Environment

NextEra Energy Canada, ULC
Bluewater Wind Energy Centre

Natural Heritage Assessment and Environmental Impact Study Report

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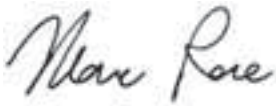

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Glossary of Terms

ANSI..... Area of Natural and Scientific Interest
Area of Investigation..... Area encompasses by 120 m setback from Project Location boundary
EIS ..... Environmental Impact Study
ESA..... Environmental Sensitive Area
Frac-out..... Escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface
MNR..... Ministry of Natural Resources
NHIC ..... Natural Heritage Information Centre
NRVIS ..... Natural Resources and Values Information System
O. Reg. 359/09..... Ontario Regulation 359/09
Project Location ..... The area encompassing all construction activities and project components
Project Study Area..... Wind Energy Centre Study Area and Transmission Line Study Area
REA..... Renewable Energy Approval
SAR..... Provincially and/or Federally-designated Species At Risk

1. Introduction

Varna Wind Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra) is proposing to construct a wind energy project in the Municipalities of Bluewater and Huron East in Huron County, Ontario. The project will be referred to as the Bluewater Wind Energy Centre (the "Project") and will be located on private lands in the vicinity of the shoreline of Lake Huron (see Figure 1.1). The wind turbine technology proposed for the Project is the 1.6 MW GE model wind turbine. The Project is categorized as a Class 4 facility under O. Reg. 359/09.

AECOM Canada Ltd. (AECOM) was retained by NextEra to prepare a Natural Heritage Assessment (NHA) and, if required, an Environmental Impact Study (EIS) for the proposed Bluewater Wind Energy Centre (the Project), in accordance with the requirements of the Renewable Energy Approval (REA) process. The REA process combines previous requirements under the *Ontario Environmental Assessment Act* with clear provincial rules and standards in a new regulation, Ontario Regulation 359/09 (O. Reg. 359/09) under the *Environmental Protection Act*. The Regulation became law on September 24, 2009. Amendments to the regulation came into force on January 1, 2011.

Under the REA process, a person who proposes to engage in a renewable energy project is required to conduct a Natural Heritage Assessment (NHA), consisting of the following:

- A Records Review (Section 25);
- A site investigation (Section 26); and,
- An evaluation of the significance or provincial significance of natural features identified in the course of the Records Review and site investigation (Section 27).

Through this process, applicants identify natural features near the proposed Project location and determine if prohibitions and setbacks apply (Sections 37 and 38). In instances where the Project is proposed within such a setback, the applicant must prepare an Environmental Impact Study Report (Section 38) to identify and assess the potential negative environmental effects that may result from the proposed renewable energy project, identify appropriate mitigation measures and describe how the potential effects will be addressed through the environmental effects monitoring plan and construction plan.

This document is intended to address the NHA and EIS requirements of O. Reg. 359/09 for the Project. It has been prepared for submission to the Ministry of Natural Resources (MNR) pursuant to sections 28 and 38 of that Regulation.

1.1 Project Location and Description

The proposed Project is located in Huron County, within the Municipalities of Bluewater and Huron East. The Project Study Area consists of the areas being studied for the wind farm component (Wind Energy Centre Study Area), as well as for the interconnection route (i.e., the area being studied for transmission lines to connect the Project to the electrical grid) (Transmission Line Study Area) (Figure 1.1). The location of the Project Study Area was defined early in the planning process for the proposed wind energy facility, based on the availability of wind resources, approximate area required for the proposed project, and availability of existing infrastructure for connection to the electrical grid. The Project Study Area was used to facilitate information collection and Records Review. The Wind Energy Centre Study Area is generally bounded by Blackbush/Bronson Line to the west, Mill Road to the north, Concession 5 Road to the east, and Danceland Road/Staffa Road to the south, in the Municipality of Bluewater, while the Transmission Line Study Area is located to the east of the Wind Energy Centre Study Area, and is generally bounded by Concession 5 Road to the west, Mill Road to the north, Huron Road and Perth 183 Road to the east, and Staffa Road to the south, extending into the Municipality of Huron East (Figure 1.2). The Project is located south of the Canadian Shield, and outside the Greenbelt Plan and Oak Ridges Moraine Plan Area.

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

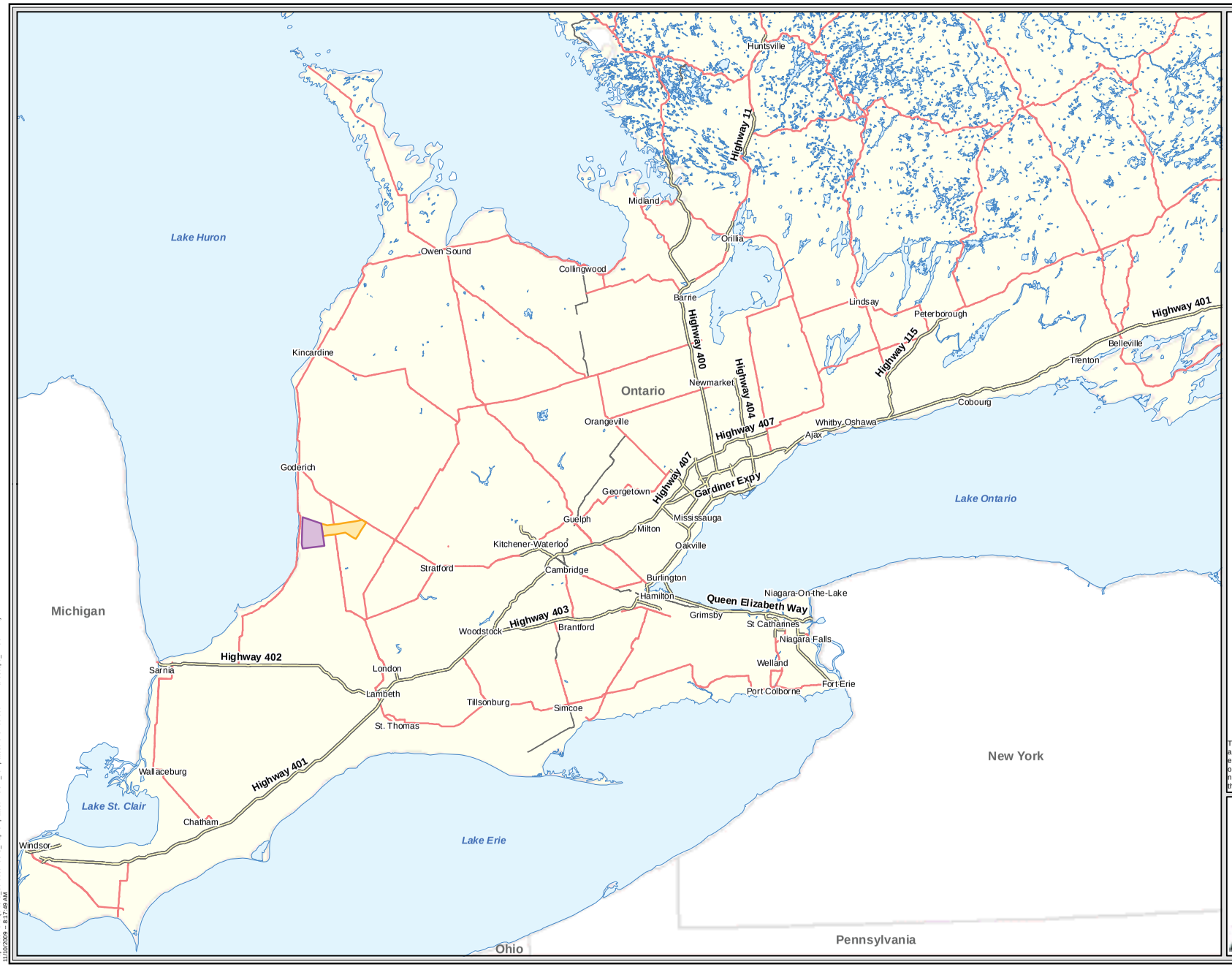
Longitude	Latitude
-81.678	43.5768
-81.344	43.5398
-81.373	43.4046
-81.706	43.4415

A project location was then identified within the Project Study Area. The Project Location is defined as per the Natural Heritage Assessment Guide for Renewable Energy Projects (July, 2011) as "*.a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project*". As described therein, the Project Location boundary is the outer limit of where site preparation and construction activities will occur (i.e., Disturbance Areas described below) and where permanent infrastructure will be located, including the air space occupied by turbine blades. The proposed Project Location is shown on Figure 1.2, and includes the locations of the components of the Project listed below.

- Up to 41 1.6 MW GE model wind turbine generators and pad mounted step up transformers (a maximum of 37 turbines will ultimately be constructed);
- Laydown and storage areas (including temporary staging areas, crane pads and turnaround areas surrounding each wind turbine);
- Approximately 52 km of underground electrical collection lines;
- Approximately 24 km of 115 kV transmission line along Centennial Road and Hensall Road;
- A transformer substation to connect to the Hydro One transmission system;
- Approximately 40 km of turbine access roads; and
- An Operations and Maintenance building.

Disturbance Areas have been identified surrounding various Project components, and are depicted on Figure 1.2. These denote areas where temporary disturbance during the construction phase may occur as a result of: temporary project component laydown and storage areas, crane pad construction and turbine turnaround areas. With the exception of the project components described above, no permanent infrastructure is proposed within these areas. Following construction activities, the Disturbance Areas will be returned to pre-construction conditions.

For the purposes of completing the Natural Heritage Assessment, a 120 m Area of Investigation was defined, based on the requirements of O. Reg. 359/09 and the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, July 2011). The Area of Investigation encompasses the Project Location and an additional 120 m surrounding the Project Location, measured from the Project Location boundary as described above. As part of the REA process, features located within the 120 m Area of Investigation must be investigated and evaluated to determine whether they are significant or provincially significant, in order to ascertain whether development prohibitions apply as per O. Reg. 359/09. The location of the 120 m Area of Investigation is shown on Figure 1.2.



Legend

- Wind Energy Centre Study Area
- Transmission Line Study Area
- Expressway
- Highway
- Secondary Highway

Basemapping from Ontario Ministry of Natural Resources

N
W E
S

Kilometers

0 10 20 40 60 80

1:1,500,000

UTM Zone 17N, NAD 83

Bluewater Wind Energy Centre

Study Area in Ontario

February 2012
Project 60155032

AECOM

Figure 1.1

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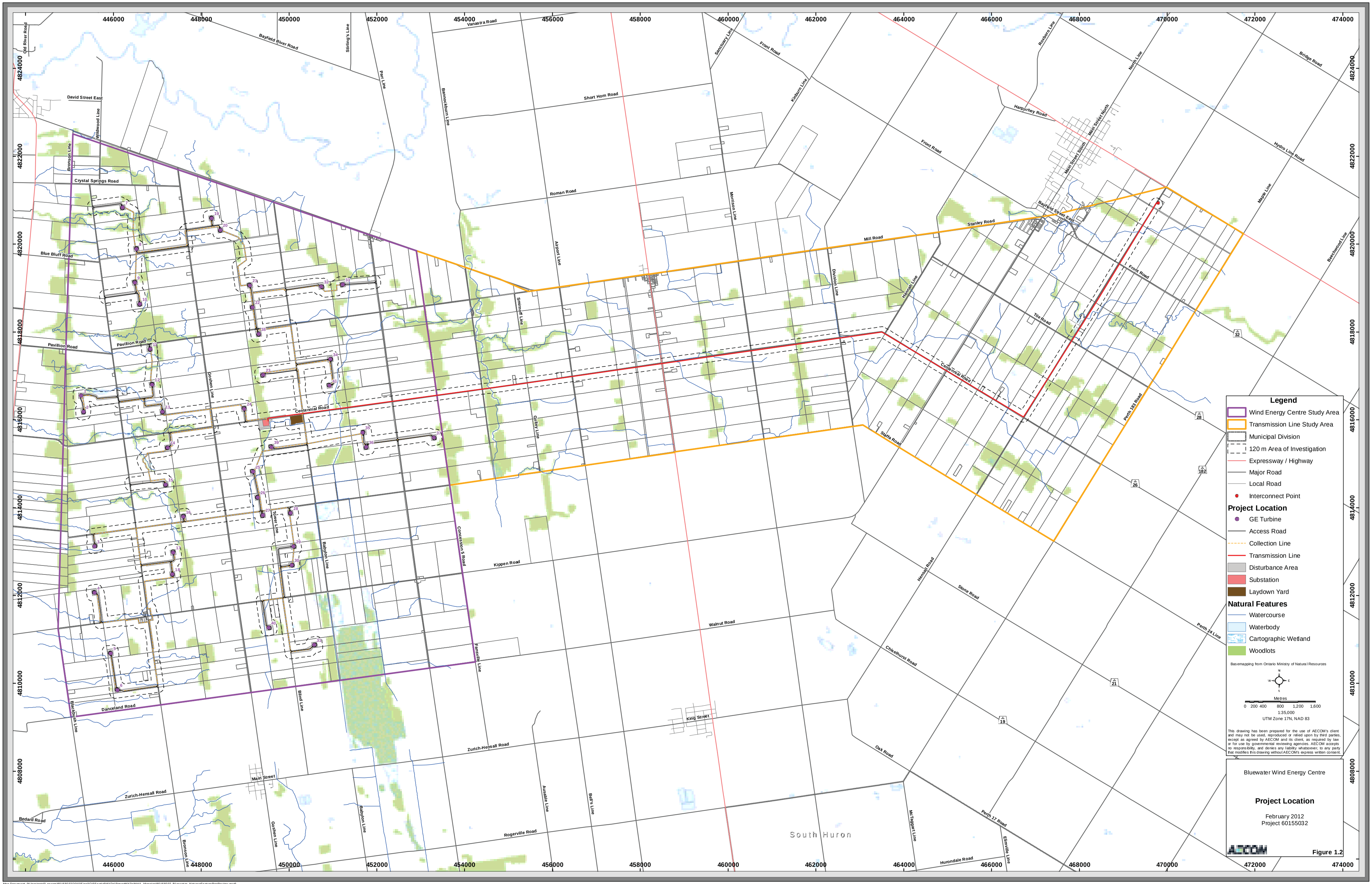

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2. Records Review

2.1 REA Requirements and Methods

Under Section 25 (Natural Heritage, Records Review) of O. Reg. 359/09, a Records Review is required to identify any natural features associated with a renewable energy project. Table 2.1 below outlines the requirements of the Natural Heritage Records Review.

Table 2.1 Natural Heritage Records to be Reviewed

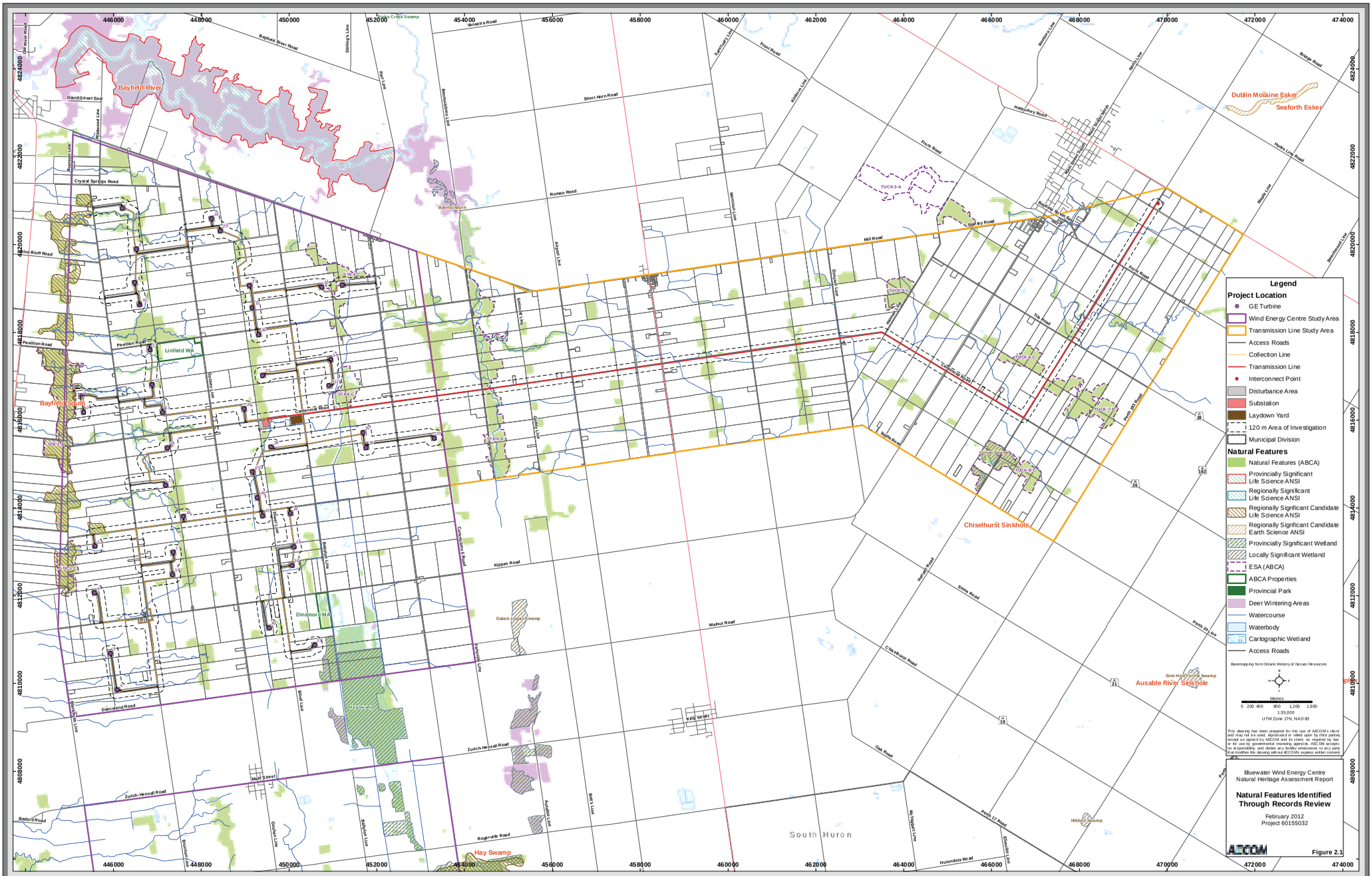
Item	Records to Be searched and Analyzed	Determination to be Made
1.	Records related to provincial parks and conservation reserves and those that are maintained by the Ministry of Natural Resources.	Whether the project location is in a provincial park or conservation reserve or within 120 m of a provincial park or conservation reserve.
2.	Records that relate to natural features and that are maintained by: i. The Ministry of Natural Resources, ii. The Crown in right of Canada, iii. A Conservation Authority, if the project location is in the area of jurisdiction of the Conservation Authority, iv. Each local and upper-tier municipality in which the project location is situated, v. The planning board of an area of jurisdiction of a planning board in which the project location is situated, vi. The municipal planning authority of an area of jurisdiction of a municipal planning authority in which the project location is situated, vii. The local roads board of a local roads area in which the project location is situated, viii. The Local Services Board of a board area in which the project location is situated, and, ix. The Niagara Escarpment Commission, if the project location is in the area of the Niagara Escarpment Plan.	Whether the project location is: i. In a Natural Feature, ii. Within 50 m of an Earth Science Area of Natural and Scientific Interest, or, iii. Within 120 m of any other natural feature protected by the REA Regulation.

The Records Review was conducted for the entire Project Study Area. An Area of Investigation was also identified, which encompasses the Project Location and an additional 120 m surrounding the Project Location (Figure 1.2). Where possible or applicable, the Records Review of natural features is summarized in the context of the Project Location design and the associated 120 m Area of Investigation (Figure 2.1).

The following types of natural features were reviewed and analyzed in the Records review process:

- Provincial Parks and Conservation Reserves;
- Wetlands;
- Woodlands;
- Valleylands;
- Rare species and significant wildlife habitats; and
- Areas of Natural and Scientific Interest (ANSIs).

Assessment of Endangered and Threatened species and their habitats protected under the *Endangered Species Act* (Species At Risk) has been undertaken separately and will be addressed through a separate consultation and permitting process, if required, with the MNR Guelph District. As such, records related to known occurrences of Species At Risk obtained through the records review process are not presented here.


Bayfield River
Dublin Moraine Esker
Seaforth Esker
Linfield WA
Bayfield Sand
Dinsmore MA
Chiselhurst Sinkhole
Ausable River Sinkhole
Hay Swamp
South Huron
Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Natural Features
Natural Features (ABCA)
Provincially Significant Life Science ANSI
Regionally Significant Life Science ANSI
Regionally Signficant Candidate Life Science ANSI
Regionally Signficant Candidate Earth Science ANSI
Provincially Significant Wetland
Locally Significant Wetland
ESA (ABCA)
ABCA Properties
Provincial Park
Deer Wintering Areas
Watercourse
Waterbody
Cartographic Wetland
Access Roads
Basemapping from Ontario Ministry of Natural Resources
Metres
0 200 400 800 1,200 1,600
1:35,000
UTM Zone 17N, NAD 83
This drawing has been prepared for the use of AECOM's client and may not be used, reused or relied upon by third parties, except as agreed by AECOM and its client, or as required by law or by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Natural Features Identified Through Records Review
February 2012
Project 60155032
AECOM
Figure 2.1

The records reviewed for the Project Study Area included a review of the following key resources (vintage / date of information that was searched or collected is shown in brackets):

- The Huron County Official Plan (1998);
- The Municipality of Bluewater Official Plan (2005);
- The Municipality of Huron East Official Plan (2009);
- Natural Heritage Information Centre (NHIC) (2011);
- MNR Natural Resources and Values Information System (NRVIS) mapping (2011);
- Land Information Ontario (LIO) data layers (MNR, 2010) for:
  - Nesting Sites;
  - Thermal Assessment of Watercourses;
  - Water Virtual Flow;
  - Staging Area Wildlife;
  - Nursery Area Wildlife;
  - Deer Wintering Areas;
  - Conservation Reserves;
  - OHN Waterbody;
  - OHN Watercourse;
  - Provincial Park Regulated;
  - National Wildlife Area;
  - Crown Game Preserves;
  - ANSIs;
  - ESAs;
  - Evaluated Wetlands;
  - Fish Spawning areas; and
  - Wooded Areas.
- MNR Wetland Evaluations (various);
- MNR ANSI Reports (various);
- Ausable Bayfield Conservation Authority (ABCA) GIS data layers and published reports (various);
- Ontario Provincial Parks website (2011);
- Land Use Policy Atlas (2011);
- Important Bird Areas database (Bird Studies Canada and BirdLife International, undated); and
- Various wildlife atlases (birds, mammals, herpetofauna).

An initial series of avian surveys was conducted by Golder Associates for the Project Study Area. The Bluewater Wind Energy Centre Avian Use Monitoring Report – 2010 (Golder Associates, 2011), describes the results of spring Tundra Swan/waterfowl surveys, winter avian use surveys, spring migration avian use surveys, breeding (summer) avian use surveys and fall migration avian use surveys. It was used in conjunction with Ontario Breeding Bird Atlas (Cadman *et al*. 2007) data to describe the bird species known to use habitats in the Project Study Area.

AECOM conducted additional breeding bird surveys in order to identify bird breeding habitats associated with specific natural areas located within the 120 m Area of Investigation. Breeding bird surveys were conducted from late May 2011 to early July 2011 for features located at or within 120 m of turbine locations in a preliminary project layout for which property access was obtained at the time of the surveys. The breeding bird survey protocol was developed with reference to the Birds and Bird Habitats Guidelines for Wind Power Projects (MNR, 2010).

Breeding bird surveys were conducted at sites with natural vegetation cover located within 120 m of turbine locations. These surveys were undertaken by qualified biologists (qualifications of field personnel are provided in Appendix C). Two surveys were conducted at least ten days apart at each location, as permitted by property access. Surveys were conducted in the morning between sunrise and 11:00 am. During each survey, an area search (as defined in MNR, 2010 and described below) was conducted within the area of the feature located at or within 120 m of a proposed turbine (*i.e.,* within a circular area having a radius of 171.5 m; or 120 m from turbine blade tip). Surveyors recorded the locations of all bird species encountered (seen or heard), as well as the date, start time, finish time, and weather conditions during the survey. A complete list of species detected on each visit was compiled and evidence of breeding and observations of other relevant behaviours was recorded using standard breeding bird

atlas codes (EC-CWS, 2007c). Field maps showing the extent of the areas searched in each survey are provided in Appendix B. A complete list of bird species observed during breeding bird surveys conducted by AECOM is provided in Appendix I.

As described in the Birds and Bird Habitats Guidelines for Wind Power Projects (MNR, 2010), the minimum searching effort to obtain a list of breeding bird species in an area for very large wind energy installations is approximately 20 hours or until at least 80% of the expected number of species have been found (on the assumption that remaining species are probably present in very low numbers). Breeding bird surveys conducted by AECOM continued for approximately 35 hours in the Bluewater Project Study Area. This level of effort is substantial and considered to be an accurate and comprehensive inventory of bird species within the 120 m Area of Investigation. Additional written requests for natural heritage information were made to a number of agencies. These requests were made for available information pertaining to natural features (Provincial Parks and Conservation Reserves, wetlands, woodlands, valleylands, wildlife habitat and ANSIs), species inventories and related GIS data layers. Table 2.2 describes the agencies contacted, information source, method of consultation, and data or information obtained.

