminary stages in North America as large scale wind energy development has only recently started to occur. However, European studies on the impacts of wind farms on swan populations are more readily available due to the abundance of European wind energy developments. Despite indicating that geese and swan populations are potentially more vulnerable to risk of collision with wind turbines due their large size and low manoeuvrability (Moorehead and Epstein, 1985) these studies have found that relatively few collisions of geese or swans with wind turbines have been recorded (Hötker *et al.*, 2006). These studies do however note that swans can be particularly sensitive to disturbance and often maintain an average minimum distance of 125 m to 150 m from wind turbines within feeding or staging habitat (Hötker *et al.* 2006). Another study recommends a precautionary minimum setback distance for wind turbines from important feeding or roosting areas for waterfowl of 400 m (Bright *et al.*, 2009). Information provided in the MNR Guide to Significant Wildlife Habitat recommends a buffer for Tundra Swan Stopover and Staging habitat ranging from 100 m to 300 m.

In addition, the following candidate Significant Wildlife Habitats were identified within the 120 m Area of Investigation however not within 120 m of qualifying project infrastructure, and were therefore considered generalized candidate Significant Wildlife Habitat:

- Colonial-nesting Bird Breeding Habitat (Tree/Shrub) (natural area 189);
- Waterfowl nesting areas (natural area 209);
- Reptile hibernacula (natural areas 232, 609 and 695);
- Bat maternity colonies (numerous);
- Amphibian woodland breeding habitat (natural areas 209, 210, 232, 236, 245, 255, 258, 266, 269, 280, 309, 342, 375 and 661);
- Amphibian wetland breeding habitat (natural areas 609 and 754);
- Rare vegetation communities (natural area 309);
- Habitat for area sensitive species: interior forest breeding birds (WOD-331);
- Mature forest stands (numerous);
- Turtle nesting habitat (natural area 209);
- Turtle overwintering habitat (natural areas 209, 255, 266, 609, 661 and 754);
- Woodland raptor nesting habitat (Woodland units WOD-117, WOD-131 and WOD-331);
- Seeps and springs (natural areas 232, 249, 267, 266, 273, 280, 309, 369, 609 and 723); and,
- Habitats of species of conservation concern (numerous).

No above-ground project infrastructure is proposed within generalized candidate Significant Wildlife Habitat and no vegetation clearing will be required in generalized candidate Significant Wildlife Habitat to accommodate the proposed Project. As a result, there will be no direct loss or fragmentation of these habitats. Potential effects to generalized candidate Significant Wildlife Habitat are described in Section 5.3. The proposed Project is not considered to have any significant effects to generalized candidate Significant Wildlife Habitat during the construction, decommissioning and operational phases of the Project, provided standard mitigation measures are followed (as described in Section 5.4). No additional mitigation measures are required for these areas.

5.8.1 Mitigation Measures

Mitigation measures to address potential negative environmental effects of Project construction, operation and decommissioning on Significant Wildlife Habitat are presented in tabular format in Table 5.4. This table describes the potential effects, mitigation measures, residual effects expected to remain after mitigation measures are applied and the significance of these residual effects, as well as the proposed monitoring plan, as they relate to Significant Wildlife Habitat located within 120 m of the proposed Project.

The significance of some Candidate Significant Wildlife Habitats (e.g., amphibian woodland breeding habitat, reptile hibernacula, bat maternity colonies, turtle over-wintering habitat) has yet to be determined, as additional field studies are required to evaluate the significance of these features. For the purposes of this submission, these Candidate Significant Wildlife Habitats have been treated as significant, and mitigation measures and monitoring related to these features is described below. However, the mitigation or monitoring related to these significance designations will only be implemented if the features in question are deemed to be significant under the criteria described in the Evaluation of Significance (Section 4). In instances where these features meet other criteria for significance (i.e., as significant woodlands, wetlands), refer also to other sections of this report for relevant discussion of potential effects and mitigation measures.

Mitigation measures to address potential negative effects to generalized candidate Significant Wildlife Habitat are described in Section 5.4). No additional mitigation measures are required for these areas.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
Effects of Turbines					
Waterfowl (Tundra Swan) Stopover and Staging Habitats (WSST-15 and WSST-36)¹²	Construction/ Decommissioning • Disruption of Tundra Swans in stopover and staging habitat due to construction/decommissioning activities.	• Avoid disruption of Tundra Swans during migration.	• Construction activities within 300 m of the stopover and staging habitat should be timed to avoid Tundra Swan migration (typically early to late March).	• Disruption to Tundra Swan will be avoided by timing of construction activities. • Negligible residual effects.	• None required.
	• Possible indirect effects on stopover and staging habitat conditions through changes to surface water drainage patterns.	• Minimize changes in surface water drainage patterns.	• Minimize land contour changes.	• Habitat damage avoided through maintaining surface water drainage patterns. • Construction effects temporary and minor.	• Inspect locations following completion of construction to ensure no grade changes.
	Operation • Avoidance by Tundra Swans of staging and stopover and staging habitat during migration due to proximity of turbines.	• Minimize disturbance or disruption to Tundra Swan stopover and staging habitats.	• Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. Contingency Measures • Temporary shut-down of select turbines during migration period if disturbance effects are detected. • If necessary, work with MNR to develop other appropriate mitigation measures.	• Significance of residual effects will be determined based on the results of post-construction monitoring.	• Conduct 3 years of post-construction monitoring at Features WSST-15 and WSST-36 (as described in Evaluation of Significance, Section 4 of this report).
Bat Maternity Colonies (BMC-189, BMC-229, BMC-326 and BMC-342) and (BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358 and BMC-372)*	Construction/ Decommissioning • Accidental intrusion into natural features resulting in habitat damage.	• Minimize accidental intrusion into natural features.	• Clearly delineate habitat boundaries where construction will occur within 10 m using protective fencing to ensure that construction activities occur outside the habitat boundaries.	• Habitat damage will be avoided through clear delineation of boundaries and protective fencing. • Negligible residual effects.	• Periodic monitoring during construction activities to ensure compliance.
	• Bats may be disturbed by noise from construction.	• Minimize disturbance to bat roosting habitat.	• Confine construction activities within 30 m of significant bat habitats to daylight hours during the period of May 1 st to August 31 st , wherever possible.	• Disturbance will be avoided or minimized through timing of construction. • Construction effects temporary and minor.	• None required.
	Operation • Bats may be disturbed by noise from operation.	• Protect bat roosting habitat.	• Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring.	• Significance of residual effects will be determined based on the results of post-construction monitoring.	• Conduct 1 year of post-construction habitat monitoring according to protocol described for pre-construction survey to

11. Additional details including contingency measures are provided in Section 5.9 (construction plan) and Section 5.10 (environmental effects monitoring plan) of this report.