Table 2.2 Summary of Agency Consultation

Agency	Information Source/Method of Consultation	Data or Information Obtained
Ministry of Natural Resources	• June 8, 2010: AECOM submitted NHA work plan and Records Review request to MNR Guelph District. • August 25, 2011: AECOM resubmitted NHA Records Review request, as requested by MNR Renewable Energy Operations Team.	• August 31, 2010: MNR Guelph District provided information pertaining to wetlands, woodlands, ANSIs, and wildlife habitat within the Project Study Area. • September 9, 2011: MNR Renewable Energy Operations Team provided information pertaining to wetlands, woodlands, valleylands, ANSIs, and significant wildlife habitat within the Project Study Area.
Ausable Bayfield Conservation Authority	• August 12, 2010: AECOM requested natural heritage information relevant to the Project Study Area, including information pertaining to woodlands, valleylands, wetlands, wildlife habitat, species inventories, conservation areas and related GIS data layers. • September 8 and 19, 2011: AECOM requested GIS data layers for Linfield Wildlife Area and properties owned by ABCA and rare species information for the Project Study Area. • November 11, 2011: AECOM followed up to determine whether the GIS data layer for significant woodlands had been finalized, to request GIS data layers for conservation areas owned by ABCA and to request information pertaining to Linfield Wildlife Area. • November 24, 2011: AECOM requested information pertaining to ABCA conservation areas and ESAs in the Project Study Area, including any relevant reports, species inventories, and information on wildlife habitats and/or ecological functions of the areas. • November 29, 2011: AECOM requested confirmation of whether ABCA considers the Linfield Wildlife Area or the Dinsmore Management Area to be "Conservation Reserves" according to the meaning of the *Provincial Parks and Conservation Reserves Act*, 2006.	• May 24, 2011: ABCA provided GIS data layers for ABCA regulation limits (encompassing all hazards such as flooding erosion and wetlands) and natural areas mapping. • September 14, 2011: In regard to the request for information on rare species, ABCA suggests retrieving information from NHIC. • November 17, 2011: ABCA confirmed that they do not have a significant woodlands GIS data layer, and that the Natural Areas data layer provided by ABCA includes all woodlands, wetlands, thickets, meadows, valleylands, etc. • November 21, 2011 ABCA provided GIS data layers for conservation authority properties. • November 29, 2011: ABCA provided a copy of the report describing ESAs in the Project Study Area (ABCA, 1995).
Canadian Wildlife Service (CWS)	• May 12, 2011: AECOM requested natural heritage information relevant to the Project Study Area, including species inventories and information pertaining to wildlife habitat.	• June 10, 2011 (Jeanette Goulet, Senior Environmental Assessment Specialist): indicated that CWS does not collect and maintain a comprehensive list of this information. Suggested consulting the district MNR office, MNR's NHIC database, and the Ontario Breeding Bird Atlas.

Table 2.2 Summary of Agency Consultation

Agency	Information Source/Method of Consultation	Data or Information Obtained
Huron County	• May 12, 2011: AECOM requested natural heritage information relevant to the Project Study Area, including information pertaining to woodlands, valleylands, wetlands, wildlife habitat, species inventories, conservation areas and related GIS data layers.	• May 12 and 20, 2011: Huron County indicated that natural heritage information they have was obtained from the Ausable Bayfield Conservation Authority or MNR. Due to license restrictions on sharing agreements, this information should be requested directly from those agencies. • November 17, 2011: Huron County indicated that the Bluewater Official Plan identifies that forests cover about 16.5% of lands within the Municipality (Section 6.1) and in Section 6.4.6 states that forested areas greater than 1 ha and less than 4 ha are of local significance while forested areas 4 ha and larger are of Provincial significance. The determination of the boundaries of the forested areas and their classification would have been completed in consultation with the Ausable Bayfield Conservation Authority (ABCA). ABCA should be contacted for the latest forested area mapping.
Municipality of Bluewater	• May 12, 2011: AECOM requested natural heritage information relevant to the Project Study Area, including information pertaining to woodlands, valleylands, wetlands, wildlife habitat, species inventories, conservation areas and related GIS data layers. • September 19, 2011: AECOM requested information pertaining to the percentage of wooded areas in the Municipality of Bluewater, criteria used to evaluate significant woodlands and related GIS data layers for significant woodlands, as identified in the Municipality of Bluewater Official Plan. • September 29 and November 17, 2011: AECOM requested information pertaining to the percentage of wooded areas in the Municipality of Bluewater.	• September 19, 2011: Municipality of Bluewater indicated that they forwarded AECOM's request to ABCA and other agencies (including Huron County) to determine who has the most information that would be of value to AECOM. When the Municipality of Bluewater receives advice as to who/which agency will be handling this request, the Municipality of Bluewater will forward that info to AECOM. • November 17, 2011: Municipality of Bluewater forwarded request for information pertaining to significant woodlands and related GIS data layers to Huron County.
Municipality of Huron East	• May 12, 2011: AECOM requested natural heritage information relevant to the Project Study Area, including information pertaining to woodlands, valleylands, wetlands, wildlife habitat, species inventories, conservation areas and related GIS data layers.	• May 12, 2011: Municipality of Huron East indicated that this information should be obtained from Huron County and forwarded our information request to the Huron County GIS Department.

2.2 Results of the Records Review

Available background data were reviewed to determine whether the Project Location is in a natural feature or within 120 m of a natural feature (50 m of Earth Science ANSIs). The results of the Records Review are described in the following sections and shown on Figure 2.1.

2.2.1 Records Related to Provincial Parks and Conservation Reserves

2.2.1.1 Provincial Parks

Based on the Provincial Parks and Conservation Reserves layers maintained by Land Information Ontario, as well as the Crown Land Use Policy Atlas administered by the Ministry of Natural Resources, there are no provincial parks or conservation reserves identified within the Project Study Area. A search of the Ontario Provincial Parks website (accessed on 10 May 2011) was also undertaken, through which no provincial parks were identified within the Project Study Area. As a result, no additional work for this feature type is required in subsequent phases of the NHA for the Project.

2.2.1.2 Conservation Reserves

There are no Conservation Reserves within the Project Study Area (MNR, 2011). As a result, no additional work for this feature type is required in subsequent phases of the NHA for the Project.

2.2.1.3 Other Conservation Areas

The Ausable Bayfield Conservation Authority (ABCA) owns several properties in the vicinity of the Project Study Area. These conservation areas are shown on Figure 2.1. The following two conservation areas are located within the Project Study Area:

- Dinsmore Management Area, located south of Centennial Road and west of Babylon Line.
- Linfield Wildlife Area, located south of Pavillion Road and west of Goshen Line; and

Dinsmore Management Area is located approximately 200 m from the outer limit of the 120 m Area of Investigation. With respect to the Linfield Wildlife Area, the 120 m Area of Investigation coincides with the western limit of the Wildlife Area. The Linfield Wildlife Area is a donated property, approximately 38 ha in size that includes 28 ha of active farm land and 10 ha of natural areas. Water and soil resources and wildlife habitat will be preserved in this area by ABCA (ABCA, 2011). Although no specific setbacks to this area are prescribed by O. Reg. 359/09, the natural features on this property may provide important ecological functions; therefore these features will be carried forward to site investigation in order to determine whether they contain candidate significant woodlands and/or wildlife habitat.

2.2.2 Records Related to Natural Features

2.2.2.1 Wetlands

As described in the MNR's Ontario Wetland Evaluation System Manual (3rd edition; December, 2002), wetlands are lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface, where the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants.

The designation of wetlands as provincially significant is completed through a standardized assessment process developed by the OMNR, the Ontario Wetland Evaluation System (OWES). The key components considered in a wetland evaluation are the biological, social, hydrological and special features of the wetland or wetland complex. Based on scoring, a wetland can fall into one of two classes: provincially significant or locally significant (non-provincially significant).

A review of the Natural Heritage Information Centre (NHIC; accessed on 18 May 2011), MNR Natural Resources and Values Information System (NRVIS) mapping (accessed on 10 May 2011), and the Evaluated Wetlands data layer maintained by Land Information Ontario (LIO; accessed on 10 May 2011), has indicated that there are two evaluated wetlands located within the Project Study Area: Hay Swamp and Colyer Swamp. In addition, one evaluated, Locally Significant Wetland (Datars-Logan Swamp) is located approximately 900 m beyond the limit of the Project Study Area. No coastal wetlands were identified within the Project Study Area (NHIC, 2011).

Provincially Significant Wetlands

Hay Swamp, 268 ha in size, is a Provincially Significant Wetland (PSW) complex located within the Project Study Area. The following description of this Provincially Significant Wetland is derived from the Natural Heritage

Information Centre (NHIC) Natural Area Record (NHIC, 2011). This wetland complex contains fifteen individual wetlands and is composed of two wetland types, including 98% swamp and 2% marsh. Soils are predominantly clay, loam or silt (78%) with some organic content (22%), and the site type is classified as 74% riverine, 24% palustrine and 2% isolated. Hay Swamp provides nesting of colonial waterbirds and is an active feeding area. This Provincially Significant Wetland also provides winter cover for wildlife, is of local significance for Deer, and provides habitat for many different species including bullfrogs, Snapping Turtles, and a diversity of mammals including Muskrat, Raccoon, Beaver, Mink, Red Fox, Coyote, Striped Skunk, and squirrels (NHIC, 2011).
Hay Swamp is located approximately 100 m outside of the 120 m Area of Investigation. This natural feature will not be carried forward to site investigation.

Locally Significant Wetlands

Colyer Swamp is a Locally Significant Wetland complex covering 30 ha, formed by two individual wetlands composed of 100% swamp. The soil is composed of 22% clays, loams or silts and 78% organic and the site is classified as 100% palustrine. Colyer Swamp provides winter cover for deer and habitat for bullfrogs and racoons (NHIC, 2011).

Colyer Swamp is located approximately 500 m outside of the 120 m Area of Investigation. This natural feature will not be carried forward to site investigation.

Unevaluated Wetlands

Unevaluated wetlands are associated with several Environmental Significant Areas (ESAs) located within the Project Study Area (ABCA, 1984). In total, nine ESAs have been identified within the Project Study Area, five of which are located in the 120 m Area of Investigation (Figure 2.1). Of these, four are described as containing wetlands (STA-6-C, STA-5-C. STA-4-A and TUCK-7-B; ABCA, 1984). Detailed descriptions of these ESAs are provided in Section 2.2.2.4 of this report. These features were assessed during site investigations to determine whether they contain wetlands in or within the 120 m Area of Investigation.

There is potential for additional unevaluated wetlands to exist in the Project Study Area. The presence or absence of these features within the 120 m Area of Investigation was determined during site investigations.

2.2.2.2 Woodlands

The Project Study Area is located in the Mixed-wood Plains Forest Region (MNR, personal comments). Under natural conditions, the forest in this region consists of a diverse mix of conifer (such as pine, cedars and hemlock) and deciduous tree species (maples, ashes, oaks, elm, poplars and several other groups).

MNR's NRVIS mapping and natural features mapping provided by ABCA indicate the Project Study Area contains woodlands ranging in size from small hedgerow features to woodlands approximately 180 ha in size. The Project Study Area contains a large number of isolated woodlands with some larger contiguous wooded areas generally associated with riparian areas.

The Official Plan for the Municipality of Bluewater states in Section 6.4 (Natural Environment Policies), that "the most significant natural features in the Municipality, identified as being provincially or locally significant, are designated Natural Environment" (Official Plan – Schedule B). Within the Municipality of Bluewater, a number of woodlands of varying size and some larger, contiguous woodland areas occurring in the 120 m Area of Investigation are included under this designation in the Official Plan. Woodlands shown in Schedule B of the Official Plan are reflected as Natural Features on Figure 2.1 of this report.

The Municipality of Huron East has mapped Significant Woodlands (Official Plan Background Map 2). According to the Huron East Official Plan, *the significance of woodlands has been evaluated based on their size, shape, linkages, diversity of vegetation types, any unique attributes, as well as their economic and social value. A combination of all of these features has been used to identify significant woodlands in this Municipality.* Significant Woodlands identified in the Official Plan (Background Map 2) are reflected as Natural Features on Figure 2.1 of this report. Seven woodlands, identified as Significant Woodlands in the Huron East Official Plan occur in the 120 m Area of Investigation (Transmission Line Study Area).

Woodlands within the 120 m Area of Investigation were assessed during site investigations.

2.2.2.3 Valleylands

Under the REA regulation, a "valleyland" is defined as a natural area that is south and east of the Canadian Shield and occurs in a valley or other landform depression that contains flowing or standing water for some period of the year (MNR, July 2011). No known significant valleylands were identified through the records review as occurring within the Project Study Area. A number of tributaries, creeks and rivers occur within the Project Study Area, which may exhibit valleyland characteristics. Watercourse features within the Project Location and its associated 120 m Area of Investigation were assessed during site investigations to determine if valleylands are present/absent.

2.2.2.4 Wildlife Habitat (including rare species)

Wildlife habitat is defined in the Significant Wildlife Habitat Technical Guide (MNR, 2000) as areas where plants, animals and other organisms live and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.

Wildlife habitat is grouped into four categories as per the Significant Wildlife Habitat Technical Guide (MNR, 2000), as follows: Seasonal Concentration Areas, Rare Vegetation Communities or Specialized Habitats for Wildlife, Movement Corridors and Habitat of Species of Conservation Concern.

This assessment of wildlife use was conducted using available secondary source information and the compiled information provided by MNR for the Project Study Area, in order to assess wildlife use and to determine if areas of confirmed Significant Wildlife Habitat occur within the Project Study Area.

The Municipality of Huron East has mapped Significant Wildlife Habitat as part of its Official Plan (Official Plan Background Map 3). Six areas, identified as Significant Wildlife Habitat in the Huron East Official Plan, occur in the 120 m Area of Investigation (Transmission Line Study Area). These areas are also identified as significant woodlands in the Official Plan. All woodlands within the 120 m Area of Investigation, including these six areas, were assessed during site investigations to determine whether they contain significant wildlife habitat.

The nearest Important Bird Area (IBA) is the Port Franks Forests and Wetlands IBA ON024, located approximately 19 km to the southwest of the Project Study Area, along the Lake Huron Shoreline (IBA Canada, 2011).

Environmental Significant Areas (ESAs) have been designated by Ausable Bayfield Conservation Authority within the Project Study Area. Although these areas are not identified as natural features requiring identification and evaluation within O.Reg. 359/09, a consideration of the ecological features and functions of these areas contributes to an understanding of wildlife habitat across the Project Study Area and potential identification of Significant Wildlife Habitat. Nine ESAs have been identified within the Project Study Area, five of which are located in the 120 m Area

of Investigation (Figure 2.1). These five ESAs are listed below with brief descriptions, summarized from ABCA's Environmentally Significant Areas Report (1984):

STA-2-A: ..... This area, which is approximately 129.2 ha, coincides with a portion of the Bayfield South Life Science ANSI (refer to section 2.2.2.5 of this report). It contains a series of upland woodlots running parallel to Lake Huron, dissected by several concession roads. Woodlots vary from young sugar maple with ash to mature ash-beech with hemlock and sugar maple. No wetlands are known to occur within this feature.

STA-6-C: ..... This site, measuring approximately 38.1 ha in size of which approximately 25 ha consists of wetland, is characterized as a lowland forest swamp with a section of sugar maple, beech and ash forest. Areas of standing water were noted at the time of inspection. An abandoned sand and gravel pit, which has since become a shallow pond, is located in the northeast portion of the woodlot. Some clearing has occurred at the northwest edge of the woodlot.

STA-5-C: ..... The southern portion of this woodlot is a young upland forest dominated by sugar maple and dogwood. The northern portion contains two areas which could be designated as wetland, together covering approximately 8.7 ha of this 25.5 ha feature, although two drains bisect this area and have likely contributed to draining the area to some extent. Areas of standing water are present in the western areas of the woodlot and there was also a very wet clearing located adjacent to the drain at the time of inspection.

STA-4-A: ..... This area is comprised of Riverine Swamp Forest, with pure stands of cedar surrounded by sugar maple, ironwood, hawthorn and dogwood, and is approximately 146.1 ha in size. The cedar portion of the forest was saturated organic matter and contained many pools of standing water. The wetland component of the features covers a total area of approximately 10 ha. There is a poorly drained area of intermittent, shallow pools where the Bannockburn River bisects this area.

TUCK-7-B: .... This area contains at least seven wetland areas, which together cover 14.5 ha of the 81.3 ha feature. The largest wetland (7.2 ha) contains a large area of standing water. Dominant species include red maple in the wetlands, as well as silver maple, willow and basswood. There is a large area of cattail, sedge, reed grasses and bulrush marsh situated at the edge of the swamp, separating it from regenerating formerly cultivated land.

As noted in Section 2.2.1.2. (Conservation Reserves), the Linfield Wildlife Area is a property recently acquired by ABCA, where wildlife habitat preservation has been identified as a management priority. The outer limit of 120 m Area of Investigation coincides with the western limit of this area.

These features were assessed to determine whether they contain candidate significant wildlife habitat during the site investigation.

Seasonal Concentration Areas

Habitats within the Project Study Area have been identified as habitats of seasonal concentrations of animals and/or possessing characteristics that make them potential habitats of seasonal concentrations. Based on the natural heritage background information reviewed and on direct input from MNR on seasonal concentrations of animals, the following habitats were carried forward to Phase 2 (site investigation) of the NHA:

Colonial-nesting Bird Breeding Habitat (bank and cliff swallows, tree/shrub, ground):

According to information provided by MNR during this Records Review, known Blue Heron nesting habitats are present to the north of the Project Study Area (MNR, 2011). According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for several colonial nesting breeding birds including Bank Swallow, Cliff Swallow, Great Blue Heron and Green Heron in the general vicinity of the Project Study Area (Cadman *et al.* 2007. Bank Swallows, Cliff Swallows, Great Blue Herons and Herring Gulls were recorded during spring and summer avian surveys conducted by Golder in the Project Study Area (Golder Associates, 2011). Bank Swallows and Cliff Swallows were identified during breeding bird surveys conducted by AECOM (Appendix I). One bank swallow was observed over an agricultural field within the 120 m Area of Investigation, and one Bank Swallow and one Cliff Swallow were observed flying over another agricultural field outside the 120 m Area of Investigation. Both of these species regularly forage several kilometres out from their breeding colonies; therefore their presence does not necessarily indicate that they are breeding nearby. In addition, one Great Blue Heron and one Green Heron were identified outside the 120 m Area of Investigation during breeding bird surveys conducted by AECOM. Suitable habitats for colonial-nesting birds may occur in the Project Study Area.

Waterfowl Stopover and Staging Areas (terrestrial and aquatic):

A flock of 80 Tundra Swans was observed feeding in fields near the southeast corner of the Transmission Line Study Area during spring Tundra Swan/waterfowl surveys (Golder Associates, 2011). This flock was observed outside the 120 m Area of Investigation. According to information provided by MNR during this Records Review, waterfowl stopover and staging areas may occur in the Project Study Area (MNR, 2011).

Waterfowl Nesting Areas:

According to the Atlas of the Breeding Birds of Ontario, there is confirmed breeding evidence for Mallard in the vicinity of the Wind Energy Centre Study Area and probable breeding evidence in the vicinity of the Transmission Line Study Area, as well as probable breeding evidence for Wood Duck in the vicinity of the Project Study Area (Cadman *et al.* 2007). Wood Duck and Mallard were identified during spring and summer avian surveys conducted in the Project Study Area (Golder Associates, 2011). Mallard and Wood Duck were also identified during breeding bird surveys conducted by AECOM (Appendix I). One Mallard was observed within the 120 m Area of Investigation however there was no evidence of breeding Mallards during surveys. One pair of Wood Ducks was noted within the 120 m Area of Investigation. A female Wood Duck and eight ducklings were noted outside the 120 m Area of Investigation. Suitable breeding habitats for these species likely occur in the Project Study Area.

Shorebird Migratory Stopover Areas (shorebird staging):

Black-bellied Plover, Upland Sandpiper and Killdeer were recorded during spring avian surveys, and Killdeer was recorded during fall avian surveys conducted in the Project Study Area (Golder Associates, 2011). According to information provided by MNR during this Records Review, shorebird stopover and staging areas may occur in the Project Study Area (MNR, 2011).

Raptor Winter Feeding and Roosting Areas (raptor wintering areas):

Rough-legged Hawk, Red-tailed Hawk and American Kestrel were observed during winter avian use surveys conducted in the Project Study Area (Golder Associates, 2011). According to information provided by MNR during this Records Review, raptor winter feeding and roosting areas may occur in the Project Study Area (MNR, 2011).

Reptile Hibernacula:

According to the Ontario Herptofaunal Summary Atlas (accessed April 11, 2011), the Eastern Gartner Snake and Brown Snake are known to occur in the vicinity of the Project Study Area (Oldham and Weller, 2000). Suitable hibernacula for these species may occur in the Project Study Area.

Bat Hibernacula and Maternity Colonies:

According to information provided by MNR during this Records Review, the potential exists for the presence of bat hibernacula in cave/cavern features that may be associated with the Bayfield and Bannockburn Rivers (MNR, 2011).

In addition, there are several features which have the potential to contain suitable habitat for bat hibernacula or maternity colonies, including known and inferred karst topography as well as woodlands. Karst topography is known to overlap with the eastern portion of the Project Study Area, and is inferred within the remainder. Karst is susceptible to the creation of geologic features, such as caves, which may be suitable for bat hibernacula (OGS, 2011). Woodlands may contain a sufficient density of snags or cavity trees which could provide suitable habitat for bat maternity colonies. Bat species which are known from the vicinity of the project location include big brown bat (*Eptesicusfuscus*) and eastern red bat (*Lasiurus borealis*) (Dobbyn 1994). Their habitats may occur in the Project Study Area.

Amphibian Breeding Habitat (woodland, wetland):

According to the Ontario Herpetofaunal Summary Atlas (accessed April 11, 2011), the following amphibian species are known to occur in the vicinity of the Project Study Area: American Toad, Spring Peeper, Western Chorus Frog, Gray Treefrog, Wood Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog, Bullfrog, Common Mudpuppy, Eastern Newt, and Northern Redback Salamander (Oldham and Weller, 2000). Suitable breeding habitats for these species may be located in woodland and wetland areas in the Project Study Area.

Each of these habitats was assessed during site investigations to determine if they are present or absent in the 120 m Area of Investigation.

Based on consultation with MNR (personal communication, 2011), the following habitats were not carried forward to Phase 2 (site investigation) of the NHA:

- Wild Turkey winter range: these habitats are known to be common with a lack of site fidelity from winter to winter.

Although MNR identified a winter deer yard associated with the Hay Swamp Provincially Significant Wetland, this feature is located beyond 120 m from the Project Location and will not be carried forward to site investigation.

Rare Vegetation Communities or Specialized Habitats for Wildlife

Based on the natural heritage background information reviewed and on direct input from MNR on rare vegetation communities or specialized habitats for wildlife, the following habitats were carried forward to Phase 2 (site investigation) of the NHA:

Rare Vegetation Communities:

According to information provided by MNR during this Records Review, alvars, tall-grass prairies, savannahs, provincially rare forest types (i.e., ranked S1 to S3), talus slopes, rock barrens, sand barrens and Great Lake dunes are unlikely but may occur in the Project Study Area (MNR, 2011).

Habitat for Area Sensitive Species (interior forest breeding birds, open country breeding birds):

According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for six interior forest breeding birds including Yellow-bellied Sapsucker, Veery, Black-throated Green Warbler, Ovenbird, Scarlet Tanager and Canada Warbler in the general vicinity of the Project Study Area (Cadman *et al.* 2007). With respect to open country breeding birds, there is confirmed breeding evidence for Eastern Kingbird and Eastern Meadowlark, probable evidence of breeding of American Kestrel and Vesper Sparrow, and possible evidence of breeding of Northern Harrier in the general vicinity of the Project Study Area (Cadman *et al.* 2007).

Old-growth or Mature Forest Stands:

According to information provided by MNR during this Records Review, old-growth or mature forest stands may occur in the Project Study Area (MNR, 2011).

Turtle Habitat (nesting, over-wintering):

According to the Ontario Herpetofaunal Summary Atlas (accessed April 11, 2011), Snapping Turtle and Midland Painted Turtle are known to occur in the vicinity of the Project Study Area. Suitable nesting and overwintering habitats for these species may occur in the Project Study Area.

Woodland Raptor Nesting Habitat:

According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for Red-tailed Hawk in the general vicinity of the Project Study Area, whereas Cooper's Hawk and Sharp-shinned Hawk were found in the first atlas only (Cadman *et al.* 2007). Cooper's Hawk was recorded in the Project Study Area during spring/summer avian surveys (Golder Associates, 2011). Suitable nesting habitats for these species may occur in the Project Study Area.

Bald Eagle Nesting Habitat:

According to the Atlas of the Breeding Birds of Ontario, there is no evidence of breeding for Bald Eagle in the general vicinity of the Project Study Area (Cadman *et al.* 2007). Bald Eagle was recorded during winter and fall surveys but not during spring and summer surveys conducted in the Project Study Area (Golder Associates, 2011). However, according to information provided by MNR during this Records Review, Bald Eagle nesting habitat may occur in the Project Study Area (MNR, 2011).

Osprey Nesting, Foraging and Perching Habitat:

According to the Atlas of the Breeding Birds of Ontario, there is no evidence of breeding for Osprey in the general vicinity of the Project Study Area (Cadman *et al.* 2007). Osprey was not recorded during winter, fall, spring or summer surveys conducted in the Project Study Area (Golder Associates, 2011). However according to information provided by MNR during this Records Review, Osprey nesting, foraging and perching habitat may occur in the Project Study Area (MNR, 2011).

Cliffs and Talus Slopes:

According to information provided by MNR during this Records Review, cliffs and talus slopes may occur in the Project Study Area (MNR, 2011).

Seeps and Springs:

According to information provided by MNR during this Records Review, seeps and springs may occur in the Project Study Area (MNR, 2011).

Marsh Bird Breeding Habitat:

According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for Green Heron in the general vicinity of the Project Study Area (Cadman *et al.* 2007). Suitable breeding habitat for this species may occur in the Project Study Area. Common Loon was recorded during spring and fall avian surveys, and one Sandhill Crane was recorded during the fall avian survey conducted in the Project Study Area (Golder Associates, 2011). Suitable breeding habitat for these species may occur within the Project Study Area.

These features were assessed during site investigations to determine if they are present or absent in the 120 m Area of Investigation.

Based on consultation with MNR (personal communication, 2011), the following habitats were not carried forward to Phase 2 (site investigation) of the NHA:

- Forests providing high diversity of habitats and/or highly diverse areas: the criteria used to define these habitats are redundant with other evaluation criteria applied to wildlife habitat and woodlands. Mitigation will be prescribed according to these other significance designations; and
- Foraging areas with abundant mast (mast producing areas): these habitats are relevant to more northerly locations, where forest stands providing hard mast (e.g., oak and beech nuts) can be important food resources for Black Bear.

Animal Movement Corridors

No known animal movement corridors were identified in the Project Study Area. Large vegetated corridors are associated with riparian areas, particularly in the western portion of the Project Study Area. Hedgerows can serve as smaller, local linkages between tableland woodlots. Movement corridors for deer and amphibians were assessed during site investigations to determine if they are present or absent in or within the 120 m Area of Investigation.

Species of Conservation Concern

As defined in the *Significant Wildlife Habitat Technical Guide* (MNR, 2000), species that may be considered species of conservation concern include:

- *species identified as nationally endangered or threatened by the Committee on the Status of Endangered Wildlife in Canada, which are not protected in regulation under Ontario's Endangered Species Act;*
- *species identified as provincially vulnerable based on lists of Vulnerable, Threatened, Endangered or Extirpated Species of Ontario that are updated periodically by the OMNR;*
- *species that are listed as rare or historical in Ontario based on records kept by the Natural Heritage Information Centre in Peterborough (S1 is extremely rare, S2 is very rare, S3 is rare to uncommon);*
- *species whose populations are known to be experiencing substantial declines in Ontario;*
- *species that have a high percentage of their global population in Ontario and are rare or uncommon in the planning area;*
- *species that are rare within the planning area, even though they may not be provincially rare;*
- *species that are subjects of recovery programs; and*
- *species considered important to the municipality, based on recommendations from the Conservation Advisory Committee.*

The NHIC and information provided by MNR for the preparation of this Records Review were used to identify Species of Conservation Concern that occur or have the potential to occur within the Project Study Area.