12. Mitigation and monitoring commitments will be applied in the event that pre-construction evaluation of significant studies determine this feature to be Significant Wildlife Habitat. If pre-construction evaluation of significant studies confirm that this feature is not Significant Wildlife Habitat, the mitigation and monitoring commitments described in the table above will not be applied.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
			<p>Contingency Measures</p> <ul style="list-style-type: none"> If a permanent disturbance has been noted within this wildlife habitat, the MNR will be contacted to determine whether additional mitigation measures will be needed. 		<p>determine if the habitat remains significant (Refer to Evaluation of Significance, Section 4).</p> <ul style="list-style-type: none"> If this first year of post-construction monitoring indicates that a feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods to determine if a change may represent normal variation in population or if the project has had an effect. If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected.
	<ul style="list-style-type: none"> Avoidance caused by turbine lighting. 	<ul style="list-style-type: none"> Protect bat roosting habitat. 	<ul style="list-style-type: none"> Propose a lighting scheme that will minimize potential disturbance to bats, while fulfilling Transport Canada requirements. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 1 year of post-construction habitat monitoring according to protocol described for pre-construction survey to determine if the habitat remains significant (Refer to Evaluation of Significance, Section 4). If this first year of post-construction monitoring indicates that a feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods to determine if a change may represent normal variation in population or if the project has had an effect.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
					<ul style="list-style-type: none"> If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected.
Bat Maternity Colony (BMC-757)	Construction/ Decommissioning <ul style="list-style-type: none"> Accidental intrusion into natural feature resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize accidental intrusion into natural features. 	<ul style="list-style-type: none"> Clearly delineate habitat boundaries where construction will occur within 10 m using protective fencing to ensure that construction activities occur outside the habitat boundaries. 	<ul style="list-style-type: none"> Habitat damage will be avoided through clear delineation of boundaries and protective fencing. 	<ul style="list-style-type: none"> Periodic monitoring during construction activities to ensure compliance.
	<ul style="list-style-type: none"> Bats may be disturbed by noise from construction. 	<ul style="list-style-type: none"> Protect bat roosting habitat. 	<ul style="list-style-type: none"> Confine construction activities within 30 m of significant bat habitats to daylight hours during the period of May 1st to August 31st, wherever possible. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> None required.
	Operation <ul style="list-style-type: none"> Bats may be disturbed by noise from operation. 	<ul style="list-style-type: none"> Protect bat roosting habitat. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction habitat monitoring according to protocol described for pre-construction survey to determine if the habitat remains significant (Refer to Evaluation of Significance, Section 4).
	<ul style="list-style-type: none"> Avoidance caused by turbine lighting. 	<ul style="list-style-type: none"> Protect bat roosting habitat 	<ul style="list-style-type: none"> Propose a lighting scheme that will minimize potential disturbance to bats, while fulfilling Transport Canada requirements. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction habitat monitoring according to protocol described for pre-construction survey to determine if the habitat remains significant (Refer to Evaluation of Significance, Section 4).
Effects of Access Roads					
Waterfowl (Tundra Swan) Stopover and Staging Habitats (WSST-15 and WSST-36)*	Construction/ Decommissioning <ul style="list-style-type: none"> Disruption of Tundra Swans in stopover and staging habitat due to construction/decommissioning activities. 	<ul style="list-style-type: none"> Avoid disruption of Tundra Swans during migration. 	<ul style="list-style-type: none"> Construction activities within 300 m of the stopover and staging habitat should be timed to avoid Tundra Swan migration (typically early to late March). 	<ul style="list-style-type: none"> Disruption to Tundra Swan will be avoided by timing of construction activities. Negligible residual effects. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Possible indirect effects on stopover and staging habitat conditions through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize changes in surface water drainage patterns in order. 	<ul style="list-style-type: none"> Minimize land contour changes. 	<ul style="list-style-type: none"> Habitat damage avoided through maintaining surface water drainage patterns. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Inspect locations following completion of construction to ensure no grade changes.
	<p>Operation</p> <ul style="list-style-type: none"> Disturbance to Tundra Swan stopover and staging habitat due to increased vehicular traffic. 	<ul style="list-style-type: none"> Minimize disturbance or disruption to Tundra Swan stopover and staging habitat. 	<ul style="list-style-type: none"> Avoid using access roads adjacent to Tundra Swan stopover and staging habitat during migration period (typically early to late March), to the extent possible. 	<ul style="list-style-type: none"> Disturbance effects reduced through mitigation measures. Operational effects minor (i.e., no or limited disturbance expected). 	<ul style="list-style-type: none"> None required.
<p>Amphibian Woodland Breeding Habitat (AWO-14, AWO-25, AWO-27 and AWO-30)</p>	<p>Construction/ Decommissioning</p> <ul style="list-style-type: none"> Accidental intrusion into natural features resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize accidental intrusion into natural features 	<ul style="list-style-type: none"> Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. 	<ul style="list-style-type: none"> Disruption to amphibian habitats avoided by clearly marking boundaries. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring during construction activities to ensure compliance.
	<ul style="list-style-type: none"> Disruption of amphibians moving between breeding pools and home range. 	<ul style="list-style-type: none"> Minimize disruption to amphibian movement 	<ul style="list-style-type: none"> Limit construction of roads within 30 m of significant amphibian habitats to daylight hours between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), to avoid excessive noise and vehicle caused mortality, wherever possible. Post speed limits along construction access roads. 	<ul style="list-style-type: none"> Disruption mitigated through construction timing and speed limits. Construction effects temporary and minor. 	<ul style="list-style-type: none"> None required.
	<ul style="list-style-type: none"> Increased erosion and, sedimentation resulting from clearing and grubbing, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation to breeding habitat. 	<ul style="list-style-type: none"> Install sediment and erosion control fencing along edge of wetland if within 30 m. 	<ul style="list-style-type: none"> Sedimentation mitigated through sediment and erosion control fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active construction to ensure compliance.
	<ul style="list-style-type: none"> Possible indirect effects on breeding pool condition through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize indirect effects on breeding pools. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of vernal pools during construction. 	<ul style="list-style-type: none"> Effects mitigated if no grade changes occur. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Inspect locations following completion of access roads to ensure no grade changes. Examine condition of vernal pools or ponds within 30 m of road following completion of construction.
	<p>Operation</p> <ul style="list-style-type: none"> Risk of mortality to amphibians moving between breeding pools and home range. 	<ul style="list-style-type: none"> Minimize amphibian mortality along access roads. 	<ul style="list-style-type: none"> Advise operations staff to avoid driving roads in proximity to these features at night between April 1st and June 30th, and any rainy nights from spring to early autumn, wherever possible. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through mitigation measures. Low likelihood of mortality due to infrequent use of 	<ul style="list-style-type: none"> Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
			<ul style="list-style-type: none"> Maintain wildlife crossing signs and limit speed of vehicles near crossings. 	access roads by maintenance vehicles.	<p>assess potential changes in amphibian breeding populations or species distribution.</p> <ul style="list-style-type: none"> If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, as determined through consultation with MNR.
Amphibian Movement Corridors (AWO-27)	Construction/ Decommissioning <ul style="list-style-type: none"> Risk of mortality to amphibians moving between breeding pool and home range. 	<ul style="list-style-type: none"> Minimize amphibian mortality along access road. 	<ul style="list-style-type: none"> Advise operations staff to avoid driving roads in proximity to this feature at night between April 1st and June 30th and any rainy nights from spring to early autumn, wherever possible. Enforce slow vehicle speeds. Post and maintain speed limit signs. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through mitigation measures. Operation effects minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> If construction occurs after dark in or near identified movement corridors between April 1st and June 30th and rainy nights from spring to early autumn, amphibian mortality surveys will be conducted the following day.
	Operation <ul style="list-style-type: none"> Risk of mortality to amphibians moving between breeding pools and home range. 	<ul style="list-style-type: none"> Minimize amphibian mortality along access road. 	<ul style="list-style-type: none"> Avoid construction in proximity to these features at night between April 1st and June 30th and any rainy nights from spring to early autumn, wherever possible. Maintain wildlife crossing signs and limit speed of vehicles near crossings. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through mitigation measures. Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> No additional monitoring required.
Reptile Hibernacula (RH-01)*	Construction/ Decommissioning <ul style="list-style-type: none"> Accidental intrusion into natural feature resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize accidental intrusion into natural feature. 	<ul style="list-style-type: none"> Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. 	<ul style="list-style-type: none"> Habitat damage will be avoided and mortality minimized through clear habitat delineation. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring during construction activities to ensure no accidental intrusion is occurring.
	<ul style="list-style-type: none"> Possible mortality from equipment. 	<ul style="list-style-type: none"> Minimize mortality from equipment. 	<ul style="list-style-type: none"> Construction activities within 60 m of the hibernaculum should be timed to avoid timing windows during which snakes emerge (April 15 - May 31) and return (September 1 – October 15) to hibernacula. If construction must take place during these timing windows, erect temporary drift fence between edge of habitat and road if hibernaculum is within 60 m of road. 	<ul style="list-style-type: none"> Habitat damage will be avoided and mortality minimized through construction timing and drift fencing. Construction effects temporary and minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> Weekly inspection of drift fence while construction is occurring during specified timing windows.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	Operation <ul style="list-style-type: none"> Possible mortality from vehicles using road. 	<ul style="list-style-type: none"> Minimize snake mortality along access road. 	<ul style="list-style-type: none"> Advise operations staff to take extra care while driving near Feature RH-01. Erect long term drift fence between edge of habitat and road if hibernaculum determined to be large (> 25 snakes). 	<ul style="list-style-type: none"> Risk of snake mortality minimized through the application of mitigation measures. Low likelihood of occurring and limited magnitude (i.e., no or limited mortality expected) due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> Conduct reptile hibernacula survey for 2 years post-construction to assess any potential changes in snake populations or species composition, according to protocol described for pre-construction survey (refer to Evaluation of Significance, Section 4). The findings of the reptile hibernacula monitoring programs will be reported back to MNR on an annual basis for the first 2 years of operation.
Turtle Over-wintering Habitat (TOW-01 and TOW-03)	Construction/ Decommissioning <ul style="list-style-type: none"> Accidental intrusion into natural features resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize intrusion into habitat. 	<ul style="list-style-type: none"> Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. Fence area as far from pond and as close to proposed road as possible. 	<ul style="list-style-type: none"> Disruption to turtle over-wintering habitats avoided and through habitat delineation and fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring during active construction to ensure compliance.
	<ul style="list-style-type: none"> Disruption of turtles moving between over-wintering ponds and other areas. 	<ul style="list-style-type: none"> Minimize disruption to turtle movement. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to proposed road as possible. Post speed limits and turtle crossing signage along relevant construction access road. 	<ul style="list-style-type: none"> Disruption minimized through speed limits and fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Examine condition of fencing and speed limit signs periodically during active construction.
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation in potential breeding pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to proposed road as possible. Install sediment and erosion control fencing at fenced area location. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active construction to ensure compliance.
	<ul style="list-style-type: none"> Possible indirect effects on over-wintering pond condition through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize indirect effects on pond through changes in surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of pond. 	<ul style="list-style-type: none"> Indirect effects to habitat minimized by maintaining grade. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Examine condition of pond and area within 30 m of road periodically during active construction.
	Operation <ul style="list-style-type: none"> Risk of mortality to turtles moving between over-wintering ponds and other areas. 	<ul style="list-style-type: none"> Minimize turtle mortality along access roads. 	<ul style="list-style-type: none"> Maintain wildlife crossing signs and limit speed of vehicles near over-wintering pond. 	<ul style="list-style-type: none"> Risk of turtle mortality reduced through mitigation measures. Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
Habitat for Plant Species of Conservation Concern (SCP-12, SCP-13, SCP-14, SCP-15, SCP-16 and SCP-17)	Construction/ Decommissioning • No effects to features due to distance (all >120 m from proposed access roads).	• None required.	None required.	• No effects on features.	• None required.
	Operation • No effects on features during operation.	• None required.	• None required.	• No effects on features.	• None required.
Effects of Collection Lines					
Waterfowl (Tundra Swan) Stopover and Staging Habitats (WSST-15 and WSST-36)*	Construction/ Decommissioning • Disruption of Tundra Swans migrating through area due to construction/decommissioning activities.	• Avoid disruption of Tundra Swans during migration.	• Construction activities within 300 m of the stopover and staging habitat should be timed to avoid Tundra Swan migration (typically early to late March).	• Disruption to Tundra Swan will be avoided by timing of construction activities. • Negligible residual effects.	• None required.
	• Possible indirect effects on stopover and staging habitat conditions through changes to surface water drainage patterns.	• Minimize changes in surface water drainage patterns in order.	• Minimize land contour changes.	• Habitat damage avoided through maintaining surface water drainage patterns. • Construction effects temporary and minor.	• Inspect locations following completion of construction to ensure no grade changes.
	Operation • No effects on natural features during operation.	• None required.	• None required.	• No effects on natural features during operation.	• None required.
Effects of the Transmission Line					
Habitat for Insect Species of Conservation Concern: Azure Bluet Habitat (SCI-01)	Construction/ Decommissioning • Removal of vegetation (up to 1,102 m ² of FOD7f and 8,982 m ² FOD6-5) within significant feature resulting in habitat damage.	• Minimize disturbance to Azure Bluet habitat. • No destruction of breeding pond.	• Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur. • Fence area as far from pond and as close to transmission line disturbance area as possible. • Minimize the area of tree removal within the natural area to the extent possible. • Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas.	• Clearing of vegetation will occur for the transmission line. • Disruption to Azure Bluet habitat avoided or minimized through setback and protective fencing. • Moderate residual effects.	• Periodic monitoring during active construction to ensure compliance. • Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Increased erosion and sedimentation from clearing and grubbing, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation in pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line disturbance area as possible. Install sediment and erosion control fencing at fenced area location. Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active construction to ensure compliance. Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Possible indirect effects on pool condition through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize indirect effects on pond through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of pond. 	<ul style="list-style-type: none"> Indirect effects to habitat minimized by maintaining grade. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<p>Operation</p> <ul style="list-style-type: none"> Increased erosion and sedimentation resulting from transmission line maintenance activities including vegetation removal. 	<ul style="list-style-type: none"> Minimize disturbance to pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Install sediment and erosion control fencing at fenced area location before commencing maintenance activities and maintain in place until disturbed areas are stabilized and re-vegetated. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Operational maintenance effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active maintenance to ensure compliance.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Removal of vegetation within Azure Bluet Habitat resulting from clearing for transmission line. 	<ul style="list-style-type: none"> Minimize disturbance to Azure Bluet habitat. No destruction of breeding pond. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through construction monitoring. <p>Contingency Measures</p> <ul style="list-style-type: none"> Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Disruption to Azure Bluet habitat avoided or minimized through mitigation measures applied during construction. Moderate residual effects. 	<ul style="list-style-type: none"> If negative effects to the pond are detected through construction monitoring, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Turtle Over-wintering Habitat (TOW-02)	<p>Construction/ Decommissioning</p> <ul style="list-style-type: none"> Removal of vegetation (up to 1,102 m² of FOD7f and 8,982 m² FOD6-5) within significant feature resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize disturbance to turtle over-wintering habitat. No destruction of over-wintering pond. 	<ul style="list-style-type: none"> Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur. Fence area as far from pond and as close to transmission line disturbance area as possible. Minimize the area of tree removal within the natural area to the extent possible. Vegetation removal should occur outside the timing windows when turtles would be emerging (May and June) or returning (September and October) to over-wintering habitat. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Disruption to turtle over-wintering habitat avoided through setback and fencing. Moderate residual effects. 	<ul style="list-style-type: none"> Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Possible mortality of turtles during construction. 	<ul style="list-style-type: none"> Minimize turtle mortality. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line disturbance area as possible. Vegetation removal should occur outside the timing windows when turtles would be emerging (May and June) or returning (September and October) to over-wintering habitat. 	<ul style="list-style-type: none"> Risk of turtle mortality reduced through mitigation measures. Construction effects temporary and minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> Periodic inspection of protective fencing during active construction.
	<ul style="list-style-type: none"> Disruption of turtles moving to over-wintering pond and other areas. 	<ul style="list-style-type: none"> Minimize disruption to turtle movement along transmission line. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Vegetation removal should occur outside the timing windows when turtles would be emerging (May and June) or returning (September and October) to over-wintering habitat. 	<ul style="list-style-type: none"> Disturbance to turtle movement avoided or minimized through protective fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Examine condition of fencing during active construction.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling. 	<ul style="list-style-type: none"> Minimize erosion and sedimentation in pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Install sediment and erosion control fencing at fenced area location. Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active construction to ensure compliance. Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Possible indirect effects on over-wintering habitat condition through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize effects on pond through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of pond. 	<ul style="list-style-type: none"> Indirect effects mitigated by maintaining grade. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of condition of the pond during construction. If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
<p>Operation</p> <ul style="list-style-type: none"> Risk of mortality to turtles moving between over-wintering habitat and other areas resulting from transmission line maintenance activities including vegetation removal. 	<ul style="list-style-type: none"> Minimize turtle mortality along transmission line. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible during maintenance. Advise operations staff to avoid maintenance activities in proximity to this feature in May, June, September or October. 	<ul style="list-style-type: none"> Risk of turtle mortality reduced through mitigation measures. Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> None required. 	