Information pertaining to endangered or threatened species is excluded from this report. As noted above, endangered and threatened species are addressed through a parallel review and approval process administered by the MNR Guelph District.

Based on the natural heritage background information reviewed and on direct input from MNR on Species of Conservation Concern, the following habitats and features were carried forward to Phase 2 (site investigation) of the NHA:

- Special Concern and provincially rare species (plants and animals); and
- Shrub/early successional bird breeding habitat.

Table 2.3 lists the species of conservation concern that were identified through the Records Review as occurring or having the potential to occur within the Project Study Area. This table was compiled with results from a search of the NHIC database, conducted in May, 2011 and on records identified in correspondence from MNR for this Records Review. In total, 37 provincially rare species (i.e., species that are ranked S1 to S3), including 13 Special Concern species, have been identified as potentially occurring within the Project Study Area.

Descriptions of the preferred habitat of each species were obtained from Appendix G of the Significant Wildlife Habitat Technical Guide (MNR, 2000) and are included in Table 2.3. The presence/absence of suitable habitats in the 120 m Area of Investigation was determined during the site investigation. If the habitat is present, the feature was carried forward and included in Evaluation of Significance Report.

2.2.2.5 Areas of Natural and Scientific Interest (ANSIs)

The Ontario Ministry of Natural Resources (MNR) evaluates ANSIs to determine whether they are provincially or regionally (locally) significant. This evaluation takes into consideration the value of the area for conservation, scientific study and education. Provincially significant ANSIs are protected under section 2.1 of the *Provincial Policy Statement* (2005), which prohibits development and site alteration in (provincially) significant ANSIs and on adjacent lands unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

ANSIs are designated as Earth Science or Life Science depending on whether they contain significant geological features (e.g., rock, fossil and landform features) or biological feature (e.g., natural landscapes, ecological communities, plant and animal species), respectively.

Life Science ANSIs

According to the MNR's Natural Resource Values Information System (NRVIS) mapping, there is one Life Science ANSI within the Project Study Area, which is regionally significant.

The Natural Heritage Information Centre (NHIC) Natural Area Record for this ANSI describes Bayfield South, a 329 ha ANSI, as a "*series of upland woodlots running parallel to Lake Huron approximately 6 km south of Bayfield, dissected by several concession roads. Woodlots vary from young sugar maple with ash to mature ash-beech with hemlock-sugar maple*" (NHIC, 2011).

Table 2.3 Species of Conservation Concern

Common Name	Scientific Name	G-rank[1]	S-rank[2]	COSEWIC Status[3]	MNR Status[4]	Preferred Habitat	Last Observed Date	Source
PLANTS (24 species)								
American Gromwell	*Lithospermum latifolium*	G4	S3	-	-	Species occurs on river floodplains, woods and edges of woods.	7/7/1983 [H]	NHIC
Autumn Coral-root	*Corallorhiza odontorhiza*	G5	S2	-	-	Species occurs in open, oak-pine woods or occasionally in open, red pine or white pine plantations		MNR Correspondence
Beaked Spike-rush	*Eleocharis rostellata*	G5	S3	-	-	Found among fens and shores.		MNR Correspondence
Carolina Whitlow-grass	*Draba reptans*	G5	S3	-	-	Primarily inhabits dry sandy areas, dry open flats & limestone pavements.		MNR Correspondence
Chinese Hemlock Parsley	*Conioselinum chinense*	G5	S2	-	-	Species inhabits calcareous cedar swamps, wet borders of streams and rivers. Also found among seepage slopes.	9/1/1986 [H]	NHIC
Crowned Beggarticks	*Bidens trichosperma*	G5	S2	-	-	Found in openings in swamps, marshes, along shores & wet fields.		MNR Correspondence
Eastern Green-violet	*Hybanthus concolor*	G5	S2	-	-	Occurs in rich, wet-mesic floodplain forests as well as mesic forests over limestone.	7/21/1983 [H]	NHIC
Green Dragon	*Arisaema dracontium*	G5	S3	SC	SC	Species found in bottomlands often along rivers and creeks.		MNR Correspondence
Hairy Valerian	*Valeriana edulis*	G5	S1	-	-	Inhabits swampy river flats and meadows, wet prairies, and wooded, rocky riverbanks.		MNR Correspondence
Hairy Wood Mint	*Blephilia hirsuta*	G5?	S1	-	-	Species found in woodlands, preferably rocky, and especially among rivers.		MNR Correspondence
Harbinger-of-spring	*Erigenia bulbosa*	G5	S3?	-	-	Occurs in rich, moist deciduous woods, especially on floodplains.		MNR Correspondence
Hill's Pond Weed	*Potamogeton hillii*	G3	S2	SC	SC	Aquatic plant found in highly alkaline waters of ditches and ponds.		MNR Correspondence
Large Round-leaved Orchid	*Platanthera macrophylla*	G4	S2	-	-	Species inhabits moist mixed woods.	7/10/1867[H]	NHIC
Lizard's Tail	*Saururus cernuus*	G5	S3			Species inhabits shores and streambanks along shallow water.		MNR Correspondence
Ram's-head Lady's-slipper	*Cypripedium arietinum*	G3	S3	-	-	Found in cedar woodlands, limestone plains and wooded fens.		MNR Correspondence
Rattlesnake Hawkweed	*Hieracium venosum*	G5	S2	-	-	Species inhabits open, dry sandy woods.		MNR Correspondence
Scarlet Beebalm	*Monarda didyma*	G5	S3	-	-	Found in moist woods, thicket swamps and floodplains.	7/1/1900 [H]	NHIC
Slender Vulpia	*Vulpia octoflora*	G5	S2	-	-	Species inhabits dry, sandy sites including meadows, dry forests, and stabilized dunes.		MNR Correspondence
Slim-flowered Muhly	*Muhlenbergia tenuiflora*	G5	S2	-	-	Found in rich deciduous forest, often on rocky or sandy soils.	9/1/1983 [H]	NHIC
Stiff Gentian	*Gentianella quinquefolia*	G5	S2	-	-	Found in moist soils of streambanks, edges of woods & wet prairies.		MNR Correspondence
Sundial Lupine	*Lupinusperennis*	G5	S3	-	-	Inhabits dry, sandy oak savannahs and prairies		MNR Correspondence
Tuberous Indian Plantain	*Arnoglossumplantagineum*	G4G5	S3	SC	SC	Species occurs in wet, calcareous meadows or shoreline fens.		MNR Correspondence
Woodland Pinedrops	*Pterospora andromedea*	G5	S2	-	-	Species found in conifer woods, under pine.		MNR Correspondence
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	G4	S2	-	-	Found in sandy meadows and prairies.		MNR Correspondence
BIRDS (6 species)								
Bald Eagle	*Haliaeetus leucocephalus*	G5	S3B	-	SC	Nests in tall trees often near shore. Feeds on fish in large open water bodies.		MNR Correspondence
Common Nighthawk	*Chordeiles minor*	G5	S4B	THR	SC	Species inhabits open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.		MNR Correspondence
Louisiana Waterthrush	*Seiurus motacilla*	G5	S3B	SC	SC	Species prefers wooded ravines, and swamps and mature forests with closed canopy. This species nests on the ground.	6/9/1983[H]	NHIC
Red-headed Woodpecker	*Melanerpes erythrocephalus*	G5	S4B	THR	SC	Species inhabits open, deciduous forest with little understorey; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory.		MNR Correspondence
Short Eared Owl	*Asio flammeus*	G5	S2N, S4B	SC	SC	Species can be found in grasslands, marshes, and bogs. Species is a ground nester. It requires 75 to 100 ha of contiguous open habitat.		MNR Correspondence

Table 2.3 Species of Conservation Concern

Common Name	Scientific Name	G-rank[1]	S-rank[2]	COSEWIC Status[3]	MNR Status[4]	Preferred Habitat	Last Observed Date	Source
Yellow-breasted Chat	*Icteria virens*	G5	S2B	SC	SC	Species inhabits large thicket habitats; nests above ground in bush, vines etc.		MNR Correspondence
INSECTS (4 species)								
Dusted Skipper	*Atrytonospsis hianna*	G4G5	S1	-	-	Species is confined to remnants of dry prairie and sand dune areas.		MNR Correspondence
Monarch Butterfly	*Danaus plexippus*	G5	S2N, S4B	SC	SC	Species can be found in any open habitat, especially where milkweed occurs.		MNR Correspondence
Sleepy Duskywing	*Erynnis brizo*	G5	S1	-	-	Species occurs in open oak woods	6/24/1985 [H]	NHIC
West Virginia White	*Pieris virginiensis*	G3G4	S3	-	SC	This species is restricted to rich deciduous woods, where its foodplant Toothwort occurs.		MNR Correspondence
REPTILES & AMPHIBIANS (3 species)								
Eastern Ribbonsnake	*Thamnophis sauritus*	G5	S3	SC	SC	Occurs in wet meadows, marshes or sphagnum bogs, usually near water such as ponds, or streams. Species hibernates in groups.		MNR Correspondence
Milksnake	*Lampropeltis triangulum*	G5	S3	SC	SC	Species inhabits abandoned farmlands, meadows, thickets and woodlands. Often found hiding under stones, or under boards	June 1992	NHIC
Snapping Turtle	*Chelydra serpentina*	G5	S3	SC	SC	Requires permanent, semi-permanent fresh water, including marshes, swamps rivers and streams. Nests in open habitats on south-facing slopes. Hibernates in mud under water.		MNR Correspondence

[1] ***G-rank*** *G Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies or variety. Definitions are as follows:*
G1 Extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 Very rare; usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3 Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4 Common; usually more than 100 occurrences; usually not susceptible to immediate threats.
G5 Very common; demonstrably secure under present conditions.

[2] ***S-rank:*** *The Natural Heritage provincial ranking system (provincial S-rank) is used by the MNR Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities.*
Definitions are as follows:
S1 ... Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.
S2 ... Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.
S3....Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.
S4 ... Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.
S5 ... Very common and demonstrably secure in Ontario.
SE ... Exotic; not believed to be a native component of Ontario's flora.
SH ... Possibly Extirpated (Historical)— Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years.

[3] ***COSEWIC Status*** *COSEWIC (Committee on the Status of Endangered Wildlife in Canada) assigns a federal status ranking for all species that it assesses.*
EXT .....Extinct.A species that no longer exists
EXP .....Extirpated. A species that no longer exists in the wild in Canada, but occurring elsewhere in the world
END.....Endangered. A species facing imminent extirpation or extinction throughout its range.
THR.....Threatened. A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction
SC .....Special Concern. A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species.
IND .....Indeterminate. A species for which there is insufficient information to support a status designation.
NAR.....Not at Risk. A species that has been evaluated and found to be not at risk.
**.....Indicates a species found on Schedule 1 of the federal Species At Risk Act.*

[4] ***MNR Status:*** *Based on consultation with COSSARO (Committee on the Status of Species at Risk in Ontario). COSSARO is the Ministry of Natural Resources (MNR) committee that evaluates the conservation status of species occurring in Ontario.*
Definitions are as follows:
EXT Extinct. A Species that no longer exist anywhere.
EXP Extirpated. Any native species no longer existing in the wild in Ontario, but existing elsewhere in the wild.
END R Endangered (Regulated). A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act
END Endangered (not regulated). A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under the Ontario Endangered Species Act
THR Threatened. Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a significant portion of its Ontario range if the limiting factors are not reversed.
SC Special Concern [formerly Vulnerable].A species with characteristics that make it sensitive to human activities or natural events.
NAR Not at Risk [formerly Not In Any Category]. A species that has been evaluated and found not to be at risk.
DD.... Data Deficient [formerly Indeterminate]. Any native species for which there is insufficient scientific information on which to base a status recommendation

Although the Bayfield South ANSI occurs within the Project Study Area and falls within the 120 m Area of Investigation, it is not a provincially significant Life Science ANSI and therefore was not carried forward to site investigation.

Earth Science ANSIs

According to the MNR's NRVIS mapping, there are no Earth Science ANSIs located within the Project Study Area of provincially significant or regional significance. As no Earth Science ANSIs have been identified within the Project Study Area, no additional work for this feature type is required in subsequent phases of the Natural Heritage Assessment for this project.

2.3 Summary of Key Findings of the Records Reviews

Table 2.4 summarizes the natural features identified through the Records Review as occurring or potentially occurring in the Project Location or its associated 120 m Area of Investigation; these are the features that were carried forward to the Site Investigation. Site investigation was required to confirm the presence and boundaries of these features, as well as to determine whether any additional natural features are present in the 120 m Area of Investigation.

Table 2.4 Summary of Natural Features within 120 m Area of Investigation Identified Through the Records Review

Feature	Results of Records Review
Provincially Significant Southern Wetlands	No provincially significant wetlands were identified in the 120 m Area of Investigation. Unevaluated wetlands may be present within the 120 m Area of Investigation; their presence/absence will be determined during site investigations.
Significant Coastal Wetlands	No significant coastal wetlands were identified in the 120 m Area of Investigation.
Significant ANSIs (Life Science)	No Provincially Significant Life Science ANSIs were identified within the 120 m Area of Investigation.
Significant ANSIs (Earth Science)	No Earth Science ANSIs were identified in the 120 m Area of Investigation.
Significant Valleylands (South and East of the Canadian Shield)	No known significant valleylands were identified in the 120 m Area of Investigation. Watercourses in the 120 m Area of Investigation may be associated with valleyland features and will be assessed during site investigations.
Significant Woodlands (South and East of the Canadian Shield)	Woodlands have been identified in the 120 m Area of Investigation, including woodlands identified as significant in municipal official plans (Wind Energy Centre – Bluewater; Transmission Line Study Area – Huron East). Woodlands in the 120 m Area of Investigation will be assessed during site investigations.
Significant Wildlife Habitat	Significant Wildlife Habitats have been identified within the Project Study Area and may occur in the 120 m Area of Investigation. Several features and type of significant wildlife habitat were identified in background documents and through consultation with MNR, ABCA and local municipalities. Thirty-seven species of conservation concern were identified as potentially occurring within the Project Study Area. This information will form the basis for the assessment and potential identification of candidate significant wildlife habitat in the 120 m Area of Investigation during site investigations.
Provincial Parks and Conservation Reserves	No provincial parks or conservation reserves were identified in the 120 m Area of Investigation.

The following features were carried forward to site investigation to determine their presence/absence within the 120 m Area of Investigation: wetlands, woodlands, valleylands and significant wildlife habitat.

3. Site Investigation

3.1 REA Requirements

As required under the REA process, detailed site investigations were completed in accordance with O.Reg. 359/09, Section 26 (1). This site investigation report was prepared in accordance with O.Reg. 359/09, Section 26 (3) and the guidelines described in the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, July 2011).

MNR was consulted on proposed work plans and field protocols for the Bluewater Wind Energy Centre site investigations including:

- Proposed Work Plan, Bluewater Wind Energy Centre Natural Heritage Assessments, submitted June 8, 2010 to Aylmer District MNR (response received August 31, 2010).
- Proposed Site Investigation field protocols, submitted May 9, 2011 to Aylmer District MNR (response received May 16, 2011).
- Meeting to discuss the Bluewater Wind Energy Centre Natural Heritage Assessment on July 25, 2011 in Burlington, Ontario.
- Meeting to discuss the Bluewater Wind Energy Centre Natural Heritage Assessment on September 20, 2011 in Markham, Ontario.

Information collected during the Records Review was used to guide the site investigations. The presence and boundaries of features identified during the Records Review were confirmed, and any changes were noted. Any additional features not identified through the Records Review but identified through the site investigation as occurring within 120 m Area of Investigation were also described.

3.2 Site Investigation Methods

Site investigations were conducted for features within the 120 m Area of Investigation, which encompasses the Project Location and an additional 120 m surrounding the Project Location. In order to facilitate site investigation data collection and reporting, “natural areas”, were identified and their boundaries delineated based on contiguous natural areas (e.g., comprised of woodland, wetland, successional vegetation communities, or a combination thereof). Each natural area was assigned a unique identifier. Site investigation survey data was initially organized according to natural areas rather than natural features as defined within the REA process (i.e., woodlands, wetlands, valleylands, significant wildlife habitat), because the identification of these features relies on the results of site investigation surveys.

Natural features identified through the Records Review were assessed to determine their composition, form and function. Any corrections to the Records Review, including changes to the boundaries of natural features or new features, were identified, as documented in Section 3.3. The following sections describe the methods used to conduct site investigations. Appendix B contains detailed site investigation field notes, Appendix C contains qualifications (i.e., curriculum vitae) for all investigators, and Appendix D documents weather conditions during field investigations.

3.2.1 Ecological Land Classification (ELC) and Vascular Plant Surveys

Field surveys to classify vegetation communities and identify vascular plant species composition within the 120 m Area of Investigation were initially conducted during the period of May 12 to November 28, 2011. The late season field surveys were conducted to accommodate changes to the project layout. Several features were revisited in February 2012 to identify and clarify particular polygon boundaries in response to MNR comments. Survey dates are provided in Table 3.3. An addendum describing changes to ELC mapping resulting from MNR consultation and associated additional site investigations is provided in Appendix B.

All natural areas occurring within the Wind Energy Centre Study Area, and natural areas occurring within the 120 m Area of Investigation in the Transmission Line Study Area, were initially identified through aerial photography interpretation. Site-specific field surveys of each natural area falling within the 120 m Area of Investigation were conducted where permission to enter was available. If property access was unavailable at the time of site investigations, an Alternative Site Investigation was conducted following the protocols described in Section 3.2.2 of this report. Reconnaissance site investigations were also conducted to confirm the presence/absence of additional natural areas not identified through aerial photography interpretation. Site investigations for natural areas located within the Area of Investigation for the transmission line were conducted from the road right-of-way. This survey method was considered to be sufficient to complete the natural heritage assessment and assess potential impacts of the transmission line, which is proposed within the road right-of-way.

Vegetation communities were described using the Ecological Land Classification (ELC) for Southern Ontario (Lee *et al.*, 1998). ELC is the provincially accepted standard for classifying vegetation communities in Ontario, and provides methods for identifying and mapping areas in a form that is useful for land use planning. This protocol distinguishes vegetation communities based on stand structure and composition which includes the compilation of a floral species list noting dominant species within each vegetation layer and a delineation of vegetation communities into Ecological Land Classification units.

This protocol uses a series of 6 levels (Site Region, System, Community Class, Community Series, Ecosite and Vegetation Type) each giving context to the site from largest to finest scale. Where possible, communities were described to Vegetation Type which is the finest level of classification. However, where Alternative Site Investigations were conducted or where aerial photography was used for the assessment, vegetation communities were described to Ecosite and/or to Community Series. The ELC assessment consisted of a combination of soil profile analysis, basal area prism sweeps, and multilayer (canopy, sub-canopy, and ground cover) vegetation inventories.

During site investigations it became apparent that some of the vegetation communities observed did not fit within the existing ELC designations, therefore, we have created a list of “new” ELC codes (e.g., CUT1a, FOD4a, etc.) for the purposes of this project. These are presented in Appendix F.

Vascular plant inventories were completed in conjunction with vegetation community surveys, where possible. Plant species were considered rare if designated provincially as S1 (Extremely rare in Ontario), S2 (Very rare in Ontario), or S3 (Rare to uncommon in Ontario), or locally rare in Huron County by Oldham (1993). Species having a high coefficient of conservatism (8, 9 or 10) as designated by Oldham *et al*. (1995) were also considered species of interest due to their fidelity to specific habitats. Due to the timing of some of the field surveys, (i.e., November surveys), a complete list of plant species was not possible. However, vegetation community classification to at minimum Ecosite level was possible based on the presence of canopy, sub-canopy and understorey vegetation. These surveys focused on completing classification through canopy, sub-canopy and understorey analysis as the herbaceous layer was not always present.

3.2.2 Alternative Site Investigation

In certain instances, it was necessary to conduct an Alternative Site Investigation, as described in Part IV, Section 26 of O.Reg. 359/09. Alternative site investigations were completed when property access was not granted and site specific investigations could not be conducted as per Section 3.2.1 above. NextEra worked closely with property owners to acquire Right of Entry agreements (ROE) in order for site investigations to occur. Alternative Site Investigations were completed when property access was unavailable at the time of site investigations (e.g., when right of entry was denied).

Alternative Site Investigations were completed using aerial photograph interpretation as well as field observations including observations made from the nearest property where an ROE was granted (fence line surveys) and observations made from a municipal or provincial road right-of-way (roadside surveys). Through aerial photography and visual field observations, vegetation communities in these natural areas were identified to Ecosite level using the Ecological Land Classification for Southern Ontario (Lee *et al*., 1998).

Table 3.1 provides a summary of the Alternative Site Investigations conducted for the Bluewater Wind Energy Centre, including why a site investigation could not be conducted and how information pertaining to the natural area was obtained. The locations of specific natural areas are shown on Figures 3.2a, b and c.

Table 3.1 Alternative Site Investigations

Natural Area #	Date	Method of Alternative Site Investigation	Rationale for Alternative Site Investigation
426	October 19, 2011	A fence line survey was conducted from the property line located along the north side of the natural area.	Did not have permission to enter property on which this natural area is located.
427	September 7, 2011	A fence line survey was conducted from the property line located along the eastside of the natural area.	Did not have permission to enter property on which this natural area is located.
462	October 19, 2011	A roadside survey was conducted from Staffa Road, located along the south side of the natural area.	Did not have permission to enter property on which this natural area is located.
463	October 6, 2011	A roadside survey was conducted for the Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1) located immediately south of Staffa Road.	Did not have permission to enter property on which this natural area is located.
480	October 6, 2011	A roadside survey was conducted for the Dry-Moist Oldfield Meadow Type (CUM1-1) located immediately north of Staffa Road.	Did not have permission to enter property on which this natural area is located.
480	July 18, 2011; revisited October 19, 2011	A fence line survey was conducted for the Dry-Moist Oldfield Meadow Type (CUM1-1) located southwest of Turbine 15. The site was revisited after property access was granted.	Did not have permission to enter property on which this natural area is located.
480	September 1, 2011	In the portion of the natural area located northwest of Turbine 16 fence line survey was conducted for the Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type (FOD5-7) and an Ash Mineral Deciduous Swamp Ecosite (SWD2) was identified through air photo interpretation.	Did not have permission to enter property on which this portion of the natural area is located.
504	October 6, 2011	A fenceline survey of the Mineral Thicket Swamp Ecosite (SWT2) was conducted from the adjacent property to the south.	Did not have permission to enter property on which this feature is located.
534	July 7, 2011; September 2, 2011; November 4, 2011	Fenceline surveys were conducted for the portion of Natural Area 534 located north of proposed Turbine 33.	Did not have permission to enter property on which this portion of the natural area is located.
539	October 6, 2011	A roadside survey of the Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4) was conducted from Bronson Line.	Did not have permission to enter property on which this natural area is located.
545	October 6, 2011	A roadside survey of the Dry-Fresh Sugar Maple Beech Deciduous Forest Type (FOD5-2) was conducted from Bronson Line.	Did not have permission to enter property on which this natural area is located.

3.2.3 Wetlands and Coastal Wetlands

Through the records review, boundaries of all known wetlands were identified within the 120 m Area of Investigation. Additional wetlands were identified during site investigation where field surveys were initially undertaken between May 2011 and November 2011 according to the Ontario Ministry of Natural Resources' Ontario Wetland Evaluation System (OWES) (MNR, 2002). Several features were revisited in February 2012 to identify and clarify particular wetland boundaries in response to MNR comments. Field personnel consisted of four certified Ontario Wetland

Evaluator biologists. Survey dates are provided in Table 3.3. An addendum describing changes to the identification and boundaries of wetland features resulting from MNR consultation and associated additional site investigations is provided in Appendix B.

Wetland boundaries were delineated using the standardized methods as outlined within the OWES manual for Southern Ontario. When wetlands were found, the boundary was delineated where 50% of the physical area was covered by wetland indicative species and 50% by plant species found within upland areas (MNR, 2002). Obligate and facultative wetland species identification was based on indicator species outlined in Appendix 5 of the OWES (MNR, 2002), Wetland Plants of Ontario (Newmaster *et al.*, 1997) as well as using the Coefficient of Wetland Index in Oldam *et al.* (1995). Tree and/or shrub forms were used as the best indicators for long term site conditions. Where woody vegetation species did not clearly indicate upland or wetland areas, other vegetation forms were used.

The Coefficient of Wetness is one component of the "Floristic Quality Assessment System for Southern Ontario" (Oldam *et al.*, 1995). The system provides a numerical ranking of the relative affinity for wet soil conditions for native plant species. For the purposes of the wetland index, plants are designated as:

Obligate Wetland (-5):..... almost always occurs in wetlands under natural conditions (estimated probability >99%);

Facultative Wetland (-4 to -2): ..... usually occurs in wetlands, but occasionally found in non-wetlands (estimated probability 67 to 99%);

Facultative (-1 to 1):..... equally likely to occur in wetlands or non-wetlands (estimated probability 34 to 66%);

Facultative Upland (+2 to +4): ..... occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated probability 1 to 33%); and

Obligate Upland (+5):..... occurs almost never in wetlands under natural conditions (estimated probability <1%).

AECOM ecologists recognize that plant species can exist as distinct ecotypes, which can tolerate different moisture regimes. For example, red maple (*Acer rubrum*), which has a Wetness Index value of 0, demonstrates high genetic variability between ecodistricts and can be found in very dry conditions and in areas where hydric soils or saturated conditions prevail. To further support the wetland boundary determination, a soil profile analysis was also taken within select wetland areas to determine the presence/absence of hydric soils. Hydrologic conditions, including the presence of seeps, were also assessed. The vegetation community analysis was also referenced to provide confirmation that adjacent communities were in fact upland in nature.

Wetlands communities were complexed together where a group of wetland units, or a contiguous group of wetland communities, at least 0.5 ha in size were functionally linked and the outer boundary of any one unit was no more than 750 m away from the outer boundary of one or more other units.

3.2.4 Woodlands

Woodland or forested areas were initially identified through aerial photography interpretation. The presence, boundaries and composition of woodlands was then confirmed at the time of vegetation community surveys wherever they occurred within the 120 m Area of Investigation, following the site investigation methods outlined in Section 3.2.1 above.