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Removal of vegetation within turtle over-wintering habitat resulting from clearing for transmission line. 	<ul style="list-style-type: none"> Minimize disturbance to Over-wintering habitat. No destruction of over-wintering pond. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through construction monitoring. <p>Contingency Measures</p> <ul style="list-style-type: none"> Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Disruption to turtle over-wintering habitat avoided through setback and fencing. Moderate residual effects. 	<ul style="list-style-type: none"> If negative effects to the pond are detected through construction monitoring, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from transmission line maintenance activities including vegetation removal. 	<ul style="list-style-type: none"> Minimize disturbance to pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Install sediment and erosion control fencing at fenced area location before commencing maintenance activities and maintain in place until disturbed areas are stabilized and re-vegetated. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Operational maintenance effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active maintenance to ensure compliance.
Amphibian Breeding Habitat (AWO-033, AWO-34 and AWO-35)*	<p>Construction/ Decommissioning</p> <ul style="list-style-type: none"> Removal of vegetation within significant feature resulting in habitat damage, including: <ul style="list-style-type: none"> AWO-33: up to 1,102 m² of FOD7f and 8,982 m² FOD6-5 AWO-34: up to 8,997 m² of FOD7-1, 535 m² of FOD6-5, and 119 m² of SWD 3-3 AWO-35: up to 541 m² of FOD8-1 and 2,030 m² of FOD9a 	<ul style="list-style-type: none"> Minimize disturbance to amphibian breeding habitat. No destruction of breeding pond. 	<ul style="list-style-type: none"> Focus construction activities within the woodland to outside April 1st and June 30th (for significant frog breeding habitats) or March 15th and April 30th (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur. Minimize the area of tree removal within the natural area to the extent possible. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding habitat should remain undisturbed. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Examine condition of vernal pools or ponds following completion of construction. If significant declines or disappearance of species is detected through post-construction monitoring, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Disruption of amphibians moving to breeding pools and home range. 	<ul style="list-style-type: none"> Minimize disruption to amphibian movement. 	<ul style="list-style-type: none"> Focus construction activities within the woodland to outside April 1st and June 30th (for significant frog breeding habitats) or March 15th and April 30th (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. 	<ul style="list-style-type: none"> Disruption to amphibians avoided with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> No disturbance to breeding amphibians. No destruction (including erosion and sedimentation) of breeding sites. 	<ul style="list-style-type: none"> Install sediment and erosion control fencing along edge pool or pond if within 30 m. Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active construction to ensure compliance. Periodic monitoring of condition of the pond during construction.
	<ul style="list-style-type: none"> Possible indirect effects on breeding pool condition through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize indirect effects on pond through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of vernal pools or ponds during construction. 	<ul style="list-style-type: none"> Indirect effects to significant wildlife habitat minimized with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control.
<p>Operation</p> <ul style="list-style-type: none"> Breeding amphibians may be disturbed by routine maintenance of transmission line corridor. 		<ul style="list-style-type: none"> Minimize disturbance due to maintenance activities. 	<ul style="list-style-type: none"> Advise operations staff to avoid, where possible, maintenance activities in proximity to these features between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), and any rainy nights from spring to early autumn. 	<ul style="list-style-type: none"> Risk of disturbance reduced through mitigation measures, including maintenance timing. Low likelihood of occurring and limited magnitude of residual effects 	<ul style="list-style-type: none"> Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution, following the protocol for pre-construction surveys (refer to Evaluation of Significance, Section 4).
<ul style="list-style-type: none"> Risk of mortality to amphibians moving between breeding pools and home range. 		<ul style="list-style-type: none"> No amphibian mortality due to maintenance activities. 	<ul style="list-style-type: none"> Advise operations staff to avoid, where possible, maintenance activities in proximity to these features between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), and any rainy nights from spring to early autumn. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through maintenance timing. Low likelihood of occurring and limited magnitude of residual effects. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Increased erosion and sedimentation resulting from transmission line maintenance activities including vegetation removal. 	<ul style="list-style-type: none"> Minimize disturbance to pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Install sediment and erosion control fencing at fenced area location before commencing maintenance activities and maintain in place until disturbed areas are stabilized and re-vegetated. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Operational maintenance effects temporary and minor. 	<ul style="list-style-type: none"> Periodic monitoring of sediment and erosion controls during active maintenance to ensure compliance.
	<ul style="list-style-type: none"> Removal of vegetation within amphibian woodland breeding habitats resulting from clearing for transmission line. 	<ul style="list-style-type: none"> Minimize disturbance to amphibian breeding habitat. No destruction of breeding pond. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through construction monitoring. <p>Contingency Measures</p> <ul style="list-style-type: none"> Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. 	<ul style="list-style-type: none"> Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding pond should remain undisturbed. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution, following the protocol for pre-construction surveys (refer to Evaluation of Significance, Section 4). Contingency Measures: If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
	<ul style="list-style-type: none"> Risk of disturbance and/or mortality from herbicide spraying along transmission line. 	<ul style="list-style-type: none"> Minimize disturbance and/or mortality from herbicide spraying. 	<ul style="list-style-type: none"> Minimize aerial extent of herbicide spraying along transmission line. Only apply herbicide when wind speeds are low and no significant precipitation is expected. Maintain 10 m buffer to pond where no herbicides area applied. 	<ul style="list-style-type: none"> Risk of amphibian mortality or disturbance reduced through mitigation measures, including minimizing aerial extent of spraying. Low likelihood of occurring and limited magnitude of residual effects. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
Bird Species of Special Concern Habitat: Red-Headed Woodpecker (SCB-03)	Construction/ Decommissioning <ul style="list-style-type: none"> Removal of vegetation (up to 1,102 m² of FOD7f and 8,982 m² FOD6-5) within significant feature resulting in habitat damage. 	<ul style="list-style-type: none"> Minimize disturbance to breeding habitat. No destruction of nesting site. 	<ul style="list-style-type: none"> Focus construction activities within habitat to outside the breeding season of May 1st to July 31st. Maintain a 10 m buffer around the nest within which no vegetation removal will occur. Clearly delineate habitat boundaries (i.e. 10 m buffer) using protective fencing to ensure that construction activities occur outside the habitat boundaries. Minimize the area of tree removal within the natural area to the extent possible. Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. If possible, leave some woody debris to decompose naturally. Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. 	<ul style="list-style-type: none"> Some permanent vegetation removal within the woodland containing the Red-Headed Woodpecker nesting site will occur. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Supervision of vegetation removal by a qualified Biologist to ensure no destruction of nesting habitat.
	<ul style="list-style-type: none"> Breeding birds may be disturbed by noise from construction. 	<ul style="list-style-type: none"> Minimize disturbance to breeding birds. 	<ul style="list-style-type: none"> Focus construction activities within habitat to outside the breeding season of May 1st to July 31st. 	<ul style="list-style-type: none"> Disturbance avoided through timing of construction activities. No residual effects anticipated. 	<ul style="list-style-type: none"> None required.
	Operation <ul style="list-style-type: none"> Red-headed Woodpecker breeding habitat may be disturbed by routine maintenance of transmission line corridor. 	<ul style="list-style-type: none"> No displacement of Red-headed Woodpeckers from habitat. No destruction of nesting habitat. 	<ul style="list-style-type: none"> Perform maintenance operations such as vegetation clearing outside the breeding season of May 1st to July 31st. Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. 	<ul style="list-style-type: none"> If routine maintenance operations such as vegetation trimming and clearing are conducted outside the breeding season of May 1st to July 31st there should be minimal residual effects from the maintenance of the transmission line. Nesting in utility poles has been recorded for Red-Headed Woodpecker, thus there is a possibility that the poles could provide future nesting habitat. 	<ul style="list-style-type: none"> Supervision of vegetation removal by qualified Biologist to ensure no destruction of nesting habitat.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Removal of vegetation within Red-Headed Woodpecker Breeding Habitat resulting from clearing for transmission line. 	<ul style="list-style-type: none"> No displacement of breeding Red-headed Woodpeckers from habitat. No destruction of nesting habitat. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. <p>Contingency Measures</p> <ul style="list-style-type: none"> Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR. 	<ul style="list-style-type: none"> Some permanent vegetation removal within the woodland containing the Red-Headed Woodpecker nesting site will occur. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction monitoring according to protocol described for pre-construction surveys (refer to Evaluation of Significance, Section 4). In addition, conduct monitoring and evaluation of Red-Headed Woodpecker nest site to measure the use of the nesting location, and the success of breeding efforts. Examine utility poles for signs of nesting by Red-Headed Woodpecker. The findings of the post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation. If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR.
Bat Maternity Colonies (BMC-648 and BMC-720)*	<p>Construction/ Decommissioning</p> <ul style="list-style-type: none"> Displacement and/or mortality of nursing female and juvenile bats. 	<ul style="list-style-type: none"> No displacement and/or mortality of nursing female and juvenile bats. 	<ul style="list-style-type: none"> Prepare a tree preservation plan which identifies specific trees to be removed and whether each tree contains a cavity suitable for potential use as a bat maternity colony. Tree removal will occur outside of the maternity and summer swarming period of May 1st to August 31st, wherever possible. If this is not possible, MNR will be consulted regarding any additional mitigation measures that may be required. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> None required.

Table 5.5 Potential Effects on Significant Wildlife Habitat and Mitigation Measures

Significant Wildlife Habitat	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan ¹¹
	<ul style="list-style-type: none"> Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees. 	<ul style="list-style-type: none"> Successful relocation of any significant maternity colonies that may be removed (if applicable). 	<ul style="list-style-type: none"> For each suitable cavity tree to be removed, a bat house will be installed in the closest suitable woodland habitat (the remainder of the woodland for each of the affected habitats). Details of bat box construction and placement will be provided to MNR for approval prior to installation. If a significant maternity colony must be removed, timing, location, and bat house design will be of utmost importance for the colony to successfully re-establish, and will be discussed with the MNR. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> None required.
	<ul style="list-style-type: none"> Noise disturbance and/or avoidance behaviour during construction. 	<ul style="list-style-type: none"> Minimize noise disturbance and/or avoidance behaviour during construction. 	<ul style="list-style-type: none"> Tree removal should occur outside of the summer swarming and roosting period of local bat species (May 1st to August 31st). 	<ul style="list-style-type: none"> Disturbance avoided through timing of construction activities. No residual effects anticipated. 	<ul style="list-style-type: none"> None required.
<p>Operation</p> <ul style="list-style-type: none"> Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees. 		<ul style="list-style-type: none"> Protection of bat roosting habitat. 	<ul style="list-style-type: none"> For each suitable cavity tree to be removed, a bat house will be installed in the closest suitable woodland habitat (the remainder of the woodland for each of the affected habitats). Details of bat box construction and placement will be provided to MNR for approval prior to installation. If a significant maternity colony must be removed, timing, location, and bat house design will be of utmost importance for the colony to successfully re-establish, and will be discussed with the MNR. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct post-construction visual monitoring of any bat boxes installed for 3 years after construction, to determine the success of the implemented mitigation measures, Conduct post-construction monitoring of all remaining cavity trees within this feature for 3 years after construction, following pre-construction methods as outlined in this table for features determined to be significant. If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.

5.9 Construction Plan

The following section describes how the draft Goshen Construction Plan Report (AECOM, 2012) addresses negative environmental effects to significant natural feature identified in the EIS.

5.9.1 Potential Negative Environmental Effects Resulting From Construction

5.9.1.1 Generalized Candidate Significant Wildlife Habitat

The features containing generalized candidate Significant Wildlife Habitat are identified above in Table 4.4. The potential effects from construction activities on generalized candidate Significant Wildlife Habitat are as follows:

- Increased erosion and sedimentation resulting in increased inputs of nutrients and contaminants to wetlands, woodlands and other significant natural features, resulting from:
 - clearing and grubbing for construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
 - excavation and backfilling for construction of turbines, collection lines, transmission line, operations building and substation;
 - directional drilling for construction of collection lines;
- Removal/disturbance of topsoil and increased soil compaction from manoeuvring of heavy machinery, excavation and backfilling of turbine foundation for construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
- Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement from construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
- Disturbance to or loss of wildlife habitat from construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
- Damage to vegetation while operating equipment used in construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
- Soil / water contamination by oils, gasoline, grease and other materials from:
 - construction equipment, material stockpiling and handling for construction of turbines, access roads, pads/turnaround areas, collection lines, transmission line, operations building and substation;
 - bentonite or polymer used during directional drilling of collection lines, resulting from the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface in the event of a “frac-out”; and
- Changes in surface water drainage patterns (e.g., obstruction of lateral flows in surface water to wetlands) from construction of turbines, access roads, pads/turnaround areas, resulting in effects to soil moisture and species composition of vegetation.

5.9.1.2 Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

The features containing significant wetlands, woodlands, valleylands and wildlife habitat are identified in Table 4.4. The potential effects from construction activities on these features include those discussed above under Generalized Candidate Significant Wildlife Habitat and additional potential effects as outlined below:

- Accidental intrusion into natural features resulting in damage to vegetation or wildlife habitat form or function resulting from:
 - turbine construction near Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-032 and WET-049;
 - access road construction near Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032, WET-049;
 - breaker switch station construction near Significant Wetland Feature WET-053;
 - turbine construction near Significant Woodland Features WOD-001, WOD-012, WOD-018, WOD-026, WOD-033, WOD-034, WOD-047, WOD-053, WOD-054, WOD-060, WOD-063, WOD-068, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-137, WOD-146, WOD-227, WOD-231, WOD-251, WOD-278, WOD-289, WOD-295, WOD-300, WOD-306, WOD-309 and WOD-328;
 - access road construction near Significant Woodland Features WOD-012, WOD-018, WOD-026, WOD-032, WOD-033, WOD-047, WOD-049, WOD-053, WOD-054, WOD-064, WOD-068, WOD-070, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD-146, WOD-149, WOD-158, WOD-227, WOD-231, WOD-251, WOD-289, WOD-300, WOD-306, WOD-309, WOD-313, WOD-328 and WOD-331;
 - collection line construction near Significant Woodland Features WOD-012, WOD-023, WOD-028, WOD-032, WOD-033, WOD-034, WOD-047, WOD-049, WOD-054, WOD-064, WOD-070, WOD-087, WOD-093, WOD-103, WOD-114, WOD-117, WOD-118, WOD-126, WOD-129, WOD-131, WOD-158, WOD-176, WOD-227, WOD-231, WOD-286, WOD-295, WOD-301, WOD-303, WOD-313 and WOD-328;
 - transformer substation construction near Significant Woodland Features WOD-093 and WOD-103;
 - meteorological tower construction near Significant Woodland Feature WOD-133;
 - breaker switch station construction near Significant Woodland Feature WOD-210;
 - turbine construction near Bat Maternity Colony Features BMC-189, BMC-229, BMC-326, BMC-342, BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358, BMC-372 and particularly BMC-757;
 - access road construction near Amphibian Woodland Breeding Habitat Features AWO-14, AWO-25, AWO-27 and AWO-30;
 - access road construction near Reptile Hibernaculum Feature RH-01;
 - access road construction near Turtle Over-wintering Habitat Features TOW-01 and TOW-03;
- Increased erosion and sedimentation resulting from:
 - turbine foundation excavation and construction near Significant Wetland Feature WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-032 and WET-049;
 - access road construction near Significant Wetland Feature WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032 and WET-049, with increased potential for sediment and erosion where the minimum 5 m setback from dripline will be applied to Significant Wetland Features WET-006 and WET-011;

- collection line construction near Significant Wetland Features WET-006, WET-008, WET-009, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025 and WET-032;
- directional drilling of collection lines under Significant Wetland Features WET-006, WET-010, WET-014, WET-021, WET-025, WET-032;
- transmission line construction near Significant Wetland Features WET-012, WET-038 and WET-053 with increased potential for sediment and erosion where transmission line will be installed by directional drilling under WET-012;
- breaker switch station construction near Significant Wetland Feature WET-053;
- turbine construction near Significant Valleyland Feature VAL-02;
- transmission line construction within Significant Valleyland Feature VAL-02;
- access road construction near Amphibian Woodland Breeding Habitat Features AWO-14, AWO-25, AWO-27 and AWO-30;
- access road construction near Turtle Over-wintering Habitat Feature TOW-01 and TOW-03;
- transmission line construction within Azure Bluet habitat Feature SCI-01;
- transmission line construction within Turtle Over-wintering Habitat Feature TOW-02;
- transmission line construction within Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35.
- Soil/water contamination resulting from accidental spills during:
 - construction of turbines near Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-032 and WET-049;
 - access road construction near Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032 and WET-049;
 - directional drilling of collection lines under Significant Wetland Features WET-006, WET-010, WET-014, WET-021, WET-025, WET-032;
 - transmission line construction near Significant Wetland Features WET-012, WET-038 and WET-053 with increased potential for soil/water contamination where transmission line will be installed by directional drilling under WET-012;
 - directional drilling of collection lines under Significant Woodland Features WOD-001, WOD-018, WOD-032, WOD-034, WOD-054, WOD-101, WOD-133, WOD-191, and WOD-313;
 - directional drilling of transmission line under Significant Woodland Features WOD-104 and WOD-109;
- Increased dust accumulation on peripheral wetland vegetation resulting from construction of access roads where the minimum 5 m setback from dripline will be applied to Significant Wetland Features WET-006 and WET-011;
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation where the minimum 5 m setback from dripline will be applied to Significant Wetland Features WET-006 and WET-011;
- Unplanned intrusion into woodlands/wetlands in event of equipment malfunction during directional drilling for:
 - construction of collection lines under Significant Woodland Features WOD-001, WOD-018, WOD-032, WOD-034, WOD-054, WOD-101, WOD-133, WOD-191, and WOD-313,
 - construction of the transmission line under Significant Woodland Features WOD-104 and WOD-109;

- construction of collection lines under Significant Wetland Features WET-006, WET-010, WET-014, WET-021, WET-025, WET-032;
- construction of the transmission line under Significant Wetland Feature WET-012;
- Unintended damage to adjacent vegetation due to small size of the right-of-way, constrained work area and proximity of transmission line to:
 - Significant Wetland Features WET-012, WET-038 and WET-053;
 - Significant Woodland Features WOD-093, WOD-104, WOD-109, WOD-112, WOD-113, WOD-120, WOD-130, WOD-135, WOD-145, WOD-154, WOD-200 and WOD-210;
- Loss of up to 2.86 ha of forest cover within Significant Woodland Features WOD-120, WOD-134, WOD-164, WOD-180, and WOD-200 from clearing for transmission line;
- Changes to surface water hydrology resulting from turbine and transmission line construction near Significant Valleyland Feature VAL-02;
- Disruption of Tundra Swan use of Waterfowl (Tundra Swan) Stopover and Staging Area Features WSST-15 and WSST-36 resulting from turbine, access road and collection line construction;
- Changes to surface water drainage patterns resulting in indirect effects on habitat condition from:
 - turbine, access road and collection line construction causing indirect effects on Waterfowl (Tundra Swan) Stopover and Staging Area Features WSST-15 and WSST-36;
 - access road construction near Amphibian Woodland Breeding Habitat Features AWO-14, AWO-25, AWO-27 and AWO-30;
 - access road construction near Turtle Over-wintering Habitat Feature TOW-01 and TOW-03;
 - transmission line construction within Azure Bluet Habitat Feature SCI-01;
 - transmission line construction within Turtle Over-wintering Habitat Feature TOW-02;
 - transmission line construction within Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35;
- Noise disturbance to bats during turbine construction near Bat Maternity Colony Features BMC-189, BMC-229, BMC-326, BMC-342, BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358, BMC-372 and particularly BMC-757;
- Disruption of amphibians moving between breeding pools and home range resulting from access road construction near Amphibian Woodland Breeding Habitat Features AWO-14, AWO-25, AWO-27 and AWO-30, and from transmission line construction within Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35;
- Risk of mortality from construction equipment to:
 - amphibians during construction of access roads near Amphibian Movement Corridor Feature AWO-27;
 - reptiles during construction of access roads near Reptile Hibernaculum Feature RH-01
 - turtles during construction of the transmission line within Turtle Over-wintering Habitat Feature TOW-02;
- Disruption of turtles moving between over-wintering ponds and other areas from:
 - access road construction near Turtle Over-wintering Habitat Feature TOW-01 and TOW-03;
 - transmission line construction within Turtle Over-wintering Habitat Feature TOW-02;

- Removal of vegetation within significant feature resulting in habitat damage from clearing for transmission line within:
 - Azure Bluet Habitat Feature SCI-01;
 - Turtle Over-Wintering Habitat Feature TOW-03;
 - Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35;
 - Red-headed Woodpecker Habitat Feature SCB-03;
- Noise disturbance to breeding Red-headed Woodpeckers during transmission line construction within Red-headed Woodpecker Habitat Feature SCB-03;
- Displacement and/or mortality of nursing female and juvenile bats resulting from vegetation clearing for transmission line construction within Bat Maternity Colony Features BMC-648 and BMC-720;
- Removal of confirmed significant cavity trees or other suitable cavity trees resulting from vegetation clearing for transmission line construction within Bat Maternity Colony Features BMC-648 and BMC-720;
- Noise disturbance to bats and/or avoidance behaviour during transmission line construction within Bat Maternity Colony Features BMC-648 and BMC-720.

5.9.2 Mitigation Measures, Residual Effects and Monitoring Plan

5.9.2.1 *Generalized Candidate Significant Wildlife Habitat*

Table 5.6 provides mitigation measures, residual effects and the monitoring plan for Generalized Candidate Significant Wildlife Habitat potential effects identified in Section 5.9.1.1 above.