Ecological vegetation community mapping was used to identify woodlands according to the definition of woodlands provided in O. Reg. 359/09, as amended through O. Reg. 521/10, whereby a "woodland" is defined as a treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees, that is located south and east of the Canadian Shield.

Woodland units were identified according to the procedures described in the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, July 2011), which states that "a bisecting opening 20 m or less in width between crown edge is not considered to divide a woodland into two separate woodland and the area of the developed opening is not included in the wooded area calculation". Woodland units were therefore established by grouping qualifying ELC polygons located within 20 m or less of each other. Given the agricultural nature of our Project Study Area, vegetation communities delineated as cultural plantations were not included within our woodland analysis.

3.2.5 Valleylands

The Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011) defines valleylands as a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year. Valleyland areas were identified during site investigation where field surveys were undertaken between May 2011 and November 2011. Field surveys were undertaken within the Area of Investigation, which comprised of a swath from proposed turbines, transmission lines and road corridors. Field personnel consisted of AECOM aquatic and terrestrial ecologists.

To determine the presence/absence of significant valleylands, the following criteria from Section 6.2.3 of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011) were used:

- Surface water functions;
- Degree of naturalness;
- Linkage functions; and
- Restoration: Existing/committed projects.

3.2.6 Wildlife Habitat

Field investigations to identify candidate significant wildlife habitat located with 120 m of the project location were conducted in conjunction with Ecological Land Classification (ELC) mapping and vascular plant surveys from May to November 2011. These surveys were generally conducted between 7:00 am and 6:00 pm. The dates on which specific surveys were conducted are provided in Table 3.3. Weather conditions and field personnel are summarized in Appendices C and D.

As described in the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, July 2011), candidate significant wildlife habitats were identified using criteria established by MNR in the Significant Wildlife Habitat Technical Guide (MNR, 2000) and through consultation with MNR wildlife biologists. Bat-related habitats were also assessed with reference to the draft and final versions of *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR 2010 and MNR 2011).

NRSI conducted site investigations in June 2010 and June 2011 based on the Ecoregion Criteria Schedules Addendum (MNR 2009) and *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR 2010). Criteria used to identify candidate bat maternity colonies included the presence of snags or live cavity trees which were greater than 20 cm diameter at breast height (dbh). Snags which were considered suitable habitat had exfoliating bark or cavities. In addition, any suitable candidates had a clear entranceway to the cavity or surrounding exfoliating bark.

Site investigations conducted after the most recent MNR guidance document, *Bats and Bat Habitats: Guidelines for Wind Power Projects* (2011b), was released were conducted according to the new guidelines. Accordingly, the number of wildlife trees per hectare were determined using 0.05 ha plots (or circular plots with a radius of 12.6 m), which are randomly placed throughout each woodland being investigated. The guidelines stipulate that a minimum of 10 plots be used for woodlands which are 10 ha or less in size, with one additional plot for every additional

hectare for larger woodlands (up to a maximum of 35 plots). Woodlands with greater than or equal to 10 wildlife trees per hectare qualify as candidate significant bat maternity colony habitats. NRSI randomly selected circular plots 12.6 m in radius within the portions of woodlands for which access was granted. The number of snags or cavity trees within these plots which were greater than 25 cm dbh was counted.

NRSI's complete report describing bat habitat assessment surveys is provided in Appendix E.

Site investigation surveys focused on identifying significant wildlife habitat triggers including vernal pools, potential hibernacula (e.g., rock piles), raptor nests or tree cavities. Incidental wildlife observations were also recorded using the ELC wildlife field data sheet (Lee *et al.*, 1998). A summary of the criteria and methods used to identify each type of candidate significant wildlife habitat is provided in Table 3.2.

3.2.6.1 Bat Habitat Assessment Surveys

NRSI conducted site investigations in June 2010 and June 2011 based on the guidance material that was available at the time, which included the Ecoregion Criteria Schedules Addendum (MNR 2009) and *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR 2010). Criteria used to identify candidate bat maternity colonies included the presence of snags or live cavity trees which were greater than 20 cm diameter at breast height (dbh). Snags which were considered suitable habitat had exfoliating bark or cavities. In addition, any suitable candidates had a clear entranceway to the cavity or surrounding exfoliating bark.

As the project layout and land access has changed since site investigations were completed, there are several woodlands which were not previously investigated that are now within 120 m of proposed turbines. The most recent MNR guidance document, *Bats and Bat Habitats: Guidelines for Wind Power Projects* (2011b), indicates that the number of wildlife trees per hectare can be determined using 0.05 ha plots (or circular plots with a radius of 12.6 m), which are randomly placed throughout each woodland being investigated. The document stipulates that a minimum of 10 plots be used for woodlands which are 10 ha or less in size, with one additional plot for every additional hectare for larger woodlands (up to a maximum of 35 plots). Woodlands with greater than or equal to 10 wildlife trees per hectare qualify as candidate significant bat maternity colony habitats. NRSI followed this protocol for woodlands which had not been previously investigated, randomly selecting circular plots 12.6 m in radius within the portions of woodlands for which access was granted. The number of snags or cavity trees within these plots which were greater than 25 cm dbh were counted.

NRSI's complete report describing bat habitat assessment surveys is provided in Appendix E.

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Seasonal Concentration Areas			
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff Swallows)	• Presence of the following Ecosites: CUM1, CUT1, CUS, BLO1, BLS1, BLT1, CLO1, CLS1, CLT1; • Eroding banks, sandy hills, pits, steep slopes, and rock faces that are undisturbed or naturally eroding for 10 years or more; and • Significant habitats are not located in licensed aggregate pits.	• Search for presence of earthen banks on air photo mosaics within project area. • Search for presence of earthen banks where suitable ecosites encountered during ELC field investigations. • Record location of any potentially qualifying features.	• No earthen banks found and therefore no candidate SWH
Colonial-Nesting Bird Breeding Habitat (Tree/Shrub)	• Presence of the following Ecosites: SWM2, SWM3, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7, FET1; • Significant sites generally have better habitat quality (e.g., optimal vegetation composition, abundant food); and • Size of habitat and level of disturbance are also important.	• Search for presence of treed wetlands (e.g., mixed or deciduous swamps or treed fen habitats) on air photo mosaics within project area. • Search for presence of large stick nests (particularly where more than one) where suitable ecosites encountered during site investigation. • Record location of any nests.	• No large stick nests observed and therefore no candidate SWH
Colonial-Nesting Bird Breeding Habitat (Ground)	• Any (rocky) island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map); • Significant sites generally have better habitat quality (e.g., optimal vegetation composition, abundant food); and • Size of habitat and level of disturbance are also important.	• Search for presence of rocky islands or peninsulas within lakes or large rivers on air photo mosaics within project area. • Search for presence of rocky islands or peninsula where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• No rocky islands or peninsulas within large lakes or rivers found and therefore no candidate SWH
Waterfowl Stopover and Staging Areas (Terrestrial)	• Presence of the following Ecosites: CUM1, CUT1; and • Evidence of annual spring flooding from melt water or runoff.	• Search for presence of cultural meadows or cultural thicket communities that may provide spring flooding or runoff on air photo mosaics within project area. • Search for evidence of spring flooding or runoff where suitable ecosites encountered during site investigation. • Determine if areas show evidence of extensive seasonal flooding to host large numbers of staging waterfowl. • Record location of any potentially qualifying features.	• No cultural meadows or cultural thickets of sufficient size and exhibiting evidence of extensive annual spring flooding found and therefore no candidate SWH

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Waterfowl Stopover and Staging Areas (Aquatic)	• Presence of the following Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, SWD1, SWD3; • Where standing water is present including ponds, marshes, lakes, bays, coastal inlets and watercourses used during migration; • Significant sites generally have better habitat quality (e.g., optimal vegetation composition, ratio of open water to emergent vegetation; extensive shoreline; abundant food, nocturnal roosting cover); and • Larger wetlands are more significant.	• Search for presence of marsh, shallow water or deciduous swamp communities large enough to act as waterfowl staging areas on air photo mosaics within project area. • Search for presence of marsh, shallow water or deciduous swamp communities large enough to act as waterfowl staging areas where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• No marsh, shallow water or deciduous swamp communities of sufficient size and/or habitat quality found and therefore no candidate SWH
Waterfowl Nesting Areas	• All upland habitats located adjacent to (within 150 m of) the following Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4; or upland habitats adjacent to (within 150 m of) Provincially Significant Wetlands; • Upland areas should be at least 120 m wide so that predators have difficulty finding nests; • Larger sites of suitable habitat are more significant; • Significant sites generally have better habitat quality (e.g., optimal vegetation structure, stable water levels, abundant cover); and • Sites wilt little disturbance (e.g., from agricultural activities such as hay cultivation or cattle grazing) are more significant.	• Search for upland habitat located near marshes or other wetland/open water areas on air photo mosaics within project area. • Search for upland habitat located near suitable wetland ecosites when encountered during site investigation. • Record location of any potentially qualifying features.	• 1 generalized candidate SWH location identified
Shorebird Migratory Stopover Areas (Shorebird Staging)	• Presence of the following Ecosites: BBO1, BBO2, BBS1, BBS2, BBT1, BBT2, SDO1, SDS2, SDT1, MAM1, MAM2, MAM3, MAM4, MAM5; and • Shorelines of lakes, rivers and wetlands, including beach areas, bars, seasonally flooded shoreline, mudflats, rock groins, and other forms of armour rock lakeshore.	• Search for stretches of undisturbed landscape found along shorelines of lakes, rivers and wetlands on air photo mosaics within project boundaries. • Search for presence of mudflats or shorelines adjacent to large open water area during site investigation. • Record location of any potentially qualifying features.	• No long stretches of undisturbed shoreline found and therefore no candidate SWH

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Raptor Winter Feeding and Roosting Areas (Raptor Wintering Areas)	• Combination of ELC Community Series; presence of one Community Series from each land class: ▪ Forest: FOC, FOD, FOM; ▪ Upland: CUM, CUT, CUS, CUW; • Sites must be at least 20 ha in size, with a combination of forest and upland habitats; • Upland communities must be >15 ha in size; • Sites that are less disturbed by agricultural activities are more significant; and • Sites with better habitat quality (e.g., abundant prey and perches; a tendency toward less snow accumulation due to exposure to strong prevailing winds) are probably more significant.	• Search for fields and open meadows on air photo mosaics within project area that are >15 ha in size and adjacent to forest habitats. • Search for fields that provide a variety of herbaceous plant species which offer seeds, nuts, fruit and leafy plant matter throughout the year which supports high populations of prey (small mammals and ground nesting birds) where suitable ecosites encountered during site investigations. • Record location of any potentially qualifying features.	• 1 candidate SWH was identified (RWA-01)
Reptile Hibernacula	• No ELC Ecosites are directly related to these habitats. Areas of broken and fissured rock, rock piles or slopes, stone fences, crumbling foundations, and old wells are candidate SWH.	• Search for presence of wooded areas adjacent to fields or thickets on air photo mosaics within project area. • Search for rock piles/abandoned foundations/fissured rock with potential to extend below the frost line during site investigation. • Record location of any potentially qualifying features.	• 2 candidate SWH locations identified (RH-01, RH, 02) and 1 generalized candidate SWH location identified
Bat Hibernacula	• All caves, abandoned mine shafts, underground foundations, and these Ecosites: CCR1, CCR2, CCA1, CCA2 (buildings are not to be considered SWH).	• Search for presence of caves, mine shafts, under-ground formations and Karsts within project area. • Record location of any potentially qualifying features.	• No suitable habitat found therefore no candidate SWH
Bat Maternity Colonies	• Presence of all Ecosites associated with the following ELC Community Series: FOD and FOM; and • Forests that have >10/ha wildlife trees (snags or cavity trees) which are >25 cm dbh.	• Search for presence of deciduous or mixed forest communities on air photo mosaics within project area. • Search for presence of forests that have a high density of wildlife trees (snags or cavity trees) which are >25 cm dbh during site investigation. • Record location of any potentially qualifying features.	• 13 candidate SWH locations identified (BMC-01, BMC-02, BMC-03, BMC-04, BMC-05, BMC-07, BMC-08, BMC-09, BMC-10, BMC-11, BMC-12, BMC-13, BMC-14)
Amphibian Breeding Habitat (Woodland)	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD; • Woodland with a wetland, lake or pond, including breeding pools that may be permanent, seasonal, ephemeral, and located within or adjacent to (within 120 m of) the woodland; • To be significant, vernal ponds in woodlands should persist until mid-July; and • Wetlands used for breeding with presence of shrubs and logs around the edges are more significant because of increased structure for calling, foraging, escape and concealment from predators.	• Search for presence of forests and swamps on air photo mosaics within project area. • Search for permanent or temporary wooded pools that are likely to hold water until July and have depths of at least 50 cm in early spring where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• 11 candidate SWH locations identified (AWO-01, AWO-02, AWO-03, AWO-04, AWO-05, AWO-06, AWO-07, AWO-08, AWO-09, AWO-10 and AWO-11) and 7 generalized candidate SWH locations identified

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Amphibian Breeding Habitat (Wetland)	• Presence of the following Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, SWT1; • Larger sites of suitable habitat are more significant; and • Wetlands used for breeding with presence of shrubs and logs around the edges are more significant because of increased structure for calling, foraging, escape and concealment from predators.	• Search for presence of meadow marsh, shallow marsh, and other suitable ecosites on air photo mosaics within project area. • Search for presence of temporary or permanent standing water where suitable ecosites encountered during site investigation. • Search for pools that are likely to hold water until July and have depths of 50 cm in early spring where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• 3 candidate SWH locations identified (AWE-01, AWE-02, AWE-03) and 3 generalized candidate SWH locations identified
Rare Vegetation Communities			
Alvars	• Presence of any of the following Ecosites: ALO1, ALS1, ALT1; • Sites must be at least 0.5 ha in size; and • Sites must not be dominated by non-indigenous species.	• Search for presence of alvars on air photo mosaics within project area. • Search for presence of savannahs and document all flora during site investigation. • Record location of any potentially qualifying features. • Refer to Appendix N of the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and determine whether alvar indicator species are present.	• No alvars found therefore no candidate SWH
Tall-grass Prairies	• Presence of any of the following Ecosites: TPO1, TPO2; • Sites with ground cover dominated by prairie grasses and less than 25% tree cover; • Site conditions must be restored or natural (e.g., not railway right-of-ways); and • Sites must not be dominated by non-indigenous species.	• Search for presence of tall-grass prairies on air photo mosaics within project area. • Search for presence of tall-grass prairies and document all flora during site investigation. • Record location of any potentially qualifying features. • Refer to Appendix N of the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and determine whether tall grass prairie indicator species are present.	• No tall-grass prairie found therefore no candidate SWH
Savannahs	• Presence of any of the following Ecosites: TPS1, TPS2, TPW1, TPW2; • Tallgrass prairie habitat with tree cover between 25% and 35% (TPS1 and TPS2), or between 35% and 60% (TPW1 and TPW2); • Site conditions must be restored or natural (e.g., not railway right-of-ways); and • Sites must not be dominated by non-indigenous species.	• Search for presence of savannahs on air photo mosaics within project area. • Search for presence of savannahs and document all flora during site investigation. • Record location of any potentially qualifying features. • Refer to Appendix N of the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and determine whether savannah indicator species are present.	• No savannahs found therefore no candidate SWH

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Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Rare Forest Types	• Presence of any rare (S1-S3, SH) forest types.	• Search for presence of rare forest types on air photo mosaics within project area. • Search for presence of rare forest types during site investigation. • Record location of any potentially qualifying features. • Refer to Appendices J and M of *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and determine whether rare forest types are present.	• 1 candidate SWH location identified (RVC-01)
Cliffs and Talus Slopes	• Presence of any of the following Ecosites: CLO1, CLS1, CLS2, CLT1, CLT2, TAO1, TAO2, TAS1, TAS2, TAT1, TAT2; • Cliffs are greater than 3 m in height of vertical to near-vertical bedrock; and • A talus slope is rock rubble at the base of a cliff made up of coarse rocky debris.	• Search for presence of cliffs and talus slopes on air photo mosaics within project area. • Search for presence of cliffs and talus slopes during site investigation. • Record location of any potentially qualifying features.	• No cliffs or talus slopes found therefore no candidate SWH
Sand Barrens	• Presence of any of the following Ecosites: SBO1, SBS1, SBT1; • Typically exposed sand habitats, generally sparsely vegetated and caused by lack of moisture, periodic fires, and erosion. Sand barrens have little or no soil, and the underlying rock protrudes through the surface. Usually located within other types of natural habitat, such as forest or savannah; and • Sites must not be dominated by non-indigenous species.	• Search for presence of sand barrens on air photo mosaics within project area. • Search for presence of sand barrens during site investigation. • Record location of any potentially qualifying features.	• No sand barrens found therefore no candidate SWH
Great Lakes Dunes	• Presence of all Ecosites associated with the following ELC Community Series: SDO, SDS, SDT; and • Located within 5 km of Lake Huron.	• Search for presence of Great Lakes dunes on air photo mosaics within project area. • Search for presence of Great Lakes dunes during site investigation. • Record location of any potentially qualifying features.	• No Great Lakes dunes found therefore no candidate SWH
Specialized Habitat for Wildlife			
Habitat for Area Sensitive Species (Interior Forest Breeding Birds)	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD; • Large mature (>60 years old) forest (non-plantation) stands or woodlots greater than 30 ha in size; and • Woodlands with at least 4 ha interior forest habitat (at least 200 m from edge of forest).	• Search for contiguous areas of forest of at least 30 ha, with at least 4 ha of interior habitat on air photo mosaics within project area. • Determine whether large mature trees are present where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• No mature forested areas with at least 4 ha of interior forest found therefore no candidate SWH

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Habitat for Area Sensitive Species (Open Country Bird Breeding Habitat)	• Presence of the following Ecosite: CUM1; and • Grassland areas (includes natural and cultural fields and meadows) greater than 30 ha in size, excluding Class 1 and 2 agricultural lands and lands actively used for farming (i.e., no row-cropping in the last 5 years).	• Search for presence of large patches (>30 ha) of grassland or old field habitat on air photo mosaics within project area. • Search for large grassland patches where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features	• No grassland or field habitats larger than 30 ha found and therefore no candidate SWH
Old-growth or Mature Forests	• Presence of all Ecosites associated with the following ELC Community Series: FOD, FOC, FOM; • Typically relatively undisturbed, structurally complex and contain a wide variety of trees and shrubs in various age classes; • Most significant sites will contain numerous trees which are at least 140 years old. Stands containing younger trees (e.g., 100 years or older) are significant where older trees no longer exist; and • Stands containing predominantly long-lived species are probably more significant than stands consisting primarily of short-lived species (e.g., trembling aspen, birch).	• Search for forest communities on air photo mosaics within project area. • Search for mature trees in forested areas that have never been cutover (Old-Growth) and mature trees in forest stands consisting of a broad range of tree size classes (Mature Forest Stands) where suitable ecosites encountered during site investigation. • Search for large standing snags and abundance of downed wood in variable sizes where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• 8 generalized candidate SWH locations identified
Turtle Nesting Habitat	• Presence of the following Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1; and • Areas of sand and/or gravel that turtles are able to dig in, including sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers; and • Nesting areas on the sides of municipal and provincial road embankments, railway embankments and active aggregate operations are not SWH.	• Search for presence of open vegetated areas near ponds, marshes, lakes or other water bodies on air photo mosaics within project area. • Search for areas that are elevated and consist of gravel or sandy soils where suitable ecosites encountered during site investigation. • Search for evidence of turtle egg predation (broken turtle shells) where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• No suitable nesting habitat found in open vegetated areas near ponds, marshes, lakes or other water bodies and therefore no candidate SWH
Turtle Over-wintering Habitat	• Presence of the following Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1; and • Overwintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	• Search for presence of ponds, large marshes, lakes or other water bodies on air photo mosaics within project area. • Search for presence of ponds, large marshes, lakes or other water bodies during site investigation. • Record location of any potentially qualifying features.	• No suitable over-wintering habitat found therefore no candidate SWH

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Woodland Raptor Nesting Habitat	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD, or the following Ecosite: CUP3; and • All natural or conifer plantation woodland/forest stands >30 ha with at least 4 ha of interior forest habitat.	• Search for extensive forested areas (>30 ha in size) on air photo mosaics within project area. • Search for large patches of suitable ecosites during site investigation. • Record location of any potentially qualifying features.	• 1 generalized candidate SWH location identified
Bald Eagle Nesting Habitat	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD; • Forest communities directly adjacent to riparian areas of rivers, lakes, ponds, wetlands, and islands; and • Nests located on man-made objects are not included.	• Search for presence of forest communities directly adjacent to open water on air photo mosaics within project area. • Search for presence of nest bowls where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features and nests.	• No nest bowls observed therefore no candidate SWH
Osprey Nesting, Foraging and Perching Habitat	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD; • Forest communities directly adjacent to riparian areas of rivers, lakes, ponds, wetlands, and islands; and • Nests located on man-made objects are not included.	• Search for presence of forest communities directly adjacent to open water on air photo mosaics within project area. • Search for presence of nest bowls where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features and nests.	• No nest bowls observed therefore no candidate SWH
Seeps and Springs	• Presence of all Ecosites associated with the following ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD; • Any predominantly forested are (with less than 25% meadow, field or pasture) within the headwater areas of a stream could have seeps or springs; and • Seeps were identified using groundwater indicator plants, with reference to McKenny and Peterson (1996), Crow and Hellquist (2000), and Niering and Thieret (2009).	• Search for presence of forest or swamp communities on air photo mosaics within project area. • Search for presence of seeps or springs, and determine presence of indicator species during site investigations. • Record location of any potentially qualifying features.	• 9 generalized candidate SWH locations identified
Marsh Breeding Bird Habitat	• Presence of the following Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1; and • Wetland habitats containing shallow water and emergent aquatic vegetation.	• Search for presence of large marshes on air photo mosaics within project area. • Search for marshes containing standing water at least 30 cm deep, and where emergent aquatic vegetation is present during site investigation. • Record location of any potentially qualifying features.	• 1 generalized candidate SWH location identified

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Species of Conservation Concern			
American Gromwell ***(Lithospermum latifolium)*** **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Shaded river banks, wooded floodplains [6]. River floodplains, woods and edges of woods. [2] • Corresponding ELC: FOD7	• Search for presence of suitable habitat and documentation of all flora during site investigations. • Search for species during vegetation survey (Bloom time - spring [1]).	• NHIC EO (21 in Ont.) – 12 are historic & 9 are extant. • Bloom time may have been missed. • Last known occurrence for this species in area was 1983. • No infrastructure proposed within required habitat for this species. • 2 generalized candidate SWH locations identified.
Autumn Coral-root ***(Corallorhiza odontorhiza)*** **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Oak-pine woods or occasionally in open, red pine or white pine plantations. Dry, sandy woods. Scattered occurrences are restricted to southern Ontario mainly in the Carolinian zone.[2] • Corresponding ELC: FOM1, FOM2, CUP3	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time - summer to fall, but some years not at all [2]).	• NHIC EO (19 in Ont.) – 15 are historic and 4 extant[2]. • No infrastructure proposed within the required habitat for this species. • 1 generalized candidate SWH location identified.
Beaked Spike-Rush ***(Eleocharis rostellata)*** **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Found among fens, calcareous shores and meadows. [2] • Corresponding ELC: FEO, FES, FET	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time - May to October [3]).	• No fens were identified during site investigations. • Last known record in area was 1976[2]. • No further investigation required as no suitable habitat found during site investigation.
Carolina Whitlow-grass ***(Draba reptans)*** **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Primarily inhabits dry sandy areas, dry open flats & limestone pavements. Occasionally weedy. [2 and 6] • Corresponding ELC: SBO, SBS, SBT, ALO, ALS, ALT	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – mid-March to mid-June [4]).	• NHIC EO (24 in Ont.) – 9 are historic and 11 extant. • Last known record in the area was 1958[2]. • No further investigation required as no suitable habitat found during site investigation.
Chinese Hemlock Parsley ***(Conioselinum chinense)*** **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Swampy places with deciduous trees, cedars, tamarack; springy river banks, creek borders[6]. Species inhabits calcareous white cedar swamps, wet borders of streams and rivers. Also found among calcareous seepage slopes.[2] • Corresponding ELC: SWC1, SWC3, SWC4, SWM1, SWM2, SWM4, SWM5, SWM6	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –summer to fall).	• NHIC EO (15 in Ont.) – 10 are historic and 5 extant. One or more may have been within Lambton, Huron, and Middlesex County [2]. • Bloom period would have been captured. • Last known record in the area was 1986[2]. • No infrastructure proposed within the required habitat for this species. • 1 generalized candidate SWH location identified.
Crowned Beggarticks ***(Bidens trichosperma)*** **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Found in openings in swamps, marshes, along shores & wet fields within the Carolinian zone and southeastern Georgian bay [2]. Bogs, fens, tamarack swamps [13]. • Corresponding ELC: SWC, SWM, SWD,SWT, MAM, MAS	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – late summer [5]).	• NHIC EO (20 in Ont.) – 13 are historic & 4 are extant. • Bloom period may have been captured. • Last known local record was 1936[2]. • No infrastructure proposed within the required habitat for this species. • Records are historic and few, therefore unlikely to occur. • No further surveys will be conducted.