5.9.2.2 *Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat:*

Table 5.7 provides Feature-specific mitigation measures, residual effects and the monitoring plan for each potential effect identified in Section 5.9.1.2 above. Note that at all locations described below, the Best Management Practices and mitigation measures outlined in the Generalized Candidate Significant Wildlife Habitat table will also be applied. Mitigation measures must be implemented under the supervision of the Environmental Monitor(s) based on site-specific conditions.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling.	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Develop and implement an erosion and sediment control plan before commencement of construction as per Ontario Provincial Standard Specifications (OPSD 219.130). Utilize erosion blankets, erosion control fencing, straw bales, siltation bags, etc. For construction activities within 30 m of a wetland, woodland or water body, to mitigate potential excessive erosion and sedimentation. Extra erosion and sediment control materials should be kept on hand, (i.e., heavy duty silt fencing, straw bales). Keep sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated). Schedule grading within 30 m of a watercourse or wetland to avoid times of high runoff volumes (spring and fall), wherever possible. Temporarily suspend work if high runoff volume is noted or excessive flows of sediment discharges occur until mitigation measures are in place. Re-vegetate temporary roads to pre-construction conditions as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> Weekly during active construction periods; Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet); Daily during extended rain or snowmelt periods; Monthly during inactive construction periods, where the site is left alone for 30 days or longer. Contingency Measures: <ul style="list-style-type: none"> Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place.
Removal/disturbance of topsoil and increased soil compaction from manoeuvring of heavy machinery, excavation and backfilling.	<ul style="list-style-type: none"> Minimize removal/disturbance of topsoil and increased soil compaction. 	<ul style="list-style-type: none"> Minimize vehicle traffic on exposed soils, avoid compacting or other hardening of natural ground surface, and avoid the movement of heavy machinery on areas with sensitive slopes. Where feasible, lighter vehicles and lighter machinery should be used in and around natural areas. Any vehicles used within natural areas should use wide-based tires. Tracked vehicles should be avoided. 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> See erosion and sedimentation above.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Increased erosion and sedimentation resulting from directional drilling.	<ul style="list-style-type: none"> Minimize erosion and sedimentation. 	<ul style="list-style-type: none"> Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario Water Resources Act, R.S.O. 1990. Set back drill entry and exit pits at least 30 m from natural features (i.e., woodlands, wetlands) or water bodies. Monitor natural features for signs of surface disturbance. 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> See erosion and sedimentation above.
Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement.	<ul style="list-style-type: none"> Minimize disturbance and/or mortality to terrestrial wildlife. 	<ul style="list-style-type: none"> Time vegetation removal to avoid periods of habitat use to the extent possible, particularly to avoid sensitive life stages (e.g., breeding season for migratory birds, May 1 to July 30). Undertake active nest surveys if clearing of vegetation must take place during this period. Avoid intersecting likely wildlife migration routes wherever possible. Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours (7:00 am to 7:00 pm), wherever possible. Clearly post construction speed limits. Install and maintain wildlife crossing and speed limit signs on access roads. 	<ul style="list-style-type: none"> Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. Consultation with MNR to determine additional contingency measures if necessary.
Damage to vegetation while operating equipment.	<ul style="list-style-type: none"> Minimize disturbance to/loss of wildlife habitat and vegetation. 	<ul style="list-style-type: none"> Keep vegetation removal to a minimum and limited to non-significant habitats (e.g., hedgerows). For roadside collection line routes, vegetation removal (if any) will be kept to a minimum and will be limited to the road right-of-way. Where construction is to occur within 30 m of natural features, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. Trees at risk of being damaged during construction should be pruned through implementation of proper arboricultural techniques. Where excavation for construction of access roads or collection lines is conducted within the rooting zone of trees (e.g., within 5 m of the dripline), proper root pruning measures should be implemented to protect tree roots. 	<ul style="list-style-type: none"> Disturbance to or loss of wildlife habitat and damage to vegetation while operating equipment avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. Consultation with MNR to determine additional contingency measures if necessary.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Disturbance to or loss of wildlife habitat, including active bird nests.	<ul style="list-style-type: none"> Minimize vegetation removal and destruction of bird nests. 	<ul style="list-style-type: none"> Schedule vegetation removal outside of breeding season (May 1 to July 30) where possible. Undertake active nest surveys if clearing of vegetation must take place during this period. Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours (7:00 am to 7:00 pm), wherever possible. 	<ul style="list-style-type: none"> Vegetation removal minimized and destruction of active bird nests avoided through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that only specified trees are removed, protective fencing is intact and that there is no damage caused to the remaining trees during construction. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. Consultation with MNR to determine additional contingency measures if necessary.
Soil / water contamination by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.	<ul style="list-style-type: none"> Minimize soil/water contamination. 	<ul style="list-style-type: none"> Ensure machinery is maintained free of fluid leaks. Site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features or water bodies. Vehicle refuelling and maintenance should be done on spill collection pads. Store any stockpiled materials at least 30 m away from a wetland, woodland or waterbody to prevent deleterious substances from inadvertently discharging to the environment. Develop a spill response plan and train staff on associated procedures. Maintain emergency spill kits on site. Control soil / water contamination through best management practices. Dispose of any waste material from construction activities by authorized and approved off-site vendors. 	<ul style="list-style-type: none"> Soil and water contamination avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Conduct daily inspections of construction equipment for leaks / spills. Implement contingency measures in the event of a spill. Contingency Measures: <ul style="list-style-type: none"> In the event of a spill, immediately stop all work until the spill is cleaned up; Install a spill collection pad for refuelling and maintenance; Notify MOE's Spills Action Centre of any leaks or spills; Assess and remediate affected soils and water by using spill kit kept on site; For spills near wetlands, analyze water samples for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum). Monitor daily to ensure proper cleanup is completed.
Soil / water contamination by oils, gasoline, grease and other materials from spills during directional drilling.	<ul style="list-style-type: none"> Minimize soil/water contamination. 	<ul style="list-style-type: none"> Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario Water Resources Act, R.S.O. 1990. Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent features. Collect drill cuttings as they are generated and place in a soil bin or bag for off-site disposal. 	<ul style="list-style-type: none"> Risk of soil / water contamination avoided or minimized through application of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would likely represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Monitor directional drilling for the duration of such activities to ensure that "frac-out" or accidental intrusion does not occur, and if it does, to ensure that there are no effects on surface or groundwater. Contingency Measures: <ul style="list-style-type: none"> In the event of a "frac-out", immediately stop all work, including the recycling of drilling mud / lubricant.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Generalized Candidate Significant Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"> • Ensure drill depth is at an appropriate depth below feature to reduce the risk of a “frac-out”. • Install protective fencing around vegetation to prevent accidental damage. 		<ul style="list-style-type: none"> ▪ Monitor “frac-out” for 4 hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain). ▪ If the fracture becomes excessively large, engage a spill response team to contain and clean up excess drilling mud in the water. ▪ If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. Revegetated areas will be monitored twice per year for two years subsequent to “frac-out” to confirm revegetation is successful. ▪ Document post-cleanup conditions with photographs and prepare “frac-out” incident report describing time, place, actions taken to remediate “frac-out” and measures implemented to prevent recurrence. Provide incident report to MNR and MOE forthwith.
<p>Changes in surface water drainage patterns.</p> <p>Obstruction of lateral flows in surface water to wetlands.</p>	<ul style="list-style-type: none"> • Minimize changes in surface water drainage patterns and obstruction of lateral flows in surface water to wetlands. 	<ul style="list-style-type: none"> • Minimize changes in land contours and natural drainage; maintain timing and quantity of flows. • Any grading of lands adjacent to natural features should match existing grades at the identified set-back, or buffer from the features. 	<ul style="list-style-type: none"> • Changes in surface water drainage patterns and obstruction of lateral flows avoided through mitigation measures. • Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> • Inspect locations within 30 m of wetlands following completion of access roads to ensure no grade changes. • Contingency Measures: <ul style="list-style-type: none"> ▪ If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Accidental intrusion resulting in damage to vegetation or wildlife habitat form or function within significant wetlands, woodlands and / or wildlife habitat.	<ul style="list-style-type: none"> Minimize potential for accidental intrusion into significant features. 	<ul style="list-style-type: none"> Maintain 30 m setback from significant wetlands and woodlands, where possible or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. Clearly delineate habitat boundaries using protective fencing to ensure that construction activities occur outside the habitat boundaries. 	<ul style="list-style-type: none"> Damage to vegetation or wildlife habitat avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that protective fencing is intact and that there is no damage caused during construction. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.
Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling.	<ul style="list-style-type: none"> Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	<ul style="list-style-type: none"> Maintain 30 m setback from significant wetlands and woodlands, where possible or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install sediment and erosion control fencing along edge of wetland if within 30 m as per Ontario Provincial Standard Specifications (OPSD 219.130). For construction of turbines and transmission line at Val-02: utilize erosion control fencing, and keep in place until disturbed areas are stabilized; schedule grading within 30 m of feature to avoid times of high runoff during spring and fall where possible. Suspend work during periods of excessive flows; store stockpiled materials away from feature to prevent substances from inadvertently entering feature; minimize the area and duration of soil exposure; and, minimize vehicle traffic on exposed soils and avoid the use of heavy machinery on slopes. For construction of access roads at Turtle Over-Wintering Habitat Features TOW-01 and TOW-03: fence area as far from pond and as close to road as possible and install sediment and erosion control fencing at fenced area location. For construction of the transmission line at Azure Bluet Habitat Feature SCI-01, Turtle Over-Wintering Habitat Feature TOW-02 and Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35: 	<ul style="list-style-type: none"> Increased erosion and sedimentation avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> Weekly during active construction periods; Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet); Daily during extended rain or snowmelt periods; Monthly during inactive construction periods, where the site is left alone for 30 days or longer. Contingency Measures: <ul style="list-style-type: none"> Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place. For construction of the transmission line at Azure Bluet Habitat Feature SCI-01, Turtle Over-Wintering Habitat Feature TOW-02 and Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35: <ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described above. Analyze water samples for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum) during and after construction.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"> ▪ Fence area as far from pond and as close to transmission line disturbance area as possible. ▪ Install sediment and erosion control fencing at fenced area location. ▪ Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. ▪ Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. ▪ Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 		<ul style="list-style-type: none"> • Contingency Measures: <ul style="list-style-type: none"> ▪ If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
<p>Soil/water contamination resulting from accidental spills.</p>	<ul style="list-style-type: none"> • Minimize soil/water contamination. 	<ul style="list-style-type: none"> • Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features. 	<ul style="list-style-type: none"> • Water contamination avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> • Conduct daily inspections of construction equipment for leaks / spills. • Implement contingency measures in the event of a spill. • Contingency Measures: <ul style="list-style-type: none"> ▪ In the event of a spill, immediately stop all work until the spill is cleaned up; ▪ Install a spill collection pad for refuelling and maintenance; ▪ Notify MOE's Spills Action Centre of any leaks or spills; ▪ Assess and remediate affected soils and water by using spill kit kept on site; ▪ For spills near wetlands, analyze water samples for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum). ▪ Monitor daily to ensure proper cleanup is completed.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Increased dust accumulation on peripheral wetland vegetation, causing damage to wetland plants resulting from construction of access roads where the minimum 5 m setback from dripline will be applied to Significant Wetland Features.	<ul style="list-style-type: none"> Minimize dust accumulation on peripheral vegetation. 	<ul style="list-style-type: none"> Use of water as a dust suppressant along areas where construction is located within 5 m of a significant wetland. 	<ul style="list-style-type: none"> Accumulation of dust on peripheral vegetation will be avoided or minimized through the application of mitigation measures. Residual effects likely however limited magnitude of effect as a result given the application of mitigation measures. 	<ul style="list-style-type: none"> Daily monitoring of areas where active construction is occurring within 5 m of a significant wetland by Environmental Monitor. Contingency Measures: <ul style="list-style-type: none"> If dust accumulation on wetland plants occurs, spray down plants with water.
Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation where the minimum 5 m setback from dripline will be applied to Significant Wetland Features.	<ul style="list-style-type: none"> No effects to soil moisture and species composition of vegetation. 	<ul style="list-style-type: none"> Ensure Best Management Practices are used to maintain current drainage patterns. 	<ul style="list-style-type: none"> Changes in surface water drainage patterns will be avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> Daily monitoring of areas where active construction is occurring within 5 m of a significant wetland by Environmental Monitor. Contingency Measures: <ul style="list-style-type: none"> If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns.
Unplanned intrusion into significant woodlands/wetlands in event of equipment malfunction due to directional drilling and risk of sedimentation or erosion into significant wetlands when directionally drilling.	<ul style="list-style-type: none"> Minimize potential for accidental intrusion and sedimentation or erosion into significant features. 	<ul style="list-style-type: none"> Where feasible, wetland/woodland crossings will be within existing right-of-ways adjacent to wetland/woodland areas. Where features cannot be avoided, crossings will be completed via horizontal directional drilling as per O. Reg. 359/09. Locate entrance and exit pits at least 30 m from feature edge. Install protective fencing around vegetation to prevent accidental damage. Ensure drill depth is at an appropriate depth below wetland to reduce the risk of a "frac-out". Restore drilling sites to pre-construction conditions once construction is complete. Develop and implement an emergency spills plan outlining steps to contain any chemicals and avoid contamination of adjacent wetland features. As part of this plan, "frac-out" provisions will be provided. Install sediment and erosion control fencing along edge of wetland if within 30 m as per Ontario Provincial Standard Specifications (OPSD 219.130). 	<ul style="list-style-type: none"> Risk of unplanned intrusion and sedimentation or erosion into feature due to directional drilling will be minimized through the use of mitigation measures. Moderate likelihood; if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> See directional drilling above.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Unintended damage to adjacent vegetation due to proximity of transmission line to significant wetlands/woodlands, small size of the right-of-way and constrained work area.	<ul style="list-style-type: none"> Minimize potential for unintended damage to significant wetlands/woodlands. 	<ul style="list-style-type: none"> Limit vegetation removal within significant wetlands to the existing right-of-way. Maintain 30 m setback from significant wetlands and woodlands, where possible or a minimum 5 m setback (measured from the dripline of trees or wetland edge if trees are absent). Install protective fencing around vegetation to prevent accidental damage. 	<ul style="list-style-type: none"> Damage to vegetation will be minimized through the application of mitigation measures. Construction effects unlikely; if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions. 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that protective fencing is intact and that there is no damage caused during construction. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.
Loss of up to 2.86 ha of forest cover within Significant Woodland Features from clearing for transmission line.	<ul style="list-style-type: none"> Minimize loss of forest cover over time. 	<ul style="list-style-type: none"> Establish an area of forest equal in area to the cleared area (up to 2.86 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). Clearly stake area to be cleared. Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained. Limit size of machines entering significant woodlands to minimize soil compaction. Removal of tree limbs on adjacent trees being retained should be carried out under supervision of an Arborist or Forester. Damaged tree roots should be cut clean as soon as possible and exposed roots covered in approved topsoil. This work to be carried out under supervision of an Arborist or Forester. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Moderate residual effects. 	<ul style="list-style-type: none"> Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. Contingency Measures: <ul style="list-style-type: none"> In the event that trees are damaged during construction, damaged trees should be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.
Changes to surface water hydrology resulting from turbine construction near Significant Valleyland Feature.	<ul style="list-style-type: none"> Minimize changes to surface water hydrology. 	<ul style="list-style-type: none"> Limit changes in land contours. Maintain streams and timing and quantity of flow. 	<ul style="list-style-type: none"> Changes in surface water drainage patterns and obstruction of lateral flows avoided through mitigation measures. Low likelihood and limited magnitude of effects as a result. 	<ul style="list-style-type: none"> Inspect locations following completion of construction to ensure no grade changes. Contingency Measures: <ul style="list-style-type: none"> If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Changes to surface water drainage patterns resulting from turbine and access road construction causing indirect effects on Waterfowl (Tundra Swan) Stopover and Staging Area Features.	<ul style="list-style-type: none"> Minimize changes in surface water drainage patterns. 	<ul style="list-style-type: none"> Minimize land contour changes. 	<ul style="list-style-type: none"> Habitat damage will be avoided through the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Inspect locations following completion of construction to ensure no grade changes. Contingency Measures: <ul style="list-style-type: none"> If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.
Disruption of Tundra Swan use of Waterfowl (Tundra Swan) Stopover and Staging Area Features resulting from turbine, access road and collection line construction.	<ul style="list-style-type: none"> Avoid disruption of Tundra Swan during migration. 	<ul style="list-style-type: none"> Construction activities within 300 m of the stopover and staging habitat should be timed to avoid migration timing windows (typically early to late March). 	<ul style="list-style-type: none"> Disruption of Tundra Swans will be avoided through the application of mitigation measures. Negligible residual effects. 	<ul style="list-style-type: none"> No monitoring or contingency measures required as long as construction occurs outside migration period.
Noise disturbance to bats during turbine construction at Bat Maternity Colony Features	<ul style="list-style-type: none"> Minimize disturbance to bat roosting habitat. 	<ul style="list-style-type: none"> Confine construction activities within 30 m of significant bat habitats to daylight hours during the period of May 15th to August 31st, wherever possible. 	<ul style="list-style-type: none"> Disturbance will be avoided through timing of construction. 	<ul style="list-style-type: none"> No monitoring or contingency measures required during construction.
Disruption of amphibians moving to breeding pools and home range resulting from access road construction near Amphibian Woodland Breeding Habitat Features.	<ul style="list-style-type: none"> Minimize disruption to amphibian movement. 	<ul style="list-style-type: none"> Limit construction of roads within 30 m of significant amphibian habitats to daylight hours between April 1st and June 30th (for significant frog breeding habitats) or between March 15th and April 30th (for significant salamander breeding habitat), to avoid excessive noise and vehicle caused mortality, wherever possible. Post speed limits along construction access roads. 	<ul style="list-style-type: none"> Disruption to amphibians avoided with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> No monitoring required if timing windows are applied. Contingency Measures: <ul style="list-style-type: none"> If construction occurs after dark within the specified timing windows, amphibian mortality surveys will be conducted the following day.
Changes to surface water drainage patterns resulting from access road construction causing indirect effects on Amphibian Woodland Breeding Habitat Features.	<ul style="list-style-type: none"> Minimize indirect effects on breeding pools. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of vernal pools during construction. 	<ul style="list-style-type: none"> Habitat damage will be avoided through the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Inspect locations following completion of access roads to ensure no grade changes. Examine condition of vernal pools within 30 m of access road following completion of construction. Contingency Measures: <ul style="list-style-type: none"> If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Risk of mortality to amphibians moving between breeding pool and home range.	<ul style="list-style-type: none"> Minimize amphibian mortality along access road. 	<ul style="list-style-type: none"> Avoid construction in proximity to this feature at night between April 1st and June 30th and any rainy nights from spring to early autumn, wherever possible. Enforce slow vehicle speeds. Post and maintain speed limit signs. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through mitigation measures. Operation effects minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> No monitoring required if timing windows are applied. Contingency Measures: <ul style="list-style-type: none"> If construction occurs after dark in or near identified movement corridors between April 1st and June 30th and rainy nights from spring to early autumn, amphibian mortality surveys will be conducted the following day.
Mortality to reptiles from construction equipment for construction of access roads near Reptile Hibernaculum Feature.	<ul style="list-style-type: none"> Minimize mortality from equipment. 	<ul style="list-style-type: none"> Construction activities within 60 m of the hibernaculum should be timed to avoid timing windows during which snakes emerge (April 15 - May 31) and return (September 1 – October 15) to hibernaculum. If construction must take place during these timing windows, erect temporary drift fence between edge of habitat and road if hibernaculum is within 60 m of road. 	<ul style="list-style-type: none"> Habitat damage will be avoided and mortality minimized through the application of mitigation measures. Construction effects temporary and minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> No monitoring required if timing windows are applied. Contingency Measures: <ul style="list-style-type: none"> Weekly inspection of drift fence if construction occurs during specified timing windows.
Disruption of turtles moving between over-wintering ponds and other areas or turtle mortality resulting from access road and transmission line construction near or within Turtle Over-wintering Habitat Features.	<ul style="list-style-type: none"> Minimize disruption of turtle movement. Minimize turtle mortality. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to proposed road or transmission line clearing as possible. Post speed limits and turtle crossing signage along relevant construction access roads. 	<ul style="list-style-type: none"> Disruption to turtle movement and risk of turtle mortality minimized with the application of mitigation measures. Construction effects temporary and minor (i.e., no or limited mortality expected). 	<ul style="list-style-type: none"> Undertake monthly site inspections to ensure that protective fencing is intact and that there is no damage caused during construction. No contingency measures required.
Changes to surface water drainage patterns resulting from access road construction causing indirect effects on Turtle Over-wintering Habitat Features.	<ul style="list-style-type: none"> Minimize indirect effects on over-wintering habitat through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of pond. 	<ul style="list-style-type: none"> Indirect effects to habitat minimized with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control. Contingency Measures: <ul style="list-style-type: none"> If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.
Removal of vegetation within significant features resulting in habitat damage from clearing for transmission line within Azure Bluet Habitat Feature and Turtle Over-wintering Habitat Feature.	<ul style="list-style-type: none"> Minimize disturbance to significant wildlife habitat. No destruction of pond. 	<ul style="list-style-type: none"> Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur. Fence area as far from pond and as close to transmission line disturbance area as possible. Minimize the area of tree removal within the natural area to the extent possible. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Disruption to significant wildlife habitat avoided or minimized through setback and protective fencing. Moderate residual effects. 	<ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control. Contingency Measures: <ul style="list-style-type: none"> If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Changes to surface water drainage patterns resulting from transmission line construction causing indirect effects on Azure Bluet Habitat Feature, Turtle Over-wintering Habitat Feature and Amphibian Woodland Breeding Habitat Features.	<ul style="list-style-type: none"> Minimize indirect effects on pond through changes to surface water drainage patterns. 	<ul style="list-style-type: none"> Ensure no grade changes within 30 m of pond. 	<ul style="list-style-type: none"> Indirect effects to significant wildlife habitat minimized with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control. Contingency Measures: <ul style="list-style-type: none"> If negative effects to the pond are detected, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Removal of vegetation within significant features resulting in habitat damage from clearing for transmission line within Amphibian Woodland Breeding Habitat Features.	<ul style="list-style-type: none"> Minimize disturbance to amphibian breeding habitat. No destruction of breeding pond. 	<ul style="list-style-type: none"> Focus construction activities within the woodland to outside April 1st and June 30th (for significant frog breeding habitats) or March 15th and April 30th (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. Maintain a 10 m buffer around the breeding pond within which no vegetation removal will occur. Minimize the area of tree removal within the natural area to the extent possible. Re-vegetate disturbed areas as soon as possible after construction activities are complete using species native to Ontario in naturally vegetated areas. 	<ul style="list-style-type: none"> Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding habitat should remain undisturbed. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Monitor condition of the pond during on-site monitoring events at frequency described for sediment and erosion control. Contingency Measures: <ul style="list-style-type: none"> If negative effects to the pond are detected based on the results of post-construction monitoring, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Disruption of amphibians moving between breeding pools and home range resulting from transmission line construction within Amphibian Woodland Breeding Habitat Features.	<ul style="list-style-type: none"> Minimize disruption to amphibian movement. 	<ul style="list-style-type: none"> Focus construction activities within the woodland to outside April 1st and June 30th (for significant frog breeding habitats) or March 15th and April 30th (for significant salamander breeding habitat), to avoid disturbance to breeding amphibians and vehicle caused mortality. 	<ul style="list-style-type: none"> Disruption to amphibians avoided with the application of mitigation measures. Construction effects temporary and minor. 	<ul style="list-style-type: none"> No monitoring or contingency measures required if timing windows are applied.
Removal of vegetation within significant feature resulting in habitat damage from clearing for transmission line within Red-headed Woodpecker Habitat Feature.	<ul style="list-style-type: none"> Minimize disturbance to breeding habitat. No destruction of nest site. 	<ul style="list-style-type: none"> Focus construction activities within habitat to outside the breeding season of May 1 to July 31. Maintain a 10 m buffer around the nest within which no vegetation removal will occur. Clearly delineate habitat boundaries (i.e. 10 m buffer) using protective fencing to ensure that construction activities occur outside the habitat boundaries. Minimize the area of tree removal within the natural area to the extent possible. 	<ul style="list-style-type: none"> Some permanent vegetation removal within the woodlot containing the Red-Headed Woodpecker nesting site will occur. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Supervision of vegetation removal by a qualified Biologist to ensure no destruction of nesting habitat. No additional monitoring or contingency measures required if timing window is applied.

Table 5.7 Mitigation Measures, Residual Effects and Monitoring Plan: Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

Potential Effect	Performance Objectives	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"> Remove trees by hand-held equipment and drag them out of the natural area to minimize soil disturbance. If possible, leave some woody debris to decompose naturally. Lighter vehicles and lighter machinery should be used in and around the natural area. Any vehicles used within the natural area should have wide-based tires. Tracked vehicles should be avoided. 		
Noise disturbance to breeding Red-headed Woodpeckers during transmission line construction within Red-headed Woodpecker Habitat Feature.	<ul style="list-style-type: none"> Minimize disturbance to breeding birds. 	<ul style="list-style-type: none"> Focus construction activities within habitat to outside the breeding season of May 1st to July 31st. 	<ul style="list-style-type: none"> Disturbance avoided through timing of construction activities. No residual effects anticipated. 	<ul style="list-style-type: none"> No monitoring or contingency measures required if timing window is applied.
Displacement and/or mortality of nursing female and juvenile bats resulting from vegetation clearing for transmission line construction within Bat Maternity Colony Features.	<ul style="list-style-type: none"> No displacement and/or mortality of nursing female and juvenile bats. 	<ul style="list-style-type: none"> Prepare a tree preservation plan which identifies specific trees to be removed and whether each tree contains a cavity suitable for potential use as a bat maternity colony. Tree removal will occur outside of the maternity and summer swarming period of May 15 to August 31, wherever possible. If this is not possible, MNR will be consulted regarding any additional mitigation measures that may be required. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> No monitoring or contingency measures required during construction.
Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees resulting from vegetation clearing for transmission line construction within Bat Maternity Colony Features.	<ul style="list-style-type: none"> Successful relocation of any significant maternity colonies that may be removed (if applicable). 	<ul style="list-style-type: none"> For each suitable cavity tree to be removed, a bat house will be installed in the closest suitable woodland habitat (the remainder of the woodland for each of the affected habitats). Details of bat box construction and placement will be provided to MNR for approval prior to installation. If a significant maternity colony must be removed, timing, location, and bat house design will be of utmost importance for the colony to successfully re-establish, and will be discussed with the MNR. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> No monitoring or contingency measures required during construction.
Noise disturbance and/or avoidance behaviour to bats during transmission line construction within Bat Maternity Colony Features.	<ul style="list-style-type: none"> Minimize noise disturbance and/or avoidance behaviour during construction. 	<ul style="list-style-type: none"> Tree removal should occur outside of the summer swarming and roosting period of local bat species (May 15th-August 31st). 	<ul style="list-style-type: none"> Disturbance avoided through timing of construction activities. No residual effects anticipated. 	<ul style="list-style-type: none"> No monitoring or contingency measures required during construction.

5.10 Environmental Effects Monitoring Plan

The following section describes how the environmental effects monitoring plan addresses negative environmental effects to significant natural feature identified in the EIS.

The performance objectives, mitigation measures, residual effects, and the monitoring plan associated with potential effects to Significant Natural Heritage Features are described in Table 5.8 below. Mitigation measures must be implemented under the supervision of the Environmental Monitor(s) based on site-specific conditions.

5.10.1 Potential Operational Effects to Confirmed Provincially Significant and Significant Natural Features

Potential effects from operational and maintenance activities on Significant Wetlands, Significant Woodlands, Significant Valleylands and Significant Wildlife Habitat include:

- Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance personnel) resulting from:
 - turbine operation and maintenance near Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-032 and WET-049;
 - substation operation and maintenance near Significant Wetland Feature WET-053;
 - transmission line maintenance within Significant Valleyland Feature VAL-02;
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation from access road operation and maintenance at:
 - Significant Wetland Features WET-006, WET-008, WET-010, WET-011, WET-012, WET-014, WET-019, WET-021, WET-025, WET-032 and WET-049;
 - Significant Woodland Features WOD-012, WOD-018, WOD-026, WOD-032, WOD-033, WOD-047, WOD-049, WOD-053, WOD-054, WOD-064, WOD-068, WOD-070, WOD-087, WOD-101, WOD-106, WOD-117, WOD-131, WOD-133, WOD 146, WOD-149, WOD-158, WOD-227, WOD-231, WOD-251, WOD-289, WOD-300, WOD-306, WOD-309, WOD-313, WOD-328 and WOD-331;
 - Significant Valleyland Feature VAL-02;
- Potential introduction of invasive species into wetland communities resulting from access road operation and maintenance near Significant Wetland Features WET-006 and WET-011;
- Loss of forest cover through vegetation clearing in significant woodlands due to transmission line establishment within Significant Woodland Features WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200;
- Clearing of vegetation for maintenance of the transmission line, resulting in accidental damage to woodlands and disturbance to wildlife within Significant Woodland Features WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200;
- Disturbance to vegetation as result of spraying of herbicide for maintenance of the transmission line at Significant Woodland Features WOD-120, WOD-134, WOD-164, WOD-180 and WOD-200;
- Avoidance by Tundra Swans of staging and stopover habitat during migration due to proximity of turbines to Waterfowl (Tundra Swan) Stopover and Staging Habitat Features WSST-15 and WSST-36;

- Disturbance to Tundra Swan stopover and staging habitat due to increased vehicular traffic on access roads near Waterfowl (Tundra Swan) Stopover and Staging Habitat Features WSST-15 and WSST-36;
- Bats may be disturbed by noise resulting from turbine operation near Bat Maternity Colony Features BMC-189, BMC-229, BMC-326, BMC-342, BMC-757, BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358 and BMC-372;
- Bats may display avoidance behaviour due to lighting resulting from turbine operation near Bat Maternity Colony Features BMC-189, BMC-229, BMC-326, BMC-342, BMC-757, BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358 and BMC-372;
- Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees as a result of vegetation removal for transmission line within Bat Maternity Colony Features BMC-648 and BMC-720;
- Risk of disturbance to breeding Red-Headed Woodpecker habitat resulting from transmission line maintenance within Red-Headed Woodpecker Habitat Feature SCB-03;
- Removal of vegetation within significant feature resulting in habitat damage from clearing for transmission line within:
 - Azure Bluet Habitat Feature SCI-01;
 - Turtle Over-Wintering Habitat Feature TOW-03;
 - Amphibian Woodland Breeding Habitat Features AWO-33, AWO-34 and AWO-35;
 - Red-headed Woodpecker Habitat Feature SCB-03;
- Risk of mortality to turtles moving between over-wintering ponds and other areas resulting from:
 - access road operation and maintenance near Turtle Over-wintering Habitat Features TOW-01 and TOW-03;
 - transmission line maintenance within Turtle Over-wintering Habitat Feature TOW-02;
- Risk of mortality / disturbance to breeding amphibians or amphibians moving between breeding pools and home range resulting from:
 - access road operation and maintenance near Amphibian Woodland Breeding Habitat Features AWO-14, AWO-25, AWO-27 and AWO-30;
 - access road operation and maintenance near Amphibian Movement Corridor Feature AWO-27;
 - transmission line maintenance within Amphibian Woodland Breeding Habitat Features AWO-033, AWO-34 and AWO-35;
- Increased erosion and sedimentation to Amphibian Woodland Breeding Habitat Features AWO-033, AWO-34 and AWO-35, Azure Bluet Habitat Feature SCI-01, and Turtle Over-wintering Habitat Feature TOW-02 resulting from transmission line maintenance activities including vegetation removal;
- Risk of disturbance and/or mortality of amphibians from herbicide spraying along transmission line within Amphibian Woodland Breeding Habitat Features AWO-033, AWO-34 and AWO-35;
- Risk of mortality to reptiles from vehicles resulting from access road operation and maintenance near Reptile Hibernaculum Feature RH-01;