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Eastern Green-violet ***(Hybanthus concolor)*** **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Occurs in rich, wet-mesic floodplain forests as well as mesic forests over limestone [3]. Includes floodplains and river banks [6]. • Corresponding ELC: ALT1, FOD7	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –mid March to August [4]).	• NHIC EO (16 in Ont.) – 11 are historic & 4 are extant. • Bloom period may have been missed. • Last known local record was 1983[2]. • No infrastructure proposed within the required habitat for this species. • 2 generalized candidate SWH locations identified.
Green Dragon ***(Arisaema dracontium)*** **Species of Conservation Concern** Vulnerable – S3 **COSEWIC (SC) and MNR Status (SC)**	• Preferred habitat ▪ Species found in damp deciduous forest and along river streams [8]. It grows in wet forests particularly Maple forest and forest dominated by Red Ash and White Elm[7]. • Corresponding ELC: FOD6, FOD7, FOD9	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – May and June [8]).	• NHIC EO (85) – 44 are historic and 11 are extant. One or more may have been within Huron and Middlesex County & ranges as far north as Goderich[2]. • Last known local record was 2001 [2]. • No infrastructure proposed within the required habitat for this species. • All FOD6, FOD7 and FOD9 ecosites considered generalized candidate SWH.
Hairy Valerian ***(Valeriana edulis)*** **Species of Conservation Concern** Critically Imperiled – S1	• Preferred habitat ▪ Inhabits swampy river flats and meadows, wet prairies, and wooded, rocky riverbanks [3] and fens [6] • Corresponding ELC: FEO1, FES1, FET1, SWC, SWM, SWD, SWT, TPO, TPS, TPW	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –June to August).	• NHIC EO (10) – 6 of those are historic and 2 of those are extant. • Last known local record was 1993 [2]. • No infrastructure proposed within the required habitat for this species. • 1 generalized candidate SWH location identified.
Hairy Wood Mint *(Blephilia hirsuta)* **Species of Conservation Concern Critically Imperiled – S1**	• Preferred habitat ▪ Rich woods, swamp forests, floodplains [6]. Species found in woodlands, preferably rocky, and especially among rivers. • Corresponding ELC: FOD6, FOD7, SWM, SWD	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – summer for a month and a half [10]).	• NHIC EO (2) – 1 historic and 1 extant. • Last known local record was 1959[2]. • No infrastructure proposed within the required habitat for this species. • No further studies required as records are historic and species is unlikely to occur in study area.
Harbinger-of-spring **(***Erigenia bulbosa)* **Species of Conservation Concern** Vulnerable – S3?	• Preferred habitat ▪ Occurs in rich, moist deciduous woods, especially on floodplains [2]. • Corresponding ELC: FOD6, FOD7, FOD8, FOD9	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – early to late April [6]).	• NHIC EO (24) – 17 of those are historic and 7 are extant. • Bloom period may have been missed. • Last known local record was 1890[2]. • No infrastructure proposed within the required habitat for this species. • All FOD6, FOD7, FOD8 and FOD9 ecosites considered generalized candidate SWH.
Hill's Pond Weed **(***Potamogeton hillii)* **Species of Conservation Concern** Imperiled – S2 **COSEWIC (SC) and MNR Status (SC)**	• Preferred habitat ▪ Aquatic plant found in highly alkaline waters of ditches, ponds, beaver ponds, and slow-moving cold waters chiefly confined to the Bruce Peninsula and Manitoulin Island, with a few additional records from Grey, Wellington and Peel Counties.[2] • Corresponding ELC: SAS1, SAM1, SAF1	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – summer [11]).	• NHIC EO (26) – 11 of those are historic and 11 are extant. Species not noted to be within study area. • Date of last known historical record is unknown [2]. • No further studies required as no suitable habitat found during site investigation.

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Large Round-leaved Orchid **(***Platanthera macrophylla)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Species inhabits moist mixed woods. Found in fairly mature, upland sugar maple-beech-eastern hemlock woodlands, a relatively common type of habitat in Ontario although this species is rarely encountered. At least one historic record was found in Huron County[2]. • Corresponding ELC: FOM6, FOM7, FOM8	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – June to August [11]).	• NHIC EO (14) – 14 of those are historic. • Last known local record was in 1867 [2]. • No further studies required as no suitable habitat found during site investigation.
Lizard's Tail **(***Saururus cernuus)* **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Species inhabits shores and streambanks along shallow water. As well as swamps (usually deciduous but sometimes cedar), floodplains, shallow water and mudflats at the borders of streams and ponds [6]. • Corresponding ELC: MAM2, MAM3, MAS2, MAS3, SWD	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – June – September [12]).	• NHIC EO (NA). • Last known local record was in 1987 [2]. • No infrastructure proposed within the required habitat for this species. • Suitable habitat considered generalized candidate SWH if site investigation was conducted after September.
Ram's-head Lady's-slipper **(***Cypripedium arietinum)* **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Found in cedar woodlands, limestone plains and wooded fens. As well as, moist coniferous swamps, dry, sandy woods, and limestone barren [2]. • Corresponding ELC: CUW1, ALO, FET1, SWC	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –mid May to mid June [2]).	• NHIC EO (96) – 49 of those are historic and 21 are extant. • Bloom period may have been missed. • Last known local record for this species was pre-1986 [2]. • No further studies required as no suitable habitat found during site investigation.
Rattlesnake Hawkweed **(***Hieracium venosum)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Species inhabits open, dry sandy woods [2].Jack pine, oak, and aspen woodlands [6]. • Corresponding ELC: FOD1, FOD2, FOD3, FOD4, FOD5, FOC1, FOM1, FOM5	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – April – September [11]).	• NHIC EO (5 in Ont.) – All are historic. • Bloom period would have been captured. • Last known local record was in 1956 [2]. • No infrastructure proposed within the required habitat for this species. • No further studies required as records are historic and species is unlikely to occur in study area.
Scarlet Beebalm **(***Monarda didyma)* **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Found in moist, rich woods, thicket swamps, banks and floodplains [6]. • Corresponding ELC: FOD6, FOD7, FOD8, FOD9, SWT2, SWT3	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – May to October [3]).	• NHIC EO (34) – 30 of those are historic. 2 are extant, and 2 are extirpated. • Bloom period would have been captured. • Last known local record was in 1958 [2]. • No further studies required as records are historic and species not observed during field investigations.
Slender Vulpia **(***Vulpia octoflora)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Species inhabits dry, sandy habitats, including rocky woods meadows, dry forests, and stabilized dunes [2]. • Corresponding ELC: SDO1, SDS1, SDT1	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – unknown).	• NHIC EO (14) – 11 of those are historic. 2 extant, 1 extirpated. • Last known local record for this species was in 1970 [2]. • No further studies required as no suitable habitat found during site investigation.

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Slim-flowered Muhly (*Muhlenbergia tenuiflora)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Found in rich deciduous forest, often on rocky or sandy soils [2]. Usually found on wooded dunes, hillsides, and riverbanks whether in oak or beech-maple woods [6]. • Corresponding ELC: SDT1, FOD5, FOD9	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – unknown).	• NHIC EO (20) –11 of those are historic, 8 extant, and 1 extirpated. • Last known local record was in 1983 [2]. • No infrastructure proposed within the required habitat for this species. • All FOD5 and FOD9 ecosites considered generalized candidate SWH.
Stiff Gentian (*Gentianella quinquefolia)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Found in moist soils of streambanks, edges of woods and wet prairies. As well as, marshy meadows, bluffs and wooded hillsides [6]. • Corresponding ELC: BLO1, BLS1, BLT1, TPO2, TPS2, TPW2, MAM2, FOD7	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – late summer to mid fall[1]).	• NHIC EO (25) – 14 are historic, 5 are extant, and 6 are extirpated. • Bloom period would have been captured. • Last known local record for this species was in 1982 [2]. • No further studies required as species was not observed during investigations.
Sundial Lupine (*Lupinus perennis)* **Species of Conservation Concern** Vulnerable – S3	• Preferred habitat ▪ Inhabits dry, sandy oak savannahs and prairies [2]. As well as, open barrens or clearings in woodlands of oak, jack pine, and/or aspen [6]. • Corresponding ELC: TPS1, TPW1, CUW1, RBO, SBO	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –mid-March to mid-June [4]).	• NHIC EO (27) – 23 of those are historic, 2 are extant, 1 is level B, and 1 is a level C. • Last known local record for this species was in 1950[2]. • No further studies required records are historical and no suitable habitat found during site investigation.
Tuberous Indian Plantain (*Arnoglossum plantagineum)* **Species of Conservation Concern** Vulnerable – S3 **COSEWIC (SC) and MNR Status (SC)**	• Preferred habitat ▪ Largely restricted to coast of Lake Huron. Occurs mainly in flat, sandy areas of the Bruce Peninsula. A localized species of fens, wet meadows, and calcareous river flats [2]. • Corresponding ELC: FEO, FES, FET, MAM2, MAM3	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time –mid-March to mid-June [4]).	• NHIC EO (26) – 13 of those are historic, 12 are extant, and 1 is extirpated. • Last known local record was 2001 (along Lake Huron?)[2]. • No further studies required, as no suitable habitat found during site investigation.
Woodland Pinedrops (*Pterospora andromedea)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Species found in conifer woods, under pines, but also hemlock, spruce, fir, and white cedar. Also in dry or rocky soil, often with common juniper and sometimes aspen or birch [6]. • Corresponding ELC: FOC1, FOC2, FOC3, FOC4	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – summer [11]).	• NHIC EO (28) – 22 of those are historic, 5 are extant, 1 is extirpated. • Last known local record was in 1936 [2]. • No further studies required as records are historic and distinctive species not observed during investigations.
Yellow Ladies'-tresses (*Spiranthes ochroleuca)* **Species of Conservation Concern** Imperiled – S2	• Preferred habitat ▪ Dry, open sites, usually on acidic sandy soil [2]. Also on dry to mesic open woodland, thickets, meadows, barrens, ledges, outcrops, banks and roadsides, old fields [11]. • Corresponding ELC: CUM1, CUT1, CUW1, RBO1, SBO1	• Search for presence of suitable habitat and documentation of all flora during site investigation. • Search for species during vegetation survey (Bloom Time – August to November [11]).	• NHIC EO (15) – 13 of those are historic, and 2 are extant. 4 EO's are pre 1950 and from Huron and Middlesex County. • Bloom period would have been captured. • Last known local record for this species was in 1942 [2]. • No further studies required records are historic and species was not observed during field investigations.

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Bald Eagle ***(Haliaeetus leucocephalus)*** **Species of Conservation Concern, MNR Status (SC)**	• Preferred habitat ▪ Nests in very large trees that afford a good view, often near shore. Feeds on fish in large open water bodies[10].	• Breeding habitat for this species was assessed as Bald Eagle Nesting Habitat (described above). • Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO – exact number unknown. • Last known occurrence for this species in area was in 2008 [2] (extant). • No further investigation required as no Bald Eagle Nesting Habitat found within the study area.
Common Nighthawk ***(Chordeiles minor)*** **Species of Conservation Concern, COSEWIC (THR) and MNR Status (SC)**	• Preferred habitat ▪ Aerial forager that hunts insects over a wide variety of habitats, in particular open or semi-open areas such as farmland, open woodlands, clearcuts, burns, rock outcrops, bogs fens, prairies, gravel pits and urban areas[7]. ▪ Nests on ground in a wide range of open, sparse or vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, rock outcrops, rocky barrens, gravel pits and urban rooftops. Sometimes may nest in grasslands, pastures, peat bogs, marshes or lakeshores. • Corresponding ELC: CUW, SDO, RBO, TPS	• Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO – exact number unknown. A common breeding species throughout Ontario, although local in many regions [2]. • Last known occurrence for this species in area is unknown. However, abundance estimates were taken during breeding bird atlas project in 1987 [2]. • No infrastructure proposed within the required habitat for this species. • All CUW ecosites carried forward as generalized candidate SWH.
Louisiana Waterthrush ***(Seiurus motacilla)*** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred habitat ▪ Species inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps. Trees, bushes, exposed roots, cliffs, banks and mossy logs are favoured nesting spots. This species nests on the ground[10.] Riparian woodlands are preferred stopover sites during migration[8]. • Corresponding ELC: FOD, FOM	• Breeding habitat for this species was assessed as part of Old-growth or Mature Forest Habitat (described above). • Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (61) – 35 of those are historic, 21 are extant, 1 is failed to find, and 4 are level D's [2]. • Isolated breeding records from as far north as Huron County [2]. • No infrastructure proposed within the required habitat for this species. • Generalized candidate SWH locations identified.
Red-headed Woodpecker ***(Melanerpes erythrocephalus)*** **Species of Conservation Concern, COSEWIC (THR) and MNR Status (SC)**	• Preferred habitat ▪ Species inhabits open woodland and woodland edges, especially in oak savannahs and riparian forest[7], open, deciduous forest with little understorey; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; requires cavity trees with at least 40 cm dbh; requires about 4 ha for a territory. • Corresponding ELC: FOD, CUW, CUT	• Breeding habitat for this species was partially assessed as Old-growth or Mature Forest Habitat (described above). • Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (19) – 6 are historic, 12 are extant and 1 is level C. • Last known occurrence for this species in area is unknown. • No infrastructure proposed within the required habitat for this species. • Generalized candidate SWH locations identified.

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Short Eared Owl ***(Asio flammeus)*** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred habitat ▪ Species is a ground nester. It requires 75 to 100 ha of contiguous open habitat[10]. ▪ The Short-eared Owl makes use of a wide variety of open habitats, including, grasslands, peat bogs, marshes, and old pastures. It also occasionally breeds in agricultural fields. Dense grasslands are preferred nesting sites. The main factor influencing the choice of its local habitat is believed to be the abundance of food, in the form of small rodents[8].	• Seasonal concentration areas for this species were assessed as part of Raptor Winter Feeding and Roosting Areas (described above), and breeding habitat of this species was assessed as part of Open Country Bird Breeding Habitat (described above). • Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO(13) – 6 are historic and 7 are extant [2]. • Almost completely absent from the large forested areas of the province, such as the Boreal Forest zone and the forested regions of the Great Lakes-St. Lawrence zone [2]. • Last known occurrence for this species in area was 1988. [2] • 1 candidate SWH location identified (RWA-01).
Yellow-breasted Chat **(*Icteria virens*)** **Endangered Species, COSEWIC (END) and MNR Status (SC)**	• Preferred habitat ▪ Species inhabits thickets, tall tangles of shrubbery beside streams, ponds; overgrown bushy clearings with deciduous thickets; nests above ground in bush, vines, etc.[10].	• Breeding habitat for this species was assessed as part of Shrub/Early Successional Bird Breeding Habitat (described below). • Search for presence of suitable habitat and documentation of all birds observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (48) – 33 are historic, 7 are extant, 4 are extirpated, 2 are failed to find, and 2 are level D [2]. • Last known occurrence for this species in area is unknown [2]. • No further investigation required as no Shrub/Early Successional Bird Breeding Habitat found within the study area.
Dusted Skipper **(*Atrytonospsis hianna*)** **Species of Conservation Concern** Critically Imperiled – S1	• Preferred habitat ▪ Species is confined to remnants of dry prairie and sand dune areas[11]. • Corresponding ELC: TPO, TPS, SDO	• Search for presence of dry prairie and sand dune areas on air photo mosaics within project area. • Search for presence of dry prairie and sand dune areas and documentation of all butterflies observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (9) – 2 are historic, 1 is level A, 4 are level C, 2 are level D [2]. • Last known occurrence for this species in area was in 1990 with a recorded level D EO [2]. • No further investigation required as no dry prairie or sand dune areas found within the study area.
Monarch Butterfly **(*Danaus plexippus*)** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred Habitat ▪ Monarchs typically occur in open field habitat where the adults forage on a wide range of flowers. The adults are very mobile and may be seen moving through almost any kind of habitat. Their larvae only feed on milkweeds (*Asclepius* spp.). Habitat includes abandoned farmland, along roadsides, and other open spaces where these plants grow[8]. ▪ Monarchs migrating south in the fall build up in large concentrations along the north shores of Lake Ontario and Lake Erie. • Corresponding ELC: CUM1, CUT1, CUW1	• According to MNR criteria, Monarch Migratory Stopover Areas are not associated with the study area and were therefore not assessed during the site investigation. • Monarch Feeding and Breeding Habitats were assessed as follows: o Search for presence of suitable feeding and breeding habitat (old fields with an abundance of milkweed) and documentation of all butterflies observed during site investigation. o Record locations of suitable habitat or species if present.	• Specific NHIC EO's is unknown [2]. • Undoubtedly more than 100 breeding EOs of this widespread migratory species that is common in some years. Several to many protected EOs although the quality of these EOs is not known [2]. • No further investigation required as no old fields containing a particular abundance of milkweed were noted within the study area.

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Sleepy Duskywing ***(Erynnis brizo)*** **Species of Conservation Concern** Critically Imperiled – S1	• Preferred Habitat ▪ Species occurs in oak or oak-pine scrub, chaparral, barrens; on well-drained sandy or shaly soils[13]. This species is regularly seen at flowers in oak woods, on the ground, and at mud puddles[11]. • Corresponding ELC: TPS, TPW	• Search for presence of suitable habitat and documentation of all butterflies observed during site investigation. Record locations of suitable habitat or species if present.	• NHIC EO (17) – 3 are historic and 14 are extant [2]. • Last known occurrence for this species in area 1985 [2]. • No further investigation required as no oak or oak-pine, sandy areas found within the study area.
West Virginia White ***(Pieris virginiensis)*** **Species of Conservation Concern, MNR Status (SC)**	• Preferred Habitat ▪ This species is restricted to rich, moist, deciduous woods, where its foodplant Toothwort occurs[7]. • Corresponding ELC: FOD5	• Search for presence of suitable habitat and documentation of all butterflies observed during site investigation. • Search for presence of Toothwort where suitable ecosites encountered during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO's not known. During intensive surveys in 1990, this species was located in a total of 64 sites (The Landplan Collaborative 1990) across southern Ontario. There are three main centres known: the forests of the Niagara Escarpment (Halton, Hamilton-Wentworth, Wellington); the forests of the Frontenac access north of Kingston; and Manitoulin Island [2]. • No infrastructure proposed within the required habitat for this species. • All FOD5 ecosites considered generalized candidate SWH.
Eastern Ribbonsnake ***(Thamnophis sauritus)*** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred Habitat ▪ Occurs in wet meadows, marshes or sphagnum bogs, usually near water such as ponds, or streams. Species hibernates in groups[10].	• Seasonal concentration areas for this species were assessed as part of Reptile Hibernacula (described above). • Search for presence of suitable habitat and documentation of all insects observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (273) – 161 are historic, 110 are extant, and 2 are level A [2]. • Last known occurrence for this species in area 1988 [2] • 2 candidate SWH locations (RH-01, RH-02) and 1 generalized candidate SWH location identified.
Milksnake ***(Lampropeltis triangulum)*** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred Habitat ▪ Species inhabits abandoned farmlands, meadows, thickets and woodlands. Often found hiding under stones, or under boards[10].	• Seasonal concentration areas for this species were assessed as part of Reptile Hibernacula (described above). • Search for presence of suitable habitat and documentation of all insects observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO (598) – 392 are historic and 206 are extant [2]. • Last known occurrence for this species in area 1988 [2] • 2 candidate SWH locations (RH-01, RH-02) and 1 generalized candidate SWH location identified.
Snapping Turtle ***(Chelydra serpentine)*** **Species of Conservation Concern, COSEWIC (SC) and MNR Status (SC)**	• Preferred Habitat ▪ Requires permanent, semi-permanent fresh water, including marshes, swamps, rivers and streams. Nests in open habitats on south-facing slopes. Hibernates in mud under water[10].	• Specialized habitats for this species were assessed as part of Turtle Nesting Habitat and Turtle Over-wintering Habitat (described above). • Search for presence of suitable habitat and documentation of all insects observed during site investigation. • Record locations of suitable habitat or species if present.	• NHIC EO(1) – 1 is extant [2]. Estimated EO known from 933 atlas squares in Ontario [2]. Widespread and locally common in southern and central Ontario [2]. • Last known occurrence for this species in area is unknown [2]. • No further investigation required as no Turtle Nesting or Over-wintering Habitats found within the study area.

Table 3.2 Summary of the Criteria and Methods Used to Identify Each Type of Candidate Significant Wildlife Habitat

Type of Candidate Significant Wildlife Habitat	Characteristics of the SWH Type *(All characteristics must be met by candidate SWH)*	Methods of Assessment	Candidate Locations/Rationale
Shrub/Early Successional Bird Breeding Habitat	• Presence of the following Ecosites: CUT1, CUS1; and • Shrublands or successional fields greater than 30 ha in size, excluding Class 2 agricultural lands and lands actively used for farming (i.e., no row-cropping in the last 5 years).	• Search for presence of large shrublands or early successional fields on air photo mosaics within project area. • Search for presence of large shrublands or early successional fields during site investigation. • Record location of any potentially qualifying features.	• No large shrublands or early successional fields identified therefore no candidate SWH
Terrestrial Crayfish	• Presence of all Ecosites associated with the following ELC Community Series: MAM and MAS; and • Entrances of terrestrial crayfish burrows, which are conspicuous tall “chimneys” constructed from pellets of excavated mud.	• Search for presence of large meadow marsh and shallow marsh communities on air photo mosaics within project area. • Search for entrances of burrows (“chimneys”) where suitable ecosites encountered during site investigation. • Record location of any potentially qualifying features.	• No crayfish chimneys observed in meadow marshes or shallow marshes therefore no candidate SWH.
Animal Movement Corridor			
Amphibian Corridors	• Habitat is not ELC specific; and • Corridors must be determined only when amphibian breeding habitat is confirmed as SWH.	• Search for candidate Amphibian Woodland Breeding Habitat and candidate Amphibian Wetland Breeding Habitat as described above. • Search for possible amphibian movement corridors associated with the above habitats during site investigation. • Record location of any potentially qualifying features.	• Assessment to be completed following identification of significant amphibian breeding habitats.

Notes:
1. *www.illinoiswildflower.info*
2. *https://www.biodiversityexplorer.mnr.gov.on.ca*
3. *www.wildflower.org*
4. *https://ontariowildflowers.com*
5. *http://plants.usda.gov/java/charProfile?symbol=BICO*
6. *Michigan Flora – Edward G.Voss – 1996*
7. *http://www.rom.on.ca/ontario/risk*
8. *http://www.registrelep-sararegistry.gc.ca/*
9. *http://montana.plant-life.org/species/vale_edul.htm*
10. *http://en.wikipedia.org/wiki/Blephilia_hirsuta*
11. *http://www.efloras.org*
12. *http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/a649/saururus-cernuus.aspx*
13. *http://michiganflora.net/species.aspx?id=251*

EO. Elemental Occurrence within Ontario
NA. not applicable

Elemental Occurrence Ranking		
Viability Rank		**Description**
A -D	Quality of data	A - high quality to D – low quality (abundant, healthy population, location conducive to thriving community
E	Extant	Species believed to be present, but viability unknown
F	Failed to Find	
H	Historical	~ 20 years last recorded sighting, not a comment on viability
X	Extirpated	

3.3 Results of Site Investigations

A total of 55 natural areas were identified within the 120 m Area of Investigation and visited during the 2011 site investigations. The locations of these natural areas are shown on Figure 3.1 (key map) and Figure 3.2a, b and c, and the ELC summary and supporting information is described in Table 3.3 below.

3.3.1 Vegetation Communities

All natural areas visited during site investigations were delineated into ELC units (Figure 3.2a, b and c). Vegetation communities found within the 120 m Area of Investigation can be divided into 13 different community series (e.g., CUM: Cultural Meadow, FOD: Deciduous Forest, SWT: Thicket Swamp etc.). This is the lowest level within the ELC classification that can be identified without site specific surveys. The units are determined based on the type of vegetation cover or plant form that best characterizes the community in question (e.g., open, shrub, treed, deciduous, coniferous, or mixed).

The observed community series designations were further separated into 23 different ecosites (e.g., CUM1: Mineral Cultural Meadow Ecosite, FOD5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite, SWT2: Mineral Thicket Swamp Ecosite, etc.). Ecosites are defined as "*mappable, landscape units integrating a consistent set of environmental factors and vegetation characteristics*" (Lee *et al*., 1998).

Where possible, these ecosites were then classified to vegetation type (e.g., CUM1-1: Dry-Moist Oldfield Meadow Type, FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type, and SWT2-5: Red-osier Mineral Thicket Swamp Type) which is the finest level of detail within the ELC classification system. These units are based on specific groupings of plants (Lee *et al*., 1998). The vegetation communities identified within the 120 m Area of Investigation are further described in Table 3.3 below and are summarized to the main ecosites in Table 3.4.

Through ELC surveys it has been noted that deciduous forest communities is the most frequent vegetation community series in the Bluewater 120 m Area of Investigation, claiming a total of 81.3 ha. The Dry-Fresh Sugar Maple Deciduous Forest was the most common Ecosite dominating 50.3 ha of the 120 m Area of Investigation.

The rarity of each vegetation community identified during sites investigations was determined using Appendix J and M of the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and the Natural Heritage Information Centre (MNR, 2011). One provincially rare community was observed during field investigations within the 120 m Area of Investigation, FOD7-4: Fresh-Moist Black Walnut Lowland Deciduous Forest Type. This community type is ranked S2S3 (imperiled to vulnerable) and was observed immediately west of Bronson Line, within natural area 539. The community is approximately 0.84 ha in size and was observed through roadside investigation. Based on aerial photo interpretation completed by the site investigator, it is believed that the larger portion of this natural area may be a wetland community. A full list of vegetation community rankings can be found in Table 3.19.

Incidental wildlife observations recorded during site investigations are included in Table 3.3. A complete list of wildlife species noted during site investigations is provided in Appendix G.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
426	0.4 ha	October 19, 2011	SWD3: Maple Mineral Deciduous Swamp Ecosite	0.4	• The canopy layer in this mid-age swamp community, occupying over 60% cover consists of silver maple (*Acer saccharinum*), ash species (*Fraxinus* sp.), and black walnut (*Juglans nigra*). The shrub layer occupying between 0-10% cover, consists of common buckthorn (*Rhamnus cathartica*), and red raspberry (*Rubus idaeus*). The herbaceous layer occupying between 25-60% consists of garlic mustard (*Alliaria petiolaris*), reed canary grass (*Phalaris arundinacea*), and goldenrods (*Solidago* sp.).	• No wildlife was observed during the site investigation. Vernal pools, potential snake hibernacula and tree cavities were noted.
427	0.3 ha	September 7, 2011	FOD7-2: Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type	0.6	• Much of the woodlot has been removed since the air photo was taken, leaving two small units of isolated mid-age forest. The canopy layer in this mid-age community is dominated by green ash (*Fraxinus pennsylvanica*)and occupies greater than 60% cover. The sub-canopy, with 25-60% cover, is dominated by green ash and common buckthorn (*Rhamnus cathartica*). The groundcover layer, occupying greater than 60% cover consists of Canada goldenrod (*Solidago canadensis*), tall white aster (*Symphyotrichum lanceolatum*), and Virginia strawberry (*Fragaria virginiana*).	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
437	5.4 ha	September 1, 2011	SWD3-3: Swamp Maple Mineral Deciduous Swamp Type <u>Inclusion:</u> CUT1: Cultural Thicket Ecosite	5.2 0.2	• The canopy layer of this young swamp community, with 10-25% cover is dominated by Freeman's maple (*Acer x freemanii*), white elm, and green ash while the sub-canopy with 25-60% cover consists of grey dogwood (*Cornus racemosa*), green ash, and riverbank grape (*Vitis riparia*). The ground cover layer occupying greater than 60% cover is dominated by Canada goldenrod (*Solidago canadensis*), red raspberry, Indian hemp (*Apocynum cannibinum*), and reed canary grass. • A cultural thicket inclusion is present along the eastern edge of the natural area. This portion of the natural area exhibits signs of disturbance resulting from adjacent agricultural land use. The vegetation community is composed mainly of shrubby common buckthorn, gray dogwood, and Manitoba maple.	• Eight bird species were observed or their vocalizations were heard during the site investigation including: American Crow, Turkey Vulture, House Wren, Yellow Warbler, Red-eyed Vireo, American robin, Gray Catbird, and Song Sparrow. Three Lepidoptera were noted: Cabbage White, Alfalfa Butterfly and Silver-spotted Skipper. No key wildlife habitat triggers were observed.
439	4.7 ha	September 1, 2011 Revisited October 18, 2011	FOD7-2: Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type	4.0	• The canopy layer, occupying greater than 60% cover, of this mid-age forest community, is dominated by green ash, trembling aspen (*Populus tremuloides*), and black walnut. The sub-canopy layer with 25-60% cover consists of hawthorn species (*Crataegus sp.*), and common apple (*Malus pumila*). The shrub layer, also with 25-60% cover is dominated by grey dogwood, and choke cherry (*Prunus virginiana*) while the ground cover layer with the same percent cover consists of inserted thicket creeper (*Parthenocissus inserta*), tall hairy agrimony (*Agrimonia gryposepala*), and calico aster (*Symphyotrichum lateriflorum*).	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Mourning Dove, Baltimore Oriole, American Crow, Cedar Waxwing, House Wren, Gray Catbird, Eastern Wood-Pewee and Red-eyed Vireo. Two Lepidoptera were also noted including: Cabbage White and Eastern Comma. Evidence of seasonal flooding was noted however apparently brief in duration given the low % composition of wetland plants. Conditions were dry at the time of the site investigation (September 1, 2011).

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
442	5.5 ha	October 19, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type	0.6	• This community is dominated by oldfield meadow species such as goldenrod species (*Solidago* sp), red raspberry, common burdock (*Arctium minus*) and wild carrot (*Daucus carota*).	• One bird species, American Kestrel, was observed during the site investigation. The presence of snags and fallen logs were also noted.
			CUW1f: Common Buckthorn – Apple – Trembling Aspen Cultural Woodland Type	4.4	• The canopy layer of this cultural woodland community consists of willow (*Salix* sp), ash species, common pear (*Pyrus communis*) and common apple, common buckthorn, trembling aspen and Manitoba maple (*Acer negundo*). The shrub layer consists of common buckthorn, and red-osier dogwood (*Cornus sericea*), and staghorn sumac (*Rhus hirta*). Species observed within the herb layer include aster species, goldenrod species, avens species (*Geum* sp), reed canary grass, tall white aster and tall goldenrod.	• One bird species, American Kestrel, was observed during the site investigation. The presence of snags and fallen logs were also noted.
			SWT2-10: Nannyberry Mineral Thicket Swamp Type	0.5	• This community is dominated by nannyberry (*Viburnum lentago*) and grey dogwood in equal amounts with small numbers of ash species.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
450	3.2 ha	October 19, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	2.8	• The canopy layer, occupying greater than 60% cover, within this mid-age to mature forest community is dominated by sugar maple with white ash and choke cherry. The sub-canopy with 10-25% cover consists of sugar maple and choke cherry and the sparse herbaceous layer with 0-10% cover consists of aster species and immature sugar maple. Marked trees were present throughout the woodlot.	• One bird species, Downy Woodpecker, was observed during the site investigation. Grey squirrel was also observed, as well as tracks of White-tailed Deer. Vernal pools, snags and fallen logs were noted. There were skidder tracks leaving the vernal pools.
			CUP3-2: White Pine Coniferous Plantation Type	0.3	• The canopy layer, occupying greater than 60% cover, of this mid-age plantation is dominated by White Pine (*Pinus strobus*).	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
456	1.8 ha	September 28, 2011	FOD4a: Dry-Fresh White ash-Beech Deciduous Forest Type	0.5	• This is a small, disturbed remnant mature forest community which exhibits evidence of edge effects. Many dead trees were noted lying on the ground, possibly uprooted by wind storms. The canopy layer occupying greater than 60% cover consists of white ash, American beech (*Fagus grandifolia*), black cherry and sugar maple. Species observed within the ground cover layer include garlic mustard, immature white ash, woodland strawberry (*Fragaria vesca*), and downy yellow violet (*Viola pubescens*). There were several dead bitternut hickory lying on the ground but no live specimens were present.	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Turkey Vulture, American Robin and Blue Jay. Four Lepidoptera were also noted: Monarch, Cabbage White, Question Mark and Eastern Comma. No key wildlife habitat triggers were observed.
			SWD2-2: Green Ash Mineral Deciduous Swamp Type	0.1	• This flooded and drowned green ash swamp contains mainly dead trees in standing water up to 50 cm deep. This flooding may originate from a blocked drain. Dominant species within the canopy layer occupying 10-25% cover include green ash. The ground cover layer consists of rice cut grass *(Leersia oryzoides*) and tall white aster.	
			FOD5-7: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type	0.5	• This is a mature forest fragment with many mature trees present. The dominant tree species observed in the canopy layer, occupying greater than 60% cover, are sugar maple and black cherry, while American basswood (*Tilia americana*) and white ash are also common. Ground cover species observed include immature white ash, false solomon's seal and immature sugar maple. • The community is adjacent to a deciduous hedgerow which extends south from the natural area, exhibiting a mature and continuous canopy consisting of sugar maple, white ash, basswood, and white elm.	

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
459	1.7 ha	October 19, 2011	FOD7-2: Fresh-Moist Green Ash – Hardwood Lowland Deciduous Forest Type	1.7	• Dominant species observed within the canopy, occupying greater than 60% cover of this mid-age forest include green ash, white elm, and choke cherry. The sub-canopy with 25-60% cover is dominated by alternate-leaved dogwood, and spicebush and the herbaceous layer with 10-25% cover consists of zigzag goldenrod (*Solidago flexicaulis*), wild ginger and red currant.	• Four bird species were observed during the site investigation including: Black-capped Chickadee, American Robin, White-breasted Nuthatch and Blue Jay. The presence of snags and fallen logs was also noted.
460	22 ha	October 6, 2011	CUT1f: White Elm-Buckthorn Cultural Thicket Type	0.6	• The canopy layer, with 25-60% cover within this young thicket community consists of white elm, silver maple, and white ash. The sub-canopy with the same percent cover is dominated by common buckthorn, and English hawthorn (*Crataegus monogyna*). Species observed within the shrub and herbaceous layer consist of tall goldenrod, hairy aster (*Symphyotrichum pilosus*), black raspberry (*Rubus occidentalis*), red-osier dogwood, garlic mustard, horsetail species (*Equisetum* sp.), and Virginia strawberry.	• Seven bird species were observed or their vocalizations were heard during the site investigation including: Morning Dove, Song Sparrow, Black-capped Chickadee, Horned Lark, American Goldfinch, Blue Jay, and Hairy Woodpecker. Feeding evidence of White-tailed Deer was also observed. The presence of snags, fallen logs and a ditch were noted.
			FOM3-1: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type	5.6	• The canopy layer, occupying greater than 60% cover within this mid-age forest community consists of white ash, sugar maple, basswood, and eastern hemlock (*Tsuga canadensis*). The sub-canopy with 25-60% cover is comprised of white ash and sugar maple with spicebush and choke cherry. Species observed within the shrub and herbaceous layer consist of calico aster, fowl manna grass (*Glyceria striata*), geum species, drooping wood sedge (*Carex arctata*), running strawberry bush *(Euonymus obovata*), and false solomon's seal.	
462	8 ha	October 19, 2011	FOD7-2: Fresh-Moist Green Ash – Hardwood Lowland Deciduous Forest Type	5.8	• The dominant species observed within the canopy layer of this mid-age forest community, which occupies greater than 60% cover, include green ash, white elm, and choke cherry. The understorey is dominated by alternate-leaved dogwood, and spicebush. The herbaceous layer with 10-25% cover consists of zigzag goldenrod, wild ginger and red currant (*Ribes rubrum*).	• Four bird species were observed during the site investigation including: Black-capped Chickadee, American Robin, White-breasted Nuthatch and Blue Jay. Snags, fallen logs and tree cavities were noted.
463	32.4 ha	October 6, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	**2.6**	• The canopy layer within this mid-age forest community, occupying greater than 60% cover, is dominated by sugar maple with a minor component of beech and white ash. The sub-canopy with 25 to 60% cover consists of sugar maple, ironwood, white ash, and blue beech (*Carpinus caroliniana*). Dominant species observed within the shrub and herbaceous layer, each occupying 25 to 60% cover consist of calico aster, zigzag goldenrod, white baneberry (*Actaea pachypoda*), enchanter's nightshade (*Circaea lutetiana*), herb robert (Geranium robertianum) and poison ivy (*Toxicodendron radicans*).	• The vocalizations of four bird species were heard during the site investigation including: American Goldfinch (5 individuals), American Crow (3 individuals), Red-bellied Woodpecker, and White- breasted Nuthatch. The presence of snags and fallen logs was also noted.
		July 19, 2011	FOD5-8: Dry-Fresh Sugar Maple-White Ash Deciduous Forest Type (*southern portion of natural area near Turbine 18)*	16.03	• Dominant species recorded within the canopy layer, of this mid-age forest community include sugar maple, white ash, beech and basswood, whereas sub-canopy, include sugar maple, ironwood, white ash, and shagbark hickory. Shrub layer species recorded include red raspberry, choke cherry, black cherry and garlic mustard. The herbaceous layer includes species such as running-strawberry bush, blue cohosh, calico aster and common speedwell.	• One amphibian species, American Toad, was observed during the site investigation. Tracks of two mammal species, Raccoon and White-tailed Deer were noted. The chimney of a Chimney Crayfish was observed. Vernal pools, snags and fallen logs were also noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		October 19, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type *(central portion of natural area near Turbine 17)*	2.6	• The canopy layer, with greater than 60% cover within this mid-age forest community consists of sugar maple and white ash, whereas the sub-canopy was dominated by beech, white elm, and sugar maple. Species observed within the herbaceous layer include violet species, jewelweed and several grass species.	• No wildlife was observed during the site investigation. Vernal pools, snags, and tree cavities were noted. A watercourse originating from the natural area was flowing at the time of the site investigation.
470	1.4 ha	September 27, 2011 Revisited October 19, 2011	FOD7-2: Fresh-Moist Lowland Ash Deciduous Forest Type *(east side of CUM1-1)*	1.0	• Tree species observed within the canopy layer occupying greater than 60% cover in this mid-age forest community include green ash, Freeman's maple, sugar maple, and white elm. The dominant ground cover species observed include garlic mustard, poison ivy, white avens, and calico aster. This community may have previously been a swamp prior to the installation of a drainage ditch on the west side.	• Nine bird species were observed or their vocalizations were heard during the site investigation including: Morning Dove, Red-tailed Hawk, Lincoln's Sparrow, Song Sparrow, Blue Jay, Common Yellow Throat, Northern Flicker, House Wren and American Crow. Two Lepidoptera, Cabbage White and Monarch, and one dragonfly, Green Darner, were also observed. In addition to the ditch with flowing water, the presence of snags and fallen logs was noted.
			CUM1-1: Dry-Moist Oldfield Meadow Type	0.4	• A drainage ditch cuts through the woodlot, dividing the wooded area into two. The ditch, which appears to have been installed during the past ten years, measures approximately 1.5 m deep and 3 m wide with water present at the time of the site investigation (September 27). The vegetation in this area consists of dense growth of red raspberry, common burdock, reed canary grass and bittersweet nightshade.	
			FOD7-2: Fresh-Moist Lowland Ash Deciduous Forest Type *(west side of CUM1-1)*	1.0	• This community is similar to the FOD7-2 community on the east side of the ditch (CUM1-1, described above) however it is acting more as a hedgerow due to the drainage ditch splitting the woodland. Dominant species include green ash.	
475	1.6 ha	October 6, 2011	FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	1.6	• The canopy layer within this mid-age forest community occupies greater than 60% cover and is dominated by sugar maple and beech, with some basswood and white ash. Species observed within the shrub and herbaceous layer consisted of zigzag goldenrod (*Solidago flexicaulis*), fowl manna grass, calico aster, avens species, running-strawberry bush, drooping wood sedge, and poison ivy.	• Five bird species were observed or their vocalizations were heard during the site investigation including: Blue Jay, Black-capped Chickadee, Song Sparrow, Red-tailed Hawk and American Crow. The vocalization of an Eastern Chipmunk was noted. Two amphibian species were noted: a Grey Treefrog was heard calling and a Wood Frog was observed. No key wildlife habitat triggers were observed.
480	68.4 ha	October 20, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type *(near Bronson Line)*	0.3	• Scattered trees were observed throughout this disturbed, cultural meadow community including Manitoba maple, red pine, ash species, and staghorn sumac. Species observed within the herbaceous layer include goldenrod species, aster species, red raspberry, and smooth brome.	• No wildlife were observed during the site investigation. The foundation of an old building has been recently disturbed and is located at edge of a lawn; therefore it is unlikely to be a snake hibernaculum.
		October 6, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type *(north of Staffa Road)*	5.1	• This cultural meadow community is dominated by common meadow species with scattered trees present. The dominant tree species observed include white elm, and Manitoba maple. Other dominant species in this community include tall goldenrod, tall white aster, New England aster, smooth brome, grass leaved goldenrod (*Euthamia graminifolia*), hairy aster (*Symphyotrichum pilosus)*, Canada thistle (*Cirsium arvense*) and common milkweed (*Asclepias syriaca*).	• Three bird species were observed or their vocalizations were heard during the site investigation including: American Goldfinch, Blue Jay and American Crow. A Monarch butterfly was also observed feeding on New England aster. No key wildlife habitat triggers were observed.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		September 1, 2011	FOD5-7: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type Inclusion: CUT1e: Sandbar Willow inclusion	5.7 0.1	• This disturbed mid-age forest community may have a history of livestock grazing. The dominant tree species are generally small, with the occasional large tree. The canopy layer is co-dominated by sugar maple, sweet cherry (*Prunus avium*), black cherry, and white ash. The sub-canopy layer consists of sugar maple, common apple, and hawthorn species (*Crataegus sp.*). The shrub layer is dominated by choke cherry and alternate-leaved dogwood (*Cornus alternifolia*). The ground cover layer consists of enchanter's nightshade, garlic mustard and choke cherry.	• Seven bird species were observed or their vocalizations were heard during the site investigation including: Mourning Dove, American Crow, American Robin, House Wren, Gray Catbird, Field Sparrow and Least Flycatcher. The vocalizations of one mammal species, Eastern Chipmunk, and one amphibian species, Spring Peeper, were also heard during the site investigation. No key wildlife habitat triggers were observed.
		n/a (polygon identified through air photo interpretation)	SWD2: Ash Mineral Deciduous Swamp Ecosite	2.0	• This deciduous swamp community was identified through air photo interpretation.	• n/a (polygon identified through air photo interpretation)
		August 17, 2011	CUT1a: Sour Cherry Cultural Thicket Type	1.0	• The canopy layer in this mid-age thicket community is dominated by sour cherry (*Prunus cerasus*), white ash, and white elm. The sub-canopy layer consists of sour cherry, common apple, red-osier dogwood, and eastern-white cedar (*Thuja occidentalis*). The ground layer was dominated by timothy, smooth brome (*Bromus inermis*), New England aster (*Symphyotrichum novae-angliae*), and black raspberry. The ground cover layer was mainly comprised of Virginian strawberry, tufted vetch (*Vicia cracca*), alsike clover (*Trifolium hybridum*), and white avens (*Geum canadense*).	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Tree Swallow, Barn Swallow, Ruby-Throated Hummingbird, Eastern Kingbird, American Crow, House Wren and Gray Catbird. No key wildlife habitat triggers were observed.
		August 17, 2011	MAM2-10: Forb Mineral Meadow Marsh Type	6.0	• The canopy layer within this mid-age community is dominated by shining willow (*Salix lucida*), long-beaked willow (*Salix bebbiana*), and common elderberry (*Sambucus canadensis*). The sub-canopy layer consists of New England aster, spotted joe-pye-weed (*Eutrochium maculatum*), purple-stemmed aster (*Symphyotrichum puniceum*), and red-osier dogwood. The shrub layer is dominated by spotted jewelweed (*Impatiens capensis*), rice cut grass, Canada thistle, and Alleghany blackberry (*Rubus allegheniensis*). The ground cover layer is mainly comprised of fox sedge (*Carex vulpinoidea*), bristly sedge (*Carex comosa*), meadow horsetail (*Equisetum pratense*), and fowl manna grass (*Poa palustris*).	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Tree Swallow, Barn Swallow, Ruby-Throated Hummingbird, Eastern Kingbird, American Crow, House Wren and Gray Catbird. No key wildlife habitat triggers were observed.
		August 17, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type (*south of Centennial Road, north end of Area of Investigation)*	0.1	• The canopy layer in this young cultural meadow community is dominated by common apple, eastern-white cedar, hawthorns, and Russian olive (*Elaeagnus angustifolia*). The sub-canopy layer consists of smooth brome, Canada goldenrod, orchard grass and timothy. The shrub layer is dominated by New England aster, red-osier dogwood, common milkweed, and chicory (*Cichorium intybus*). The ground cover layer is mainly comprised of Virginia strawberry, and common St. john's-wort (*Hypericum perforatum*).	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Tree Swallow, Barn Swallow, Ruby-Throated Hummingbird, Eastern Kingbird, American Crow, House Wren and Gray Catbird. No key wildlife habitat triggers were observed.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		August 17, 2011 Revisited October 19, 2011	CUW1a: Beech-Sugar Maple Cultural Woodland Type	1.1	• The broken canopy layer in this young cultural woodland is dominated by beech, sugar maple, ironwood, and white ash. The sub-canopy layer consisted of common buckthorn, sour cherry, sugar maple, and ironwood. The shrub layer is dominated by riverbank grape, inserted Virginia-creeper, and choke cherry. The ground cover layer is mainly dominated by Virginia strawberry, white avens, common dandelion (*Taraxacum officinale*), and garlic mustard.	• Eight bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Tree Swallow, Barn Swallow, Ruby-Throated Hummingbird, Eastern Kingbird, American Crow, House Wren and Gray Catbird. No key wildlife habitat triggers were observed.
		July 18, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type *(near Turbine 15, southwest portion of Area of Investigation)*	0.6	• The dominant species observed in this cultural meadow community include curly dock, tall white aster, blue vervain (*Verbena hastata*), sow thistle (*Sonchus arvensis*), wild carrot, common burdock, ragweed (*Ambrosia artemisiifolia*), bird's foot trefoil (*Lotus corniculatus*), smooth brome, Canada thistle, timothy (*Phleum pratense*), and scattered white ash.	• Singing males of four bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Grasshopper Sparrow, Cedar Waxwing and American Goldefinch. Vernal pools, snags, fallen logs, and potential snake hibernacula were noted.
		July 18, 2011	FOD6-5: Fresh-Moist Sugar Maple Deciduous Forest Type <u>Inclusion:</u> SWT2-2: Willow Mineral Thicket Swamp Type	2.3 0.1	• The dominant tree species observed, occupying greater than 60% cover, in this mid-age forest community includes sugar maple, silver maple, basswood and trembling aspen. The species observed dominating the shrub layer includes red-osier dogwood, spotted jewelweed, and blue cohosh. The herbaceous layer occupying between 10-25% cover consists of wild mint (*Mentha arvensis*), jack-in-the-pulpit, Virginia strawberry, and herb robert.	• Singing males of eight bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, American Goldfinch, Hairy Woodpecker, Indigo Bunting, Gray Catbird, Northern Cardinal, Wood Thrush and Great Crested Flycatcher. Vernal pools, snags, fallen logs, and potential snake hibernacula were noted.
		July 18, 2011 Revisited October 19, 2011	CUS1: Mineral Cultural Savannah Ecosite	10.9	• Species observed within the canopy layer of this cultural savannah community include white pine, white ash, common apple, and black walnut, with white pine and black walnut becoming more dominant toward the northwest. Other species observed include white elm and white oak. The sub-canopy consisted of white pine, red-osier dogwood, and sandbar willow. The shrub layer occupying between 25 - 60% cover consists of smooth brome, wild carrot, Canada thistle, and blackberry. The herbaceous layer consisted of alsike clover, cowvetch, Virginia Strawberry and field bindweed.	• Singing males of four bird species were observed or their vocalizations were heard during the site investigation: including Grasshopper Sparrow, Song Sparrow, American Goldfinch, and Savannah Sparrow. American Robin, Cowbird, American Crow, Blue Jay and a sparrow species were also observed. One Mammal, Meadow Vole, and a Monarch butterfly were noted. The presence of vernal pools, snags, fallen logs, and potential snake hibernacula was documented.
		July 18, 2011 Revisited October 19, 2011	CUW1: Mineral Cultural Woodland Ecosite	1.3	• Species observed within the canopy layer of this young cultural woodland community include white pine, black walnut, white elm and white oak. The herbaceous layer includes asters and goldenrod species.	• Singing males of four bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Gray Catbird, American Robin and American Goldfinch. Vernal pools, snags, fallen logs, and potential snake hibernacula were noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
481	4.5 ha	May 13, 2011	FOD5-1: Dry-fresh Sugar Maple Deciduous Forest Type	4.5	• The canopy layer within this mid-age deciduous forest consists of sugar maple, and white ash. The sub-canopy is dominated by choke cherry. The shrub layer occupying approximately 10-25% cover is dominated by red-berried elderberry (*Sambucus racemosa*). The ground cover layer consists of yellow dog's-tooth violet (*Erythronium americanum*), white avens, and downy yellow violet.	• Singing males of five bird species were observed or their vocalizations were heard during the site investigation including: Wood Thrush, Rose-breasted Grosbeak, Yellow-rumped Warbler, Great Crested Flycatcher, American Robin and Ovenbird. Turkey Vulture and White-throated Sparrow were also observed. Vernal pools, snags and fallen logs were noted.
483	6.2 ha	July 5, 2011 Revisited October 19, 2011	SWD3-2: Silver Maple Mineral Deciduous Swamp Type	1.7	• The canopy layer within this mid-aged deciduous swamp consists of silver maple, red maple (*Acer rubrum*), black ash, and white elm. The sub-canopy is dominated by common buckthorn, and white elm. The ground cover layer consists of poison ivy, thicket creeper, yellow avens, and bebb's sedge (*Carex bebbii*).	• One bird species, Red-winged Blackbird, and tracks of one mammal species, White-tailed Deer, were observed during the site investigation. Abundant fallen logs and occasional snags were noted.
		November 22, 2011	FOD6-5: Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type	4.4	• Dominant species observed within the canopy layer of this mature deciduous forest include sugar maple, beech, white ash, and bitternut hickory while the same species are observed within the sub-canopy with the addition of a cherry species. Herbaceous species were limited in abundance due to the timing of the site investigation.	• Canid scat and evidence of rodent feeding on hickory nuts was observed during the site investigation. One vernal pool, abundant snags, abundant fallen logs, mast-producing trees (Hickory), and tree cavities were also noted.
484	50 ha	September 28, 2011 Revisited November 4, 2011	FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	16.2	• The canopy layer within this young to mid-age deciduous forest is comprised of green ash and white elm, while the sub-canopy is dominated by common buckthorn and white elm. The ground cover layer occupies greater than 60% cover and consists of poison ivy, thicket creeper and white avens.	• Five bird species were observed or their vocalizations were heard during the site investigation including: Blue Jay, American Crow, Black-capped Chickadee and American Robin. One Butterfly, Cabbage White was also observed. Some shallow ephemeral (vernal) pools, snags and abundant fallen logs were noted. An area search for salamanders was conducted; however none were found. • It was noted that the SWD3-3 community shows signs of seasonal flooding but no water was observed during site investigations.
			SWD3-3: Swamp Maple Mineral Deciduous Swamp Type	26.9	• The canopy layer within this mature deciduous swamp is dominated by Freeman's maple, and green ash while the sub-canopy consists of white elm and Freeman's' maple. The ground cover layer is dominated by gray's sedge and tall white aster.	
			SWD2-2: Green ash Mineral Deciduous Swamp Type	2.6	• The canopy layer of this ash deciduous swamp consists of green ash and Freeman's maple, while the sub-canopy white elm, Freeman's maple, and common buckthorn. The ground cover layer is dominated by tall white aster, and gray's sedge. This ash swamp is a fringe to the previous maple swamp.	
487	24.5 ha	August 17, 2011	CUP3-2: White Pine Coniferous Plantation Type <u>Inclusion:</u> CUM1-1: Dry-Moist Oldfield Meadow Type	5.0	• The canopy within this mid-age cultural plantation consists of white pine, sour cherry, common apple, and white ash. The sub-canopy is dominated by white pine, white ash and common apple. The shrub layer is dominated by white ash, tall white aster, calico aster, and red raspberry. The ground cover layer consists of Virginia strawberry, white ash, and sugar maple. • This community contains several cultural meadow inclusions found throughout the community.	• Six bird species were observed or their vocalizations were heard during the site investigation including: Savannah Sparrow, Gray Catbird, Song Sparrow, American Goldfinch, Black-capped Chickadee and Grasshopper Sparrow. A Monarch butterfly was also observed. Vernal pools, snags and potential snake hibernacula were noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
			FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	6.3	• The canopy layer within this mature deciduous forest consists of sugar maple, beech, basswood, and white ash. The sub-canopy consists of sugar maple, white elm, white ash and basswood. The shrub layer consists of sugar maple, white ash, white birch, and ironwood, while the ground cover layer is dominated by enchanter's nightshade, yellow avens, immature beech, and immature white ash.	• Vocalizations of four bird species were heard during the site investigation including: White-breasted Nuthatch, Ovenbird, Eastern Wood-pewee and Wood Thrush. The tracks of one mammal species, Raccoon, and seven Wood Frogs were observed. The presence of snags and fallen logs was noted.
488	14.4 ha	September 27, 2011 Revisited October 20, 2011	CUT1b: Nannyberry-Common Pear-Hawthorn Cultural Thicket Type	2.0	• The young cultural thicket community is dominated by nannyberry, common pear, hawthorn and common buckthorn. Other dominant species observed include prickly ash, multiflora rose, calico aster, Canada goldenrod, Virginia strawberry, orchard grass and Kentucky bluegrass.	• Ten bird species were observed or their vocalizations were heard during the site investigation including: Horned Lark, Savannah Sparrow, Vesper Sparrow, Killdeer, House Wren, American Goldfinch, American Crow, Song Sparrow, Gray Catbird and Blue Jay. • Seven Lepidoptera were also observed including: Monarch, Cabbage White, Alfalfa, Common Sulphur, Eastern Comma, Pearl Crescent. Praying Mantis and Canada Darner were noted. • An old rock pile and some metal and wood debris were identified as potential snake hibernacula. The landowner also mentioned the presence of a coyote den at the back of the property.
			CUM1-1: Dry-Moist Oldfield Meadow Type	1.8	• This cultural meadow community is dominated by oldfield meadow species with scattered shrubs. Dominant species observed include common pear, orchard grass, brown knapweed (*Centaurea jacea*), Canada goldenrod, smooth brome, and wild carrot. • The hedgerow extending to the south consists of green ash, common buckthorn, and grey dogwood. The entire hedgerow is covered in riverbank grape and some thicket creeper.	
		June 29, 2011	SWD3: Maple Mineral Deciduous Swamp Ecosite	10.7	• Dominant species observed include Freeman's maple, white elm, and basswood.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
490	0.5 ha	May 13, 2011	CUP3-9: Norway Spruce Coniferous Plantation Type	0.5	• The canopy layer within this young cultural plantation consists of Norway spruce (*Piceaabies*). The sub-canopy is dominated by choke cherry and downy hawthorn (*Crataegus mollis*). The shrub layer is dominated by prickly rose (*Rosa acicularis*). The ground cover layer consists of Virginia strawberry and common dandelion.	• Singing males of five bird species were observed or their vocalizations were heard during the site investigation including: Song Sparrow, Brown-headed Cowbird, American Goldfinch, White-breasted Nuthatch and Red-winged Blackbird. A Great Horned Owl pellet was also noted. No key wildlife habitat triggers were observed.
492	1.3 ha	November 23, 2011	FOD6-5: Fresh-Moist sugar Maple-Hardwood Deciduous Forest Type	1.3	• Dominant species recorded within the canopy of this mature deciduous forest include sugar maple, black cherry, beech, and bitternut hickory while sub-canopy species include sugar maple, juneberry species, and white ash. Herbaceous species observed include wild leek and viola species. Herbaceous species were not all visible due to the timing of the field visit. Evidence of logging is present within the community.	• One mammal species, Chipmunk, was observed during the site investigation. Snags and fallen logs were also noted.
493 & 496	4.6 ha	October 20, 2011	MAM2-2: Reed Canary Grass Mineral Meadow Marsh Type <u>Inclusion:</u> CUM1: Mineral Cultural Meadow	0.6 0.1	• This pioneer marsh community is dominated by reed canary grass. Planted trees are present along the road and farm property.	• Three bird species were observed or their vocalizations were heard during the site investigation, including American Crow, Blue Jay and American Robin. No key wildlife habitat triggers were noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
494	74.4 ha	June 29, 2011	FOD7: Fresh-Moist Lowland Deciduous Forest Ecosite Inclusion: MAM2: Mineral Meadow Marsh	0.47 0.2	• Dominant species observed include eastern-white cedar, eastern cottonwood (*Populus deltoides*), willows, trembling aspen, and black ash.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
495	2.2 ha	October 6, 2011 Revisited November 5, 2011	SWT2-2: Willow Mineral Thicket Swamp Type	1.4	• The canopy layer within this mid-age swamp thicket is dominated by peach-leaved willow (*Salix amygdaloides*), and crack willow (*Salix fragilis*) while the sub-canopy consists of Missouri willow (*Salix eriocephala*), red-osier dogwood, and reddish willow (*Salix X rubens*). The shrub and herb layers consist of rice-cut grass, jewelweed, broad- leaved cattail, joe-pye-weed, meadow horsetail, and Pennsylvania bittercress (*Cardamine pensylvanica*).	• The vocalization of two bird species, Gray Catbird and Blue Jay, and one amphibian species, Spring Peeper, were heard during the site investigation. One bird species, Canada Goose, was observed in the adjacent pond. • In addition, evidence of beaver activity was observed at the east end of the large pond adjacent to the natural area.
498	2.7 ha	May 13, 2011	FOD5-2: Dry-Fresh Sugar Maple Deciduous Forest Type	2.7	• The canopy layer within this mid-age deciduous sugar maple forest consists of sugar maple, beech, and black cherry. The sub-canopy is dominated by green ash. The shrub layer occupying approximately 10-25% cover is dominated by choke cherry while the ground cover layer consists of yellow dog's-tooth violet, and white avens.	• Singing males of five bird species were observed or their vocalizations were heard during the site investigation, including House Wren, Song Sparrow, Great Crested Flycatcher and Downy Woodpecker. Vernal pools, snags and fallen logs were noted.
501	5.0 ha	August 18, 2011	CUP3-2: White Pine Coniferous Plantation Type	2.4	• The canopy within this mid-age white pine plantation is dominated by planted white pine, with some natural regeneration of white ash and white elm. The sub-canopy, with 10-25% cover, consists of common apple, sour cherry, and white ash. The shrub layer occupies between 10-25% cover and consists of common buckthorn, and choke cherry. The ground cover layer is sparse consisting of calico aster and thicket creeper.	• Seven bird species were observed or their vocalizations were heard during the site investigation including: Black-capped Chickadee, Eastern Kingbird, Barn Swallow, Song Sparrow, Blue Jay, House Wren and a Great Horned Owl calling at mid-day. The presence of snags was also noted.
			CUP1-3/MAM: Black Walnut Deciduous Plantation Type	1.9	• This community consists of a mid-age black-walnut plantation. The canopy layer occupying between 30-60% cover, and consists of planted black walnut with regeneration of white elm and white ash. The ground cover consists of tall white aster, orchard grass and smooth brome with moist depressions consisting of spotted jewelweed, rice cut grass and fowl manna grass.	• Three bird species were observed or their vocalizations were heard during the site investigation including: House Wren, Gray Catbird and Song Sparrow. The presence of snags and fallen logs was noted.
504	96.6 ha	October 6, 2011 Revisited November 4, 2011	SWT2: Mineral Thicket Swamp Ecosite	1.9	• This community represents the treed edge of a willow swamp that borders an agricultural field. Dominant trees along the edge include sugar maple, basswood, and white ash. The interior is dominated by willows which extend just beyond the 120 m Area of Investigation. Dominant herbaceous species include Virginia strawberry, smooth brome, Canada goldenrod, garlic mustard, St-John's wort and riverbank grape.	• The vocalizations of three bird species were heard during the site investigation including: Downy Woodpecker, Black-capped Chickadee, Gray Catbird and Song Sparrow. Vernal pools, snags and fallen logs were noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		October 6, 2011 Revisited November 4, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	25.7	• This community is a mid-age, managed deciduous forest. Dominant species observed within the canopy layer, which occupies greater than 60% cover, is sugar maple with a minor component of American beech and white ash, while the shrub layer consists of choke cherry, immature white ash, and black raspberry. The herbaceous layer occupying between 25-60% cover is dominated by zig-zag goldenrod, calico aster, wild ginger, violets and sugar maple seedlings.	• One bird species, Blue Jay, was observed during the site investigation. Vernal pools, snags and fallen logs were noted.
506	5.7 ha	August 18, 2011 Revisited November 23, 2011	MAS2-9: Forb Mineral Shallow Marsh Type	0.1	• The canopy layer occupies between 0-10% cover and consisted of white willow (*Salix alba*). The sub-canopy occupies 10 to 25% and consisted of Long-beaked Willow, Missouri Willow, black elder, and pussy willow. The sparse shrub layer contains red-osier dogwood, joe-pye weed northern willow herb and broad-leaved cattail. Spotted jewelweed dominates the ground layer.	• Singing males of five bird species were observed during the site investigation including: Red-winged Black Bird, Eastern Kingbird, Tree Swallow, Downy Woodpecker and Grey Catbird. • The presence of fallen logs was noted.
		November 23, 2011	MAM2-10: Forb Mineral Meadow Marsh Type	2.3	• This community is dominated by herbaceous species with greater than 60% cover. Species observed include willow herb (*Epilobilum sp.),* grass species *(*Panicum sp.), foxtail species (*Setaria sp.)* and barnyard grass species (*Echinochloa sp.).*	• No wildlife species were observed during the site investigation.
508	7.8 ha	May 13, 2011 Revisited October 20, 2011	FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	7.8	• The canopy layer of this mid-age deciduous forest occupies between 25-60% cover and is co-dominated by sugar maple and American beech, white ash and ironwood. The shrub layer, occupying 10-25% cover, is dominated by choke cherry and alternate-leaved dogwood. The ground cover layer consists of yellow dog's-tooth violet, white avens, and dog violet (*Viola conspersa).*	• Singing males of three bird species were observed or their vocalizations heard during the site investigation including: Rose-breasted Grosbeak, Wood Thrush and Yellow-throated Vireo. The presence of snags and fallen logs was noted.
510	41.3 ha	September 2, 2011	SWD2-2: Green Ash Mineral Deciduous Swamp Type	2.2	• The canopy layer, occupying between 10-25% cover within this young deciduous swamp, is dominated by green ash. The sub-canopy with 25-60% cover consists of blue beech (*Carpinus caroliniana*), green ash, and black maple (*Acer nigrum*) and the ground cover layer occupying greater than 60% cover is dominated by spotted jewelweed, sedge species (*Carex sp.*), and calico aster.	• Nine bird species were observed or their vocalizations heard during the site investigation including: American Robin, Gray Catbird, Eastern Pewee, Black-Capped Chickadee, House Wren, Rose-Breasted Grosebeak, Turkey Vulture, American Crow and American Goldfinch. • Two herpetofauna species were observed or their vocalizations heard, including: Green Frog and Grey Tree Frog. Two Lepidoptera species were observed, the Common Sulfur and the Cabbage White. The tracks of White-tailed Deer were also observed.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		September 2, 2011	SWD3-3: Swamp Maple Mineral Deciduous Swamp Type *(near Centennial Road)*	8.0	• The canopy layer, occupying greater than 60% cover within this mature deciduous swamp is dominated by Freeman's maple, and green ash while the sub-canopy with between 25-60% cover consists of Freeman's maple, white elm, and green ash. The ground cover layer is dominated by tall white aster, fowl meadow grass, poison-ivy, and spotted jewelweed.	• Ten bird species were observed or their vocalizations heard during the site investigation, including: Eastern Pewee, House Wren, Red-winged Blackbird, Song Sparrow, American Crow, Rose-breasted Grosebeak, White-breasted Nuthatch, Downy Woodpecker, Indigo Bunting and Baltimore Oriole. The vocalizations of one species of herpetofauna, the Grey Tree Frog, were heard. Possible vernal pools were noted, along with trees with cavities, fallen logs and a few snags.
		September 2, 2011	FOD6-5: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type *(near Centennial Road)*	11.2	• The canopy layer occupying greater than 60% cover within this mature moist deciduous forest is dominated by sugar maple, Beech, and green ash. The sub-canopy with 25-60% cover is dominated by sugar maple, and bitternut hickory (*Carya cordiformis*) while the ground cover layer with greater than 60% cover is comprised of poison-ivy, tall white aster, Virginia creeper, and wood avens (*Geum urbanum*).	
		May 31, 2011	FOD6-5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite *(near Turbine 38)* Inclusion: MAM2: Mineral Meadow Marsh Ecosite	2.1	• The canopy layer, occupying greater than 60% cover within this mid-age mature deciduous forest consists of sugar maple, white ash, white elm, and basswood. The shrub layer occupying approximately 10-25% cover is dominated by common buckthorn. The ground cover layer consists of jack-in-the-pulpit, white trillium (*Trillium grandiflorum),* foamflower (*Tiarella cordifolia*), and blue cohosh.	• No wildlife species were observed during the site investigation. Abundant vernal pools, abundant fallen logs and a few snags were noted.
		May 26, 2011 Revisited September 2, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type *(near Turbine 23)* Inclusion: SWD2: Ash Mineral Deciduous Swamp Ecosite	3.5	• This community consists of a mid-age to mature deciduous forest. The canopy layer, which occupies greater than 60% cover, is dominated by sugar maple, with a minor component of beech, black cherry and white ash, while the sub-canopy consists of sugar maple and ironwood. The shrub layer occupying approximately 10-25% cover was dominated by choke cherry, red-berried elderberry, and sugar maple. The ground cover layer consists of sugar maple and choke cherry seedlings, yellow dog's-tooth violet, blue cohosh, jack-in-the-pulpit, and herb-robert.	• The following bird species were observed or their vocalizations heard during the site investigation: Ovenbird, Song Sparrow, Great-Crested Flycatcher, American Crow, American Robin and Rose-breasted Grosebeak.
		May 26, 2011	SWD4: Mineral Deciduous Swamp Ecosite	2.2	• The canopy layer, with between 25-60% cover within this mid-age deciduous swamp consists of green ash, black maple, silver maple, and basswood while the sub-canopy contains black maple, green ash, and blue beech. The ground cover layer consists of spotted jewelweed, fringed sedge (*Carex crinita*), and tall white aster.	• One amphibian species was observed, the Wood Frog.
512	68.2 ha	June 29, 2011	SWM1-1: White Cedar Hardwood Mineral Mixed Swamp Ecosite	0.4	• This community is dominated by eastern white cedar. Several dead cedars were observed near the edge of the road.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
			FOD7: Fresh-Moist Lowland Deciduous Forest Ecosite	1.57	• This community is located near a watercourse and is dominated by willows, white elm, Manitoba maple, and basswood. Only a few eastern white cedar were observed within this area.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
			MAM2: Mineral Meadow Marsh	0.1	• This community is located on the south side of Centennial Road and is dominated by sedges, narrow-leaved cattail, bulrushes (*Scirpus* sp.), and grasses.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
514	51.2 ha	October 20, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type	2.3	• This community is dominated by meadow species such as goldenrods, reed canary grass, asters, and Virginia strawberry. • A stream runs through the centre of this community.	• Eight bird species were observed during the site investigation, including: Savannah Sparrow, Junco, Brown-headed Cowbird, Blue Jay, American Crow, Killdeer, Turkey Vulture and White Throated Sparrow.
		October 20, 2011	MAM2-2: Reed Canary Grass Mineral Meadow Marsh Type	0.5	• This community is dominated by reed canary grass. Other species include a minor component of stinging nettle, garlic mustard, and smooth brome.	• No wildlife or key wildlife habitat triggers were observed during the site investigation. • Evidence of beaver activity was noted at the confluence of the rivers within this natural area.
			SWD3: Maple Mineral Deciduous Swamp Ecosite	25.7	• Species observed included silver maple, ash species and white elm as viewed from a distance. It was not possible to access this community.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
		June 29, 2011	SWD3: Maple Mineral Deciduous Swamp Ecosite	25.7	• This community is dominated by Freeman's maple, white elm, and basswood.	• Three bird species were observed during the site investigation, including: Yellow Finch, Killdeer and Red-Winged Blackbird.
			CUW1: Cultural Woodland Ecosite.	2.9	• This community is dominated by basswood, white elm, and Freeman's maple.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
		June 29, 2011	FOD5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite	5.1	• This community is dominated by sugar maple, white elm, and basswood.	• Three bird species were observed during the site investigation, including: Yellow Finch, Killdeer and Red-Winged Blackbird.
518	84.1 ha	May 13, 2011 Revisited October 20, 2011	FOM3-2: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type	9.6	• This community is a mid-age mixed forest. The broken canopy layer, which occupies 10-25% cover, is dominated by eastern hemlock, sugar maple, and some Norway spruce, while the sub-canopy contains American beech, green ash, and yellow birch (*Betula alleghaniensis)*. The sparse shrub layer is made up of alternate-leaved dogwood while the ground cover layer with 10-25% cover consists of yellow dog's-tooth violet.	• Singing males of eight bird species were heard during the site investigation, including the Blue Jay, American Crow, Wood Thrush, Red-Eyed Vireo, Brown-Headed Cowbird, Rose-Breasted Grosebeak, Blue-Headed Vireo and Great Crested Flycatcher. Snags and fallen logs were also noted.
		May 12, 2011 Revisited November 4, 2011	FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	33.2	• The canopy layer of this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple and beech, while the sub-canopy layer consists of green ash. The sparse shrub layer is comprised of choke cherry. The ground cover layer is dominated by yellow dog's-tooth violet, common speedwell (*Veronica officinalis*), and white lettuce (*Prenanthes altissima*).	• Three bird species were observed or their vocalizations were heard during the site investigation, including: the Rose-breasted Grosebeak, Ovenbird and Chickadee. Snags and fallen logs were also noted.
		November 4, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type	4.7	• This community is dominated by oldfield species including grasses, goldenrods, asters, and wild carrot. The natural area is disturbed, currently used as a dirt bike trail.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
520	115.2 ha	June 29, 2011	FOD5: Maple Mineral Deciduous Forest Type	16.2	• This community is dominated by sugar maple, and trembling aspen (*Populus tremuloides*). • Note: This natural area was viewed from over 100 m away from the road because investigators did not have property access therefore it was difficult to determine species dominance. Observations were made with the use of binoculars.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
524	3 ha	July 5, 2011 Revisited November 28, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type Inclusion: MAM2-9: Jewelweed Forb Mineral Meadow Marsh Type	2.7 0.3	• The canopy layer this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple with a minor component of beech, ironwood, and basswood. The shrub layer is mainly white ash. The ground cover layer with between 10-25% cover consists of blue cohosh, trillium (*Trillium sp.*), and baneberry (*Actaea sp.*).	• No wildlife species were observed during the site investigation. Abundant vernal pools and fallen logs were noted.
525	6.6 ha	May 12, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	1.9	• The canopy layer this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple with some beech. The sub-canopy contains white ash and ironwood. The shrub layer consists mainly of choke cherry. The ground cover layer occupying between 25-60% cover consists of yellow dog's-tooth violet, zig-zag goldenrod, and Virginia water-leaf (*Hydrophyllum virginianum*).	• Singing males of two bird species were observed or their vocalizations were heard during the site investigation, including: the House Wren and Red-winged Blackbird. Two other bird species were observed, including the Blue Jay and American Redstart, as well as the tracks of White-tailed Deer. Vernal pools, snags and fallen logs were also noted.
532	11.2 ha	May 12, 2011	SWT2-5: Red-osier Dogwood Mineral Thicket Swamp Type	2.5	• The canopy layer of this young thicket swamp community occupies 0-10% cover. A few scattered Manitoba maple (*Acer negundo*) and American basswood are present. The tall shrub layer is dominated by silky dogwood (*Cornus amomum*), with some hawthorn and long-beaked willow (*Salix bebbiana*) while the ground cover layer consists of common dandelion, and rough bedstraw (*Galium asprellum*).	• Singing males of four bird species were observed or their vocalizations were heard during the site investigation including: the Gray Catbird, Yellow Warbler, Song Sparrow and American Goldfinch.
			FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	7.4	• This is a mid-age deciduous forest wherein the canopy layer occupies greater than 60% cover and is dominated by sugar maple. The sub-canopy is dominated by ironwood and the shrub layer is mainly choke cherry. The ground cover layer consists of yellow dog's-tooth violet, Virginia water-leaf and blue cohosh.	• Singing males of three bird species were observed or their vocalizations were heard, including the Red-tailed Hawk, Great Crested Flycatcher and Baltimore Oriole. Snags and fallen logs were also noted.
		November 23, 2011	MAM2-10: Forb Mineral Meadow Marsh Type	1.1	• This community is dominated by asters and goldenrods.	• The vocalizations of one bird species, the Wild Turkey, were heard, and one mammal species, the Cottontail, was observed.
534	51.3 ha	July 7, 2011 Revisited September 2, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type *(north and west of Turbine 33)*	39.6	• The canopy layer occupying greater than 60% cover within this mid-age to mature deciduous forest is dominated by sugar maple, American basswood, beech, and white ash. The sub-canopy consists of common buckthorn, white elm, sugar maple, hawthorn and white ash. The shrub layer is dominated by common buckthorn, choke cherry, sugar maple, and white ash. The ground cover layer is comprised of false solomon's seal, thicket creeper, star-flowered solomon's seal (*Maianthemum stellatum*), graceful sedge (*Carex gracillima*), and violets.	• Abundant vernal pools, rare snags and abundant fallen logs where noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		July 7, 2011 Revisited September 2, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type *(near Turbine 32)*	0.5	• The canopy layer of this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple, with a minor component of basswood, black cherry, and white elm. The sub-canopy is dominated by sugar maple, white ash, and bitternut hickory. The shrub layer, with 25-60% cover is dominated by common buckthorn. The dense ground cover layer consists of false solomon's seal, Star-flowered Solomon's Seal, trilliums, and jack in the pulpit.	
		July 7, 2011	SWD3-3: Swamp Maple Mineral Deciduous Swamp Ecosite *(between Turbines 32 and 33)*	0.7	• The canopy layer is dominated by Freeman's maple with some American basswood. The ground cover layer consists of spotted jewelweed, violets, poison-ivy, and sensitive fern.	• A Chimney Crayfish chimney was observed within the natural area. In addition, a 30 m long pool is present within the community and had standing water during site investigations. Abundant vernal pools, a few snags and abundant fallen logs were also noted.
		September 2, 2011	SWD3-3: Swamp Maple Mineral Deciduous Swamp Ecosite *(northwest of Turbine 33)*	0.3	• The canopy layer is dominated by Freeman's maple, and representations of green ash, while the sub-canopy largely consists of blue beech, and white elm. The ground cover layer is dominated by tall white aster, sensitive fern (*Onoclea sensibilis*), bladder sedge (*Carex intumescens*), and poison-ivy.	• Eleven bird species were observed or their vocalizations heard during the site investigation, including: a Hairy Woodpecker, Black-capped Chickadee, American Robin, American Crow, Red-tailed Hawk, American Goldfinch, Ovenbird, Red-eyed Vireo, American Redstart, Eastern Pewee, and White-breasted Nuthatch. The vocalizations of two species of amphibians, the Gray Treefrog and a Spring Peeper were heard. The tracks of one species of mammal, the White-tailed Deer, were observed. A chimney crayfish chimney was observed. In addition, one species of Lepidoptera were observed, the Cabbage White. • Several vernal pools are present within the community but dry at the time of investigations. Snags and fallen logs were also noted.
		November 4, 2011	FOD7-2: Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type Inclusions: SWD3-3: Swamp Maple Mineral Deciduous Swamp Ecosite	4.8	• This community consists of a mid-age deciduous forest with greater than 60% canopy cover. Dominant species include green ash.	• No wildlife species were observed during the site investigation. A vernal pond with a Spring Peeper calling was noted to the north, within the FOD7-2 community.
			CUP3a: Austrian Pine Coniferous Plantation Type	0.8	• This community consists of an Austrian Pine plantation.	
			SWD3-3: Swamp Maple Mineral Deciduous Swamp Ecosite *(northwest of Turbine 33)*	0.3	• This mid-aged deciduous swamp with greater than 60% canopy cover is dominated by freman's maple with some green ash and silver maple, while the sub canopy is dominated by silver maple and common buckthorn.	

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
537	15.1 ha	August 19, 2011 Revisited October 19, 2011 Revisited February 1, 2012	FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type *Inclusion:* SWD3-3: Swamp Maple Mineral Deciduous Swamp Type	13.0 0.5	• This mature deciduous forest with greater than 60% canopy cover, consists of sugar maple, beech, and basswood. The sub-canopy with 25-60% cover consists of sugar maple, sour cherry, ironwood, and beech. The shrub layer with the same percent cover is dominated by sugar maple, white ash, sour cherry, and beech. The ground cover layer is mainly comprised of sugar maple, white ash, enchanter's nightshade, and wild black currant. • Within the deciduous swamp inclusion, the canopy layer consists of Freeman's maple with some willow and white elm trees. No subcanopy or shrub layer was noted. Ponded water was observed with isolated tufts of sedges/grasses within the groundcover layer during the site investigation.	• Singing males of two bird species were observed or their vocalizations were heard, including: the Eastern Wood-pewee and Red-eyed Vireo, while the vocalizations of four other bird species were heard, including: the Cedar Waxwing, Black-capped Chickadee, Hairy Woodpecker and White-breasted Nuthatch. Two species of amphibian were observed or their vocalizations were heard, including the Wood Frog and Eastern Gray Tree Frog. The tracks of one species of mammal, the Coyote, were observed. Large vernal pools, snags and fallen logs were also noted.
		August 19, 2011	FOD5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type	1.7	• The canopy layer, occupying greater than 60% cover within this mature deciduous forest is dominated by basswood, sugar maple, ironwood, and beech. The sub-canopy layer with between 25-60% cover consists of ironwood, basswood, sugar maple, and white ash. The shrub layer is dominated by blue cohosh, garlic mustard, black cherry, and false solomon's seal and the ground cover layer is mainly comprised of enchanter's nightshade.	• Singing males of two bird species were observed or their vocalizations were heard, including: the Eastern Wood-pewee and Black-capped Chickadee, while the vocalizations of three other bird species were heard, including the White-breasted Nuthatch, Hairy Woodpecker and American Robin. One species of amphibian, the Wood Frog, was observed. Vernal pools, snags and fallen logs were also noted.
539	21.1 ha	October 6, 2011	FOD7-4: Fresh-Moist Black Walnut Lowland Deciduous Forest Type	1.6	• Dominant tree species found within this mid-age moist deciduous forest include black walnut, eastern cottonwood, green ash, white ash and black ash.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
541	40.1 ha	August 19, 2011	MAM2-10: Forb Mineral Meadow Marsh Type	2.7	• The canopy layer, within this mid-age meadow marsh occupying between 0 and 25% cover is dominated by white ash, green ash, and white elm. The sub-canopy cover consists of red-osier dogwood, long-beaked willow, common buckthorn and Missouri willow. The shrub layer is dominated by tall white aster, spotted joe-pye-weed, grass-leaved goldenrod, giant goldenrod (*Solidago gigantea*). The ground cover layer is comprised of small yellow sedge (*Carex flava*), bristly sedge (*Carex comosa*), meadow horsetail (*Equisetum pratense*), and spotted jewelweed.	• The vocalizations of four bird species were heard, including: the Eastern Kingbird, Cerulean Warbler, Song Sparrow and American Goldfinch. Fallen logs were also noted.
		August 19, 2011	CUW1h: White Elm Cultural Woodland Type	0.6	• The canopy layer, occupying between 25-60% cover within this young cultural woodland is dominated by white elm, white ash, and trembling aspen while the sub-canopy layer with the same percent cover consists of white elm, common buckthorn, staghorn sumac (*Rhus hirta*), and trembling aspen. The shrub layer is dominated by spotted joe-pye-weed, tall goldenrod, reed canary grass, and European elderberry (*Sambucus nigra*). The ground cover layer is comprised of Alleghany blackberry, tall white aster, red raspberry, and yellow avens.	• Singing males of two bird species were observed or their vocalizations were heard, including: the House Wren and Song Sparrow. A potential hibernacula habitat, vernal pools, snags and fallen logs were also noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		August 19, 2011	FOD7b: Fresh Moist Basswood-Sugar Maple Lowland Deciduous Forest Type	2.6	• This community consists of a mature deciduous forest with greater than 60% canopy cover. The canopy layer is co-dominated by American basswood and sugar maple, while black cherry and white ash are common. The sub-canopy consists of basswood, white ash, sugar maple, and eastern hemlock. The shrub layer is dominated by blue beech, white ash, eastern hemlock, and basswood. The ground cover layer is comprised of blue cohosh, jack-in-the-pulpit, white snakeroot (*Ageratina altissima*), and fowl manna grass.	• Singing males of two bird species were observed or their vocalizations were heard, including: the Downy Woodpecker and White-breasted Nuthatch. The tracks of one species of mammal, the White-tailed Deer, were observed. Vernal pools, snags and fallen logs were also noted.
		August 19, 2011	FOD7-1: Fresh-Moist White Elm Lowland Deciduous Forest	5.03	• This mid-age moist deciduous forest is dominated by white elm, white ash, trembling aspen, and green ash. The sub-canopy layer consists of white elm, white ash, sour cherry and alternate-leaved dogwood. The shrub layer is dominated by virgin's-bower (*Clematis virginiana*), spotted Joe-pye-weed, common buckthorn and spotted jewelweed. The ground cover layer is comprised of poison-ivy, sensitive fern and heal-all (*Prunella vulgaris*).	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
		September 6, 2011	FOD4-2: Dry-Fresh White Ash-Hardwood Deciduous Forest Type	1.3	• The canopy layer of this mid-age deciduous forest with greater than 60% canopy cover is dominated by green ash, white ash, and sugar maple. The sub-canopy layer consists of alternate-leaved dogwood, poison-ivy, and sugar maple. The shrub layer is dominated by choke cherry and alternate-leaved dogwood. The ground cover layer is comprised of spotted jewelweed, alternate-leaved dogwood, and white ash. • Irregular patches of seepage areas were seen along the north facing slope.	• Eleven bird species were observed or their vocalizations were heard, including: the Mourning Dove, Song Sparrow, Ruby-Throated Hummingbird, Northern Flicker, American Crow, Gray Catbird, Common Yellowthroat, American Goldfinch, Hairy Woodpecker, Red-Bellied Woodpecker and Wood Thrush. One species of herpetofauna, the Gray Tree Frog was observed, as well as three species of Lepidoptera, including the Cabbage White, Common Sulfur and Alfalfa Looper. An Eastern Chipmunk was observed, as well as the tracks of a White-tailed Deer and the burrows/chimneys of a Chimney Crayfish. Trees with cavities, snags and fallen logs were also noted.
		September 6, 2011	SWT2-2: Willow Mineral Thicket Swamp Type	2.2	• The canopy layer occupying 0-10% cover is dominated by white elm, and peach-leaved willow. The sub-canopy layer with 25-60% cover consists of pussy willow, Missouri willow, red-osier dogwood, and long-beaked willow. The ground cover layer is comprised of spotted jewelweed, purple-stemmed aster (*Symphyotrichum puniceum*), spotted joe-pye-weed, and tall goldenrod. • This community is the floodplain of a creek and is a mixture of dense swamp thicket and meadow marsh. A defined stream channel is present with flowing water up to 30 centimetres deep.	
		September 6, 2011	CUM1-1: Dry-Moist Oldfield Meadow Type	0.1	• Occasional white pine trees and thickets of white pine, white cedar, and multiflora rose occur randomly among field vegetation. The ground cover is largely co-dominated by smooth brome, orchard grass, heath aster (*Symphyotrichum ericoides*), and Canada goldenrod.	
		September 6, 2011	CUP2-1: Black Walnut – White Pine Mixed Plantation Type	0.3	• The canopy layer occupying greater than 60% cover is dominated by black walnut and white pine that were planted. The sub-canopy layer consists of white ash.	
		September 6, 2011	FOD5-4: Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type	0.8	• The canopy layer within this mid-age deciduous forest is dominated by sugar maple and ironwood, with white ash, black cherry, and basswood. The sub-canopy consists of sugar maple, and ironwood. The ground cover layer is comprised of alternate-leaved dogwood, jack-in-the-pulpit, choke cherry, and sugar maple.	