In addition to effects on significant bird or bat habitats identified in the Natural Heritage Assessment, direct bird or bat mortality may occur at all proposed turbine locations.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
<p>Risk of bird collisions with turbines (Project-wide).</p> <p>Risk of bat collisions with turbines (Project-wide).</p>	<ul style="list-style-type: none"> Minimize disturbance and/or mortality to wildlife. 	<ul style="list-style-type: none"> Implement contingency mitigation measures if mortality thresholds are exceeded based on the results of post-construction monitoring. Operational mitigation techniques for birds, which would be applied at times of the year when mortality risks to the affected bird species are particularly high (e.g., migration) may include: <ul style="list-style-type: none"> Periodic shut-down of select turbines Blade feathering Mitigation techniques for bats may include: <ul style="list-style-type: none"> Changing the wind turbine cut-in speed to 5.5 m/s Feathering of blades when wind speeds are below 5.5 m/s Co-ordinating turbine shut-down for maintenance with periods of high bat activity (specifically in June during the breeding season when bat maternity colony habitats are occupied) and/or mortality. Utilize a lighting scheme that will minimize risk to bird or bat collisions, while fulfilling Transport Canada requirements. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. Risk of bird collisions with turbine minimized through mitigation. Risk of bat collisions with turbine minimized through mitigation. 	<ul style="list-style-type: none"> Develop and implement a monitoring program for bird and bat mortality consistent with <i>Birds and Bird Habitats: Guidelines for Wind Power Projects</i> (MNR, 2010) and <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i> (MNR, 2011) including: <ul style="list-style-type: none"> Mortality surveys; Carcass removal trials; Searcher efficiency trials. Conduct monitoring during the core season for bird activity and bat activity (May 1-October 31) for the first three years of operation. Mortality surveys should be conducted at each monitored turbine twice per week (at least 30% of turbines) and raptor mortality surveys should be continued once per week in November. Monitor all turbines within the Project Location once during the survey period for evidence of raptor mortalities. Conduct subsequent monitoring for two years at individual turbines (and unmonitored turbines in close proximity) where significant bird or raptor annual mortality is identified. Conduct effectiveness monitoring at individual turbines for three years where mitigation has been implemented. The findings of the bird and bat mortality monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation. Contingency Measures: <ul style="list-style-type: none"> Institute changes to turbine operation if mortality thresholds are exceeded (see mitigation strategy in this table).
<p>Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant, maintenance personnel) resulting from turbine operation and maintenance, substation operation and maintenance, or transmission line maintenance.</p>	<ul style="list-style-type: none"> No off-site contamination of soil or no contamination of groundwater or surface water. 	<ul style="list-style-type: none"> Control soil / water contamination through Best Management Practices. Ensure machinery arrives on site in a clean, washed condition and is maintained free of fluid leaks. Develop a spill response plan outlining steps to contain any spills during maintenance activities to avoid contamination of valleyland and wetland features. Train staff on associated procedures and maintain emergency spill kits on site. 	<ul style="list-style-type: none"> Soil / water contamination will be minimized through the application of mitigation measures. Low likelihood and limited magnitude of effects on surface water and groundwater as a result. 	<ul style="list-style-type: none"> Conduct regular site inspections and monitoring of turbines by a designated on-site Environmental Monitor(s). Contingency Measures: <ul style="list-style-type: none"> Notify MOE's Spills Action Centre of any spills. Assess and remediate affected soils and water. In the event that a spill occurs, the details of the spill will be reported back to MOE, including a description of any assessment and remediation undertaken.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
		<ul style="list-style-type: none"> • Dispose of any waste material from maintenance activities by authorized and approved off-site vendors. • Site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features including water bodies and significant woodlands, wetlands, and wildlife habitat. • Implement vehicle and equipment cleaning procedures and practices to minimize or eliminate the discharge of pollutants from vehicle / equipment cleaning operations to watercourses or natural areas. • Store any stockpiled materials away from natural features to prevent deleterious substances from inadvertently discharging to the environment. • Only apply herbicides (if required) when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices). • Only use herbicides (if required) approved for use adjacent to water bodies, riparian buffers, or woodland edges (does not apply to agricultural practices). 		
<p>Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation from access road operation and maintenance.</p>	<ul style="list-style-type: none"> • No effects to soil moisture and species composition of vegetation. • Minimize changes in surface water drainage patterns. 	<ul style="list-style-type: none"> • Implement infiltration techniques to the maximum extent possible. • Minimize paved surfaces and design roads to promote infiltration. 	<ul style="list-style-type: none"> • Effects to soil moisture and species composition of vegetation minimized through application of mitigation measures. • Low likelihood and limited magnitude of effects as a result. 	<ul style="list-style-type: none"> • Inspect locations within 30 m of wetlands following completion of access roads to ensure no grade changes. • Contingency Measures: <ul style="list-style-type: none"> - If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern.
<p>Potential introduction of invasive species into Significant Wetlands communities resulting from access road operation and maintenance.</p>	<ul style="list-style-type: none"> • Minimize species invasion into wetland communities. 	<ul style="list-style-type: none"> • A restoration plan should be implemented to re-vegetate the 5 m buffer between the turbine and wetland. This should include the 1 year application of an approved herbicide to eradicate invasive species followed by the cultivation and seeding of the area with a native seed mix as well as the planting of native shrubs along the edge consistent with existing wetland vegetation composition. 	<ul style="list-style-type: none"> • Introduction of invasive species avoided or minimized through the application of mitigation measures. • Low likelihood and limited magnitude of effect as a result. 	<ul style="list-style-type: none"> • Monitor twice per year for two years to confirm survival of seed mix. • Contingency Measures: <ul style="list-style-type: none"> - Should seed mix and/or plantings not survive, additional seeding and/or plantings will be undertaken.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Loss of forest cover (up to 2.8 ha) through vegetation clearing in Significant Woodlands due to transmission line establishment.	<ul style="list-style-type: none"> No loss of forest cover over time. 	<ul style="list-style-type: none"> Establish an area of forest equal in area to the cleared area (up to 2.8 ha; to be determined through a post-construction site inspection) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Loss of forest cover minimized through afforestation over time. Moderate residual effects. 	<ul style="list-style-type: none"> Conduct post-planting inventory of planted area to determine success of establishment (may be undertaken by partner organization). Contingency Measures: <ul style="list-style-type: none"> If plantation is not establishing for any number of reasons, conduct silvicultural intervention including, but not limited to: fill planting, cleaning, re-planting or thinning (may be undertaken by partner organization).
Clearing of vegetation for maintenance of the transmission line, resulting in accidental damage to Significant Woodlands.	<ul style="list-style-type: none"> Minimize accidental damage to significant woodlands. 	<ul style="list-style-type: none"> Perform vegetation clearing outside of the breeding bird season (May 1st to July 31st). Undertake active nest surveys if vegetation removal must take place during this period. Clearly stake area to be cleared. Limit size of machines to minimize soil compaction. 	<ul style="list-style-type: none"> Minimal effects to significant woodlands during maintenance. 	<ul style="list-style-type: none"> Removal of tree limbs on adjacent trees being retained should be carried out under supervision of an Arborist or Forester.
Disturbance to vegetation in Significant Woodlands as a result of spraying herbicide along transmission line.	<ul style="list-style-type: none"> Minimize disturbance to vegetation. 	<ul style="list-style-type: none"> Minimize aerial extent of herbicide spraying along transmission line. Only apply herbicides when wind speeds are low and no significant precipitation is expected (does not apply to agricultural practices). 	<ul style="list-style-type: none"> Operational effects considered negligible. 	<ul style="list-style-type: none"> As appropriate, and following the schedule for the application of herbicides, a certified Arborist or Forester should be present on site during the application of herbicides along transmission line. No contingency measures required.
Avoidance by Tundra Swans of stopover and staging habitats during migration due to proximity of turbines.	<ul style="list-style-type: none"> Minimize disturbance or disruption to Tundra Swan stopover and staging habitats. 	<ul style="list-style-type: none"> Implement contingency mitigation measures if disturbance effects are detected through post-construction monitoring. Mitigation techniques for Tundra Swans may include: <ul style="list-style-type: none"> Temporary shut-down of select turbines during migration period (typically early to late March); If necessary, work with MNR to develop other appropriate mitigation measures. 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction Tundra Swan monitoring at Features WSST-15 and WSST-36, including: <ul style="list-style-type: none"> Conduct surveys on three occasions approximately one week apart during the peak migratory period, which typically occurs in March but can range from mid-February to mid-April. Conduct surveys between sunrise and noon, and under calm, clear weather conditions, to the extent possible. One survey station will be placed per 0.5 km of candidate Tundra Swan stopover and staging habitat and be monitored for approximately 15 minutes. All observed waterfowl will be recorded along with their approximate location, age and behavior. The findings of the Tundra Swan monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation. Contingency Measures: <ul style="list-style-type: none"> Institute changes to turbine operation if disturbance effects are detected through post-construction monitoring (see mitigation strategy in this table).

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Disturbance to Tundra Swan stopover and staging habitats due to increased vehicular traffic on access roads.	<ul style="list-style-type: none"> Minimize disturbance or disruption to Tundra Swan stopover and staging habitats. 	<ul style="list-style-type: none"> Avoid using access roads adjacent to Tundra Swan stopover and staging habitats during migration period (typically early to late March), to the extent possible. 	<ul style="list-style-type: none"> Disturbance effects minimized through mitigation measures. Operational effects minor (i.e., no or limited disturbance expected). 	<ul style="list-style-type: none"> No additional monitoring or contingency measures required.
Bats may be disturbed by noise from operation of turbines.	<ul style="list-style-type: none"> Protect bat roosting habitat. 	<ul style="list-style-type: none"> Implement mitigation when disturbance effects are detected through post-construction monitoring (refer to mitigation measures for bat collisions with turbines above). 	<ul style="list-style-type: none"> Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction acoustic monitoring for Feature BMC-757 according to protocol described for pre-construction survey (as described in March 2010 Draft version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i>) including: <ul style="list-style-type: none"> Through the night acoustic monitoring stations to be positioned within 10 m of the potential roost. Survey same stations as pre-construction survey. Visual monitoring to be conducted at dusk in June. Acoustic monitoring to begin at dusk and continue for 5 hours, for up to 10 nights, or until roost is confirmed. Monitoring to occur between June 1 and June 30. Conduct 1 year of post-construction acoustic monitoring for Features BMC-189, BMC-229, BMC-326, and BMC-342 according to protocol described for pre-construction survey, as described in the March 2010 Draft version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i> (see above). If the first year of post-construction monitoring indicates that this Feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods. If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected. Conduct 1 year of post-construction acoustic monitoring for Features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-352, BMC-358 and BMC-372 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of <i>Bats and Bat Habitats: Guidelines for</i>

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
				<p><i>Wind Power Projects</i>) including:</p> <ul style="list-style-type: none"> - Conduct monitoring of roost trees through exit surveys through June. - Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June. • If this first year of post-construction monitoring indicates that a Feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods to determine if a change may represent normal variation in population or if the project has had an effect. • If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected. <p>The findings of all acoustic monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation.</p> <ul style="list-style-type: none"> • Contingency Measures: <ul style="list-style-type: none"> - Institute changes to turbine operation if disturbance effects are detected through post-construction monitoring (see mitigation strategy in this table). - Consultation with MNR to determine additional contingency measures if necessary.
<p>Bats may display avoidance behaviour caused by turbine lighting.</p>	<ul style="list-style-type: none"> • Protect bat roosting habitat. 	<ul style="list-style-type: none"> • Propose a lighting scheme that will minimize potential disturbance to bats while fulfilling Transport Canada requirements. 	<ul style="list-style-type: none"> • Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> • Conduct 3 years of post-construction acoustic monitoring for Feature BMC-757 according to protocol described for pre-construction survey (as described in March 2010 Draft version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i>) including: <ul style="list-style-type: none"> - Through the night acoustic monitoring stations to be positioned within 10 m of the potential roost. - Survey same stations as pre-construction survey. - Visual monitoring to be conducted at dusk in June. - Acoustic monitoring to begin at dusk and continue for 5 hours, for up to 10 nights, or until roost is confirmed. - Monitoring to occur between June 1 and June 30. • Conduct 1 year of post-construction acoustic monitoring for Features BMC-189, BMC-229, BMC-326, and BMC-342 according to protocol

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
				<p>described for pre-construction survey, as described in the March 2010 Draft version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i> (see above).</p> <ul style="list-style-type: none"> • If the first year of post-construction monitoring indicates that this Feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods to determine if a change may represent normal variation in population or if the project has had an effect. • If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected. • Conduct 1 year of post-construction acoustic monitoring for Features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-352, BMC-358 and BMC-372 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i>) including: <ul style="list-style-type: none"> - Conduct monitoring of roost trees through exit surveys through June. - Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June. • If this first year of post-construction monitoring indicates that a Feature may no longer be significant, an additional 2 years of post-construction monitoring will occur following pre-construction methods to determine if a change may represent normal variation in population or if the project has had an effect. • If a significant habitat is still significant after the first year of post-construction monitoring, no further monitoring will occur as the habitat will be considered to be unaffected. • The findings of all acoustic monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation. • Contingency Measures: <ul style="list-style-type: none"> - Institute changes to turbine operation if