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
		September 6, 2011	SWD2-2: Ash Mineral Deciduous Swamp Ecosite	0.3	• The community consists of a mid-age deciduous swamp with 25-60% canopy cover. The canopy is dominated by green ash, and trembling aspen. The sub-canopy layer consists of white elm, and sugar maple. The shrub layer is dominated by choke cherry, alternate-leaved dogwood, and spicebush. The ground cover layer is comprised of spotted jewelweed, fowl manna grass, and alternate-leaved dogwood, and rice cut grass. A creek is present within the community.	
		September 6, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	7.1	• The canopy layer within this mature deciduous forest is dominated by sugar maple, with occasional white ash and beech. The sub-canopy layer consists of ironwood, sugar maple, and black cherry. The shrub layer is dominated by choke cherry and white ash. Blue-stemmed goldenrod (*Solidago caesia*), calico aster, zig-zag goldenrod, and bitter nightshade (*Solanum dulcamara*) are common in the ground cover.	
		September 6, 2011	FOD5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type	3.3	• This is a mature deciduous forest dominated by sugar maple, basswood, white ash, and beech. The sub-canopy layer consists of sugar maple, ironwood. The shrub layer is dominated by choke cherry and the ground cover layer is comprised of blue-stemmed goldenrod, herb-robert, and garlic mustard.	
542	15.5 ha	July 5, 2011 Revisited November 4, 2011	SWD4: Mineral Deciduous Swamp Ecosite <u>Inclusion:</u> MAM2-5: Narrow l-leaved sedge Mineral Meadow marsh	1.1 0.1	• The canopy layer, occupying greater than 60% cover consists of white elm, willows, trembling aspen, and basswood. The sub-canopy is dominated by white elm. The shrub layer occupying approximately 25-60% cover is dominated by gray dogwood (*Cornus racemosa*), common buckthorn, and riverbank grape. The ground cover layer consists of cut-leaved water-horehound (*Lycopus americanus*), fox sedge and other sedges. <u>Inclusion:</u> • The shrub layer occupying approximately 10-25% cover is dominated by reddish willow (*Salix X rubens*), and red-osier dogwood. The ground cover layer consists of compressed rush (*Juncus compressus*), swamp aster, Bebb's sedge, and fox sedge. This community could also be classified as a swamp thicket – meadow marsh mosaic.	• Four species of amphibians were observed, including the Spotted Salamander, Red-back Salamander, Wood Frog and Spring Peeper. One species of Lepidoptera was observed, the American Copper. White-tailed Deer tracks and Black Bear scat were also noted. • Ten species of birds were observed or their vocalizations heard during site investigations: Palm Warbler, American Redstart, Magnolia Warbler, House Wren, Blue Jay, American Crow, Least Flycatcher, Hairy Woodpecker, Grey Catbird, and Great Crested Flycatcher.
		July 5, 2011 Revisited November 4, 2011	FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	6.6	• This mature forest is dominated by sugar maple and beech, with some black cherry and ironwood. The sub-canopy layer consists of sugar maple, beech and ironwood. The shrub layer is choke cherry and white ash seedlings. The ground cover is diverse consisting of bittersweet nightshade, tall white aster, enchanter's nightshade, purple trillium, and others.	
544	3.9 ha	May 12, 2011	FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	3.9	• The canopy layer within this mid-age deciduous forest, which occupies 25-60% cover, is dominated by sugar maple, with some ironwood. The sub-canopy is largely white ash saplings, while the shrub layer occupying 10-25% cover is mainly choke cherry. The ground cover layer consists of yellow dog's-tooth violet, and jack-in-the-pulpit.	• Singing males of two bird species were observed or their vocalizations were heard during the site investigation, including: the Ovenbird, House Wren, Wood Thrush and Northern Flicker. Vernal pools, snags and fallen logs were also noted.

Table 3.3 Vegetation Communities Identified Within the 120 m Area of Investigation

Natural Area ID	Total Size of Natural Area	Date of Site Investigation	Ecological Land Classification (ELC) Unit	Area (ha)	Vegetation Composition	Wildlife and Other Observations
545	11.6 ha	October 6, 2011	FOD5-2: Dry-Fresh Sugar Maple Beech Deciduous Forest Type	10.9	• Dominant tree species observed include sugar maple, beech and white ash.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
551	13 ha	July 4, 2011 Revisited February 1, 2012	FOM2: Dry-Fresh White Pine-Black Walnut Mixed Forest Ecosite	1.1	• This mid age mixed forest is co-dominated by white pine and black walnut.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
552	13.4 ha	July 4, 2011 Revisited February 1, 2012	CUW1o: White Pine-Scot's Pine and Black Walnut Cultural Woodland Type	1.3	• This mid age cultural woodland with canopy cover between 30% and 60% is largely made up of Scot's pine (*Pinus sylvestris*), white pine and black walnut with some white ash.	• Two bird species were observed during site investigation: Baltimore Oriole and Black-capped Chickadee.
553	1.1 ha	July 4, 2011	CUP3: Coniferous Plantation Ecosite	1.1	• This mid age closed canopy coniferous plantation is dominated by Scot's pine, with white ash, and black walnut.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
555	1.6 ha	July 4, 2011	FOD9-5: Fresh Moist Bitternut Hickory Deciduous Forest Type	1.6	• This is a mid-age deciduous forest with greater than 60% canopy cover. Dominant species observed include bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), white ash, and basswood.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
556	44.7 ha	July 4, 2011 Revisited February 1, 2012	FOD5-5: Dry Fresh Sugar Maple – Hickory Deciduous Forest Type <u>Inclusion:</u> CUM1: Mineral Cultural Meadow	1.8 0.54	• This is a mid-age deciduous forest is co-dominated by sugar maple, bitternut hickory (*Carya cordiformis*), white ash, and basswood. • The cultural meadow inclusion was observed through air photo interpretation.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
561	22.1 ha	July 4, 2011 Revisited February 1, 2012	FOD5: Dry Fresh Sugar Maple Deciduous Forest Ecosite	7.9	• This mid age deciduous forest is dominated by sugar maple, beech, basswood and green ash.	• One woodpecker species was observed during the site investigation.
			SWD3-3: Swamp Maple Mineral Deciduous Swamp Type	1.4	• The canopy layer in this deciduous swamp community is dominated by Freeman's maple, with green ash and white elm associates. The sub-canopy consists of immature sugar maple, trembling aspen and basswood trees along the road.	
562	12.9 ha	July 4, 2011 Revisited February 1, 2012	FOD7-2: Fresh Moist Ash Lowland Deciduous Forest Type <u>Inclusion:</u> SWD4-1: Willow Mineral Deciduous Swamp Type	6.78 0.4	• This mid age moist deciduous forest is dominated by green ash with some silver maple, black walnut and willow species. • The SWD4-1 inclusion consists of an old oxbow dominated by willow trees.	• No wildlife or key wildlife habitat triggers were observed during the site investigation. A pond was also noted during site the investigation.
563	0.7 ha	July 4, 2011	CUP3: Coniferous Plantation Ecosite	0.7	• This mid age coniferous plantation with greater than 60% canopy cover is dominated by white spruce.	• No wildlife or key wildlife habitat triggers were observed during the site investigation.
564 & 565	3.1 ha	July 4, 2011	MAM2: Mineral Meadow Marsh Ecosite	12.9	• This pioneer mineral meadow marsh is located along watercourse and is dominated by reed canary grass.	• One bird, a Mallard, one mammal, a woodchuck, and one amphibian, a Green Frog, were all observed during site investigation.

Table 3.4 Total Area of ELC Communities Observed within the 120 m Area of Investigation

Community Series Name	Size	Ecosite Name	Size
Cultural Communities			
CUM: Cultural Meadow	6.5 ha	CUM1: Mineral Cultural Meadow	6.5 ha
CUP: Cultural Plantation	8.3 ha	CUP1: Deciduous Plantations	0.7 ha
		CUP2: Mixed Plantations	0.2 ha
		CUP3: Coniferous Plantations	7.4 ha
CUS: Cultural Savannah	6.1 ha	CUS1: Mineral Cultural Savannah Ecosite	6.1 ha
CUT: Cultural Thicket	2.7 ha	CUT1: Mineral Cultural Thicket Ecosite	2.7 ha
CUW: Cultural Woodland	8.6 ha	CUW1: Mineral Cultural Woodland Ecosite	8.6 ha
		Total Hectares for Cultural Communities	**32.2 ha**
Forest Communities			
FOD: Deciduous Forest	81.3 ha	FOD: Deciduous Forest	1.3 ha
		FOD4: Dry-Fresh Deciduous Forest Ecosite	1.7 ha
		FOD5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite	50.3 ha
		FOD6: Fresh-Moist Sugar Maple Deciduous Forest Ecosite	4.1 ha
		FOD7: Fresh-Moist Lowland Deciduous Forest Ecosite	22.8 ha
		FOD9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite	1.1 ha
FOM: Mixed Forest	4.6 ha	FOM2: Dry-Fresh White Pine-Maple-Oak Mixed Forest Ecosite	1.1 ha
		FOM3: Dry-Fresh Hardwood-Hemlock Deciduous Forest Ecosite	3.5 ha
		Total Hectares for Forest Communities	**85.9 ha**
Swamp Communities			
SWD: Deciduous Swamp	15.7 ha	SWD2: Ash Mineral Deciduous Swamp Ecosite	2.3 ha
		SWD3: Maple Mineral Deciduous Swamp Ecosite	12.1 ha
		SWD4: Mineral Deciduous Swamp Ecosite	1.3 ha
SWM: Mixed Swamp	0.4 ha	SWM1: White Cedar Mixed Swamp Ecosite	0.4 ha
SWT: Thicket Swamp	6.1 ha	SWT2: Mineral Thicket Swamp Ecosite	6.1 ha
		Total Hectares for Swamp Communities	**22.2 ha**
Marsh Communities			
MAM: Meadow Marsh	8.0 ha	MAM2: Mineral Meadow Marsh Ecosite	8.0 ha
		Total Hectares for Marsh Communities	**8.0 ha**
Open Water Communities			
OAO: Open Aquatic	**0**.2 ha	n/a	0.2 ha
		Total Hectares for Open Water Communities	**0.2 ha**
		Total:	**148.5 ha**

3.3.2 Vascular Plant Inventory

A total of 351 vascular plant species were observed in natural areas occurring within the 120 m Area of Investigation. Of these, 249 (71%) are native and 102 (29%) are exotic. This level of species diversity is indicative of the high number of naturally occurring vegetation communities present within the Project Study Area. Of the species observed, the majority (58%) had a moderate coefficient of conservatism (CC) (between 4 and 6). Species with this range of CC are associated with a specific community (e.g., deciduous forest, meadow marsh, etc.) but can tolerate moderate disturbance. Thirty-one percent (31%) of the species observed are ranked as having the lowest sensitivity (between 1 and 3) and these are species that can be found on a variety of sites including disturbed sites. The remaining 11% of species have a high CC rank (between 7 and 8). These species are associated with a mature community, and are tolerant of only minor disturbances.

A full list of species observed within each natural area is presented in Appendix H. The rarity of each species was determined using Appendix J and M of the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and the Natural Heritage Information Centre (MNR, 2011). Of the species recorded during site investigations, 234 are ranked as S5 (Secure) and seven are ranked as S4 (Apparently Secure). One provincially rare (S1-S3) species, honey locust

(*Gleditsia triacanthos*), was observed within natural area 442, located north of Kippen Road and east of Bronson Line; however it is not naturally occurring this far north in Ontario and it was found within a cultural woodland. Honey locust is widely planted and this individual either was planted, or has seeded in from nearby planted stock and should not be treated as a native occurrence. No other species of conservation concern or rare species within the planning area were observed during site investigations.

3.3.3 Wetlands

A total of ten (10) unevaluated wetlands or wetland complexes were identified as being at least partially located within the 120 m Area of Investigation through the site investigation and records review process. These are shown on Figure 3.3. All of these ten wetlands are considered wetland complexes. One is considered a wetland unit. All wetlands are considered either riverine, palustrine or isolated in nature made up mostly of swamp with some associated marsh communities. The marsh communities are typically found along stream systems whereas the swamp communities are found both along stream systems, but isolated amongst agricultural field as well. A description of the attributes, composition, and function of each wetland occurring at least partially within the 120 m Area of Investigation, as well as the minimum distance from each wetland complex to the nearest project component, is provided in Table 3.5 below. These ten wetland complexes were carried forward to the evaluation of significance phase of the Natural Heritage Assessment.

3.3.4 Woodlands

A total of 39 woodlands were identified within the 120 m Area of Investigation through the site investigation. The boundaries of these woodland units are shown on Figure 3.4. A description of the attributes, composition, and function of each woodland, as well as the distance from each woodland to the nearest project component, is provided in Table 3.6 below. All of these woodlands will be carried forward to the evaluation of significance phase of the Natural Heritage Assessment.

Table 3.5 Wetland Features Identified Through the Site Investigation

Wetland ID	Minimum Distance from Project Location[1]	Attributes			Composition	Function
		Total Size (ha)	Wetland Type	Site Type		
WET-01	>0.1 (collection line)	188.4	Marsh and Swamp	Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Forb Mineral Meadow Marsh Type(MAM 2-10): In the northern portion of the complex, canopy dominated by white ash, green ash, and white elm; sub-canopy consists of red-osier dogwood, long-beaked willow, common buckthorn and Missouri willow; shrub layer dominated by tall white aster, spotted joe-pye-weed, grass-leaved goldenrod, giant goldenrod; groundcover comprised of small yellow sedge, bristly sedge, meadow horsetail and spotted jewelweed. Species observed near the middle of the complex include willow herb, foxtail species and barnyard grass species. Farther south, canopy layer dominated by shining willow, long-beaked willow and common elderberry; sub-canopy consists of New England aster, spotted joe-pye-weed, purple-stemmed aster and red-osier dogwood; shrub layer dominated by spotted jewelweed, rice cut grass, Canada thistle, and Alleghany blackberry; groundcover comprised of fox sedge, bristly sedge, meadow horsetail and fowl manna grass. • Green Ash Mineral Deciduous Swamp Type(SWD2-2):canopy dominated by green ash and trembling aspen; sub-canopy consists of white elm and sugar maple; shrub layer dominated by choke cherry, alternate-leaved dogwood and spicebush; groundcover comprised of spotted jewelweed, fowl manna grass, and alternate-*leaved* dogwood, and rice cut grass. • Willow Mineral Thicket Swamp Type(SWT 2-2):canopy dominated by white elm, peach-leaved willow and crack willow; sub-canopy consists of pussy willow, Missouri willow, red-osier dogwood, reddish willow and long-beaked willow; groundcover comprised of spotted jewelweed, purple-stemmed aster, spotted joe-pye-weed, tall goldenrod, rice-cut grass, broad- leaved cattail, meadow horsetail, and Pennsylvania bittercress. • Red-osier Dogwood Mineral Thicket Swamp Type(SWT 2-5): canopy layer consists of Manitoba maple and American basswood; shrub layer dominated by silky dogwood with some hawthorn and long-beaked willow; groundcover consists of common dandelion, and rough bedstraw. • Forb Mineral Shallow Marsh Type(MAS 2-9): canopy consists of white willow; sub-canopy consists of Long-beaked Willow, Missouri Willow, black elder and pussy willow; shrub layer contains red-osier dogwood, joe-pye weed northern willow herb and broad-leaved cattail; groundcover dominated by spotted jewelweed. • Black Walnut Deciduous Plantation Type (CUP1-3/MAM): canopy layer consists of planted black walnut with regeneration of white elm and white ash; groundcover consists of tall white aster, orchard grass and smooth brome with moist depressions consisting of spotted jewelweed, rice cut grass and fowl manna grass. • Reed Canary Grass Mineral Meadow Marsh Type (MAM 2-2): dominated by reed canary grass. • (SWD2): deciduous swamp community was identified through air photo interpretation. • (FOD7-2): canopy includes green ash, white elm and choke cherry; understorey dominated	• Water quality improvement; and, • Habitat and resources for wetland flora and fauna.

1. *Reflects distance between feature and disturbance area associated with project infrastructure.*

Table 3.5 Wetland Features Identified Through the Site Investigation

Wetland ID	Minimum Distance from Project Location[1]	Attributes			Composition	Function
		Total Size (ha)	Wetland Type	Site Type		
					by alternate-leaved dogwood and spicebush; herbaceous layer consists of zigzag goldenrod, wild ginger and red currant. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD), meadow marsh (MAM), shallow marsh (MAS), and thicket swamp (SWT).	
WET-03	19 (collection line)	8.6	Swamp	Palustrine, Isolated and Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Nannyberry Mineral Thicket Swamp Type (SWT 2-10): dominated by nannyberry and grey dogwood in equal amounts with small numbers of ash species. • Maple Mineral Deciduous Swamp Ecosite (SWD3): canopy layer consists of silver maple, ash species, and black walnut; shrub layer consists of common buckthorn, and red raspberry; herbaceous layer consists of garlic mustard, reed canary grass, and goldenrods. • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): canopy layer dominated by green ash; sub-canopy dominated by green ash and common buckthorn; groundcover consists of Canada goldenrod, tall white aster, and Virginia strawberry. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD) and thicket swamp (SWT).	• Flood attenuation; • Water quality improvement; and, • Habitat and resources for wetland flora and fauna.
WET-04	>0.1(collection line)	15.4	Swamp and Marsh	Isolated	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy layer consists of Freeman's maple with some willow and white elm trees. No subcanopy or shrub layer was noted; ponded water observed with isolated tufts of sedges/grasses within the groundcover layer. • Mineral Deciduous Swamp Ecosite (SWD4): canopy layer consists of white elm, willows, trembling aspen, and basswood; sub-canopy dominated by white elm; shrub layer dominated by gray dogwood, common buckthorn, and riverbank grape; groundcover layer consists of cut-leaved water-horehound, fox sedge and other sedges. • Narrow Leaved Sedge Mineral Meadow Marsh (MAM2-5): shrub layer dominated by reddish willow, and red-osier dogwood; groundcover consists of compressed rush, swamp aster, Bebb's sedge, and fox sedge. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD) and thicket swamp (SWT).	• Flood attenuation; and, • Habitat and resources for wetland flora and fauna.

Table 3.5 Wetland Features Identified Through the Site Investigation

Wetland ID	Minimum Distance from Project Location[1]	Attributes			Composition	Function
		Total Size (ha)	Wetland Type	Site Type		
WET-05	>0.1(collection line)	30.3	Swamp and Marsh	Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Green Ash Mineral Deciduous Swamp Type(SWD 2-2): canopy layer dominated by green ash; sub-canopy consists of blue beech, green ash, and black maple; groundcover dominated by spotted jewelweed, sedge species, and calico aster. • (SWD3-3): canopy layer dominated by Freeman's maple and green ash; sub-canopy consists of Freeman's maple, white elm, and green ash; groundcover dominated by tall white aster, fowl meadow grass, poison-ivy, and spotted jewelweed. • (SWD3-2): canopy layer consists of silver maple, red maple, black ash, and white elm; sub-canopy dominated by common buckthorn, and white elm; groundcover consists of poison ivy, thicket creeper, yellow avens, and bebb's sedge. • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): canopy layer includes green ash, Freeman's maple, sugar maple, and white elm; groundcover species include garlic mustard, poison ivy, white avens, and calico aster. Vegetation communities outside the 120 m Area of Investigation composed of deciduous swamp (SWD).	• Water quality improvement; and, • Habitat and resources for wetland flora and fauna.
WET-06	>0.1 (transmission line)	47.5	Swamp and Marsh	Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Maple Mineral Deciduous Swamp Ecosite (SWD3): Near Turbine 41, species included silver maple, ash species and white elm. Near Centennial Road, dominant species include Freeman's maple, white elm, and basswood. • Reed Canary Grass Mineral Meadow Marsh Type(MAM 2-2): community dominated by reed canary grass; other species include a minor component of stinging nettle, garlic mustard, and smooth brome. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD) and meadow marsh (MAM).	• Water quality improvement; and, • Habitat and resources for wetland flora and fauna.
WET-07	43 (collection line)	181.6	Swamp and Marsh	Isolated and Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Swamp Maple Mineral Deciduous Swamp (SWD3-3): canopy layer dominated by Freeman's maple with some green ash, silver maple and American basswood; sub-canopy includes blue beech, silver maple, common buckthorn and white elm; groundcover consists of spotted jewelweed, tall white aster, violets, poison-ivy, sensitive fern and bladder sedge. • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): canopy dominated by green ash. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD), mixed swamp (SWM), shallow marsh (MAS) and meadow marsh (MAM).	• Flood attenuation; • Water quality improvement; and, • Habitat and resources for wetland flora and fauna.

Table 3.5 Wetland Features Identified Through the Site Investigation

Wetland ID	Minimum Distance from Project Location[1]	Attributes			Composition	Function
		Total Size (ha)	Wetland Type	Site Type		
WET-08	35 (turbine)	61.6	Swamp	Isolated	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Green Ash Mineral Deciduous Swamp Type (SWD2-2): canopy layer consists of green ash and Freeman's maple; sub-canopy includes white elm, Freeman's maple, and common buckthorn; groundcover dominated by tall white aster, and gray's sedge. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy layer dominated by Freeman's maple and green ash; sub-canopy consists of white elm and Freeman's' maple; groundcover dominated by gray's sedge and tall white aster. • Fresh-Moist Ash Lowland Deciduous Forest Type (FOD7-2): canopy comprised of green ash and white elm; sub-canopy dominated by common buckthorn and white elm; groundcover consists of poison ivy, thicket creeper and white avens. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD), mixed swamp (SWM) and shallow marsh (MAS).	• Flood attenuation; and, • Habitat and resources for wetland flora and fauna.
WET-10	26 (access road)	213.8	Swamp	Isolated and Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Ash Lowland Deciduous Forest Type (FOD7-2): canopy layer dominated by green ash, trembling aspen and black walnut; sub-canopy consists of hawthorn species and common apple; shrub layer dominated by grey dogwood and choke cherry; groundcover consists of inserted thicket creeper, tall hairy agrimony, and calico aster. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy layer dominated by Freeman's maple, white elm, and green ash; sub-canopy consists of grey dogwood, green ash, and riverbank grape; groundcover dominated by Canada goldenrod, red raspberry, Indian hemp, and reed canary grass. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD) and thicket swamp (SWT). This wetland complex includes Hay Swamp Provincially Significant Wetland.	• Flood attenuation; • Water quality improvement; and, • Habitat and resources for wetland flora and fauna.
WET-12	>0.1 (transmission line)	55.0	Swamp and Marsh	Riverine	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh Moist Ash Lowland Deciduous Forest Type (FOD7-2): dominated by green ash with some silver maple, black walnut and willow species. • Willow Mineral Deciduous Swamp Type (SWD4-1): an old oxbow dominated by willow trees. • Mineral Meadow Marsh Ecosite (MAM2): dominated by reed canary grass. Vegetation communities outside the 120 m Area of Investigation include deciduous swamp