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
				<p>disturbance effects are detected through post-construction monitoring (see mitigation strategy in this table).</p> <ul style="list-style-type: none"> - Consultation with MNR to determine additional contingency measures if necessary.
<p>Removal of confirmed significant cavity trees or other suitable, but not studied, cavity trees in Bat Maternity Colony Features as a result of vegetation removal for the transmission line.</p>	<ul style="list-style-type: none"> • Protection of bat roosting habitat. 	<ul style="list-style-type: none"> • For each suitable cavity tree to be removed, a bat house will be installed in the closest suitable woodland habitat (the remainder of the woodland for each of the affected habitats). • Details of bat box construction and placement will be provided to MNR for approval prior to installation. • If a significant maternity colony must be removed, timing, location, and bat house design will be of utmost importance for the colony to successfully re-establish, and will be discussed with the MNR. 	<ul style="list-style-type: none"> • Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> • Conduct 3 years of post-construction acoustic monitoring of all remaining cavity trees for Features BMC-648 and BMC-720 (if deemed to be significant) according to protocol described for pre-construction survey (as described in July 2011 version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i>) including: <ul style="list-style-type: none"> - Conduct monitoring of roost trees through exit surveys through June. - Conduct active visual and acoustic monitoring at the cavity opening or crevice from 30 minutes before dusk until 60 minutes after dusk in June. • Conduct post-construction visual monitoring of any bat boxes installed for 3 years after construction, to determine the success of the implemented mitigation measures. • The findings of all acoustic monitoring programs will be reported back to MNR on an annual basis for the first 3 years of operation. • Contingency Measures: <ul style="list-style-type: none"> - If a permanent and significant disturbance has been noted within these Features, the MNR will be contacted to determine whether additional mitigation measures will be needed.
<p>Red-Headed Woodpecker Breeding Habitat may be disturbed by routine maintenance of the transmission line corridor.</p>	<ul style="list-style-type: none"> • No displacement of breeding Red-Headed Woodpeckers from habitat. • No destruction of nesting habitat. 	<ul style="list-style-type: none"> • Perform maintenance operations such as vegetation clearing outside the breeding season of May 1st to July 31st. • Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. 	<ul style="list-style-type: none"> • If routine maintenance operations such as vegetation trimming and clearing are conducted outside the breeding season of May 1st to July 31st there should be minimal residual effects from maintenance of the transmission line. • Nesting in utility poles has been recorded for Red-Headed Woodpecker, thus there is a possibility that the poles could provide future nesting habitat. 	<ul style="list-style-type: none"> • Supervision of vegetation removal by a qualified Biologist to ensure no destruction of nesting habitat. • No additional monitoring or contingency measures required if timing window is applied.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Removal of vegetation within Red-Headed Woodpecker Breeding Habitat resulting from clearing for the transmission line.	<ul style="list-style-type: none"> No displacement of breeding Red-headed Woodpeckers from habitat. No destruction of nesting habitat. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. 	<ul style="list-style-type: none"> Some permanent vegetation removal within the woodland containing the Red-Headed Woodpecker nesting site will occur. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years of post-construction monitoring for Feature SCB-03, according to protocol described for pre-construction surveys following the <i>Forest Bird Monitoring Protocol</i> including: <ul style="list-style-type: none"> Point counts within the woodlot on three separate visits during the period of May 15 – July 10. Conduct monitoring and evaluation of Red-Headed Woodpecker nest site to measure the use of the nesting location, and the success of breeding efforts. Examine utility poles for signs of nesting by Red-Headed Woodpecker. The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation. <p>Contingency Measures</p> <ul style="list-style-type: none"> If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Removal of vegetation within Azure Bluet Habitat and Turtle Over-wintering Habitat resulting from clearing for the transmission line.	<ul style="list-style-type: none"> Minimize disturbance to Azure Bluet habitat and turtle over-wintering habitat. No destruction of pond. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through construction monitoring. 	<ul style="list-style-type: none"> Clearing of vegetation will occur for the transmission line. Disruption to Azure Bluet habitat and turtle over-wintering habitat avoided or minimized through mitigation measures applied during construction. Moderate residual effects. 	<ul style="list-style-type: none"> If negative effects to the pond are detected through construction monitoring, corrective measures will be taken, to be determined through consultation with MNR. These habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Removal of vegetation within Amphibian Woodland Breeding Habitats resulting from clearing for the transmission line.	<ul style="list-style-type: none"> Minimize disturbance to amphibian breeding habitat. No destruction of breeding pond. 	<ul style="list-style-type: none"> Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring. 	<ul style="list-style-type: none"> Some permanent vegetation removal within woodlands containing amphibian breeding habitat will occur. Breeding habitat should remain undisturbed. Significance of residual effects will be determined based on the results of post-construction monitoring. 	<ul style="list-style-type: none"> Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution (if Features deemed to be significant), including: <ul style="list-style-type: none"> Call surveys at each Feature three times between April 1st and June 30th, as per the <i>Marsh Monitoring Protocol</i>. Conduct surveys between one half-hour after sunset and 2:00 am and, to the extent possible, on nights that are clear, cloudy, damp, foggy, or have light rain and

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
				minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. Complete a 3-minute listening survey at each station. <ul style="list-style-type: none"> - Conduct surveys to target non-vocalizing amphibians (i.e., salamanders) using one of the following three protocols: <ul style="list-style-type: none"> o Nocturnal survey for adult salamanders in late March to early April; o Surveys for salamander egg masses on two occasions in March and April; o Surveys for larval salamanders in May or June. • The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation. <p>Contingency Measures</p> <ul style="list-style-type: none"> - If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
<p>Possible mortality of turtles moving between over-wintering ponds and other areas due to access road operation and maintenance near Turtle Over-wintering Habitats.</p>	<ul style="list-style-type: none"> • Minimize turtle mortality along access roads. 	<ul style="list-style-type: none"> • Maintain wildlife crossing signs and limit speed of vehicles near over-wintering ponds. 	<ul style="list-style-type: none"> • Risk of turtle mortality reduced through mitigation measures. • Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> • No monitoring or contingency measures required.
<p>Possible mortality of turtles moving between over-wintering ponds and other areas due to transmission maintenance within Turtle Over-wintering Habitat.</p>	<ul style="list-style-type: none"> • Minimize turtle mortality along transmission line. 	<ul style="list-style-type: none"> • Advise operations staff to avoid maintenance activities in proximity to this feature in May, June, September or October. • Fence area as far from pond and as close to transmission line as possible during maintenance activities. • Maintain wildlife crossing signs and limit speed of vehicles near over-wintering pond. 	<ul style="list-style-type: none"> • Risk of turtle mortality reduced through mitigation measures. • Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> • No monitoring or contingency measures required.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
<p>Increased erosion and sedimentation to Amphibian Woodland Breeding Habitat, Azure Bluet Habitat and Turtle Over-wintering Habitat resulting from vegetation removal for maintenance of the transmission line.</p>	<ul style="list-style-type: none"> Minimize disturbance to pond. 	<ul style="list-style-type: none"> Fence area as far from pond and as close to transmission line as possible. Install sediment and erosion control fencing at fenced area location before commencing maintenance activities and maintain in place until disturbed areas are stabilized and re-vegetated. 	<ul style="list-style-type: none"> Erosion and sedimentation mitigated through sediment and erosion control fencing. Operational maintenance effects temporary and minor. 	<ul style="list-style-type: none"> Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> Weekly during active construction periods; Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet); Daily during extended rain or snowmelt periods; Monthly during inactive construction periods, where the site is left alone for 30 days or longer. In the event that a spill / flooding occurs, the details of the event will be reported back to MOE, including a description of any assessment and remediation undertaken. Contingency Measures: <ul style="list-style-type: none"> Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place.
<p>Mortality to amphibians moving between breeding pools and home range resulting from access road operation and maintenance.</p>	<ul style="list-style-type: none"> Minimize amphibian mortality along access roads. 	<ul style="list-style-type: none"> Advise operations staff to avoid driving roads in proximity to these features at night between April 1st and June 30th, and any rainy nights from spring to early autumn, wherever possible. Maintain wildlife crossing signs and limit speed of vehicles near crossings. 	<ul style="list-style-type: none"> Risk of amphibian mortality reduced through mitigation measures. Low likelihood of mortality due to infrequent use of access roads by maintenance vehicles. 	<ul style="list-style-type: none"> Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution (if Features deemed to be significant), including: <ul style="list-style-type: none"> Call surveys at each Feature three times between April 1st and June 30th, as per the <i>Marsh Monitoring Protocol</i>. Conduct surveys between one half-hour after sunset and 2:00 am and, to the extent possible, on nights that are clear, cloudy, damp, foggy, or have light rain and minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. Complete a 3-minute listening survey at each station. Conduct surveys to target non-vocalizing amphibians (i.e., salamanders) using one of the following three protocols: <ul style="list-style-type: none"> Nocturnal survey for adult salamanders in late March to early April; Surveys for salamander egg masses on two occasions in March and April; Surveys for larval salamanders in May or June.

Table 5.8 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
				<ul style="list-style-type: none"> The findings of post-construction monitoring will be reported back to MNR on an annual basis for the first 3 years of operation. <p>Contingency Measures</p> <ul style="list-style-type: none"> If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.
Breeding amphibians may be disturbed by routine maintenance of the transmission line corridor.	<ul style="list-style-type: none"> Minimize disturbance due to maintenance activities. 	<ul style="list-style-type: none"> Advise operations staff to avoid maintenance activities in proximity to these features between April 1st and June 30th (for significant frog breeding habitats), or between March 15th and April 30th (for significant salamander breeding habitats) and any rainy nights from spring to early autumn. 	<ul style="list-style-type: none"> Risk of disturbance reduced through mitigation measures. Low likelihood of occurring and limited magnitude of residual effects. 	<ul style="list-style-type: none"> No additional monitoring or contingency measures required.
Risk of disturbance to and/or mortality of amphibians from herbicide spraying along transmission line.	<ul style="list-style-type: none"> Minimize disturbance and/or mortality from herbicide spraying. 	<ul style="list-style-type: none"> Minimize aerial extent of herbicide spraying along transmission line. Only apply herbicides when wind speeds are low and no significant precipitation is expected. Maintain 10 m buffer to pond where no herbicides area applied. 	<ul style="list-style-type: none"> Risk of amphibian mortality or disturbance reduced through mitigation measures. Low likelihood and limited magnitude of residual effects as a result. 	<ul style="list-style-type: none"> No additional monitoring or contingency measures required.
Possible reptile mortality from vehicles using access road.	<ul style="list-style-type: none"> Minimize snake mortality along access road. 	<ul style="list-style-type: none"> Erect long term drift fence between edge of habitat and road if hibernaculum determined to be large (>25 snakes). Advise operations staff to take extra care while driving near Feature RH-01. 	<ul style="list-style-type: none"> Risk of snake mortality minimized through the application of mitigation measures. Low likelihood of occurring and limited magnitude (i.e., no or limited mortality) due to limited volume of maintenance vehicles. 	<ul style="list-style-type: none"> Conduct reptile hibernaculum survey annually for 2 years post-construction to assess any potential changes in snake populations or species composition using protocol described for pre-construction survey (if Feature deemed to be significant), including: <ul style="list-style-type: none"> Examination of rock piles and vicinity on three occasions between mid-April and mid-May. Identify species and count individuals. The findings of the reptile hibernaculum monitoring programs will be reported back to MNR on an annual basis for the first 2 years of operation. Contingency Measures: <ul style="list-style-type: none"> If significant declines or disappearance of species is detected, determine whether likely to have been caused by the project. If so, corrective measures will be taken, to be determined through consultation with MNR. .

5.11 Summary and Conclusions

The landscape in the Project Study Area is nearly level and quite intensively cultivated with natural features mostly in the form of isolated woodlands. This landscape configuration has made it possible to derive a layout of turbines and associated infrastructure that largely avoids the natural features. None of the above-ground project infrastructure (turbines, access roads, collection lines, transmission line, operations building and substation) is proposed within significant wetlands. Vegetation clearing for the transmission line will occur in five significant woodlands which include two bat maternity colonies, three amphibian woodland breeding habitats, one turtle over-wintering pond, habitat for Azure Bluet - an insect species of conservation concern, and breeding habitat for Red-headed Woodpecker - a bird species of conservation concern. Strategies to mitigate direct loss and fragmentation will be implemented resulting in moderate significance of residual effects; provided they are applied correctly based on site-specific conditions.

Where turbines, access roads and/or underground lines are proposed in agricultural fields adjacent to significant woodlands, significant wetlands, and Significant Wildlife Habitat, a minimum 5 m buffer from the edge of the feature will be applied in which no physical disturbance will be permitted where the ground is flat or sloping away from the feature and the agriculture is intensive (i.e. row crop). Where the ground is sloping towards the feature and the agriculture is not intensive (i.e. hay field or pasture), significant woodlands and wetlands will have a setback of 30 m applied. All locally significant wetlands and regionally significant ANSIs will have a 5 m setback regardless of the adjacent slope or agriculture. All provincially significant ANSIs will have a 120 m setback, and all waterbodies will have a 30 m setback. This buffer will avoid and mitigate potential negative environmental effects associated with construction and operation of access roads, collection lines, and turbines. Where underground collection lines and the transmission line are proposed along existing road right-of-ways adjacent to significant natural features, all construction activity will occur within the right-of-way in order to avoid intrusion into the features. Site specific mitigation measures (i.e., tree protection fencing) will be implemented to avoid or reduce potential impacts.

Underground collection lines will be installed under significant natural features via directional drilling technique in ten locations. In order to avoid impacts to significant natural features associated with directional drilling, entrance and exit pits will be located a minimum of 30 m away from the feature and no other physical disturbance within the 30 m buffer will be permitted. This buffer will mitigate potential negative environmental effects associated with use of equipment and machinery for the installation of collection lines. Additional site-specific mitigation measures specific to the installation of underground collection lines (i.e., "frac-out" response plan), will be implemented to avoid or reduce potential impacts.

Operational effects of turbines on bird and bat mortality will be monitored for at least 3 years post-construction and, if required, mitigation measures (including operational controls) will be implemented in consultation with MNR and in accordance with provincial guidelines and requirements, as described in *Birds and Bird Habitats: Guidelines for Wind Power Projects* (MNR, 2011h) and *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR, 2011e). Operational mitigation measures may include periodic shut-down of select turbines and/or blade feathering at specific times of the year when mortality risks to the affected species is particularly high (e.g., during migration).

Generally, with respect to the proposed Project, the significance of anticipated residual effects is predicted to be low to moderate provided that the recommended mitigation measures are properly implemented and proactively managed throughout the duration of construction and post-construction activities.

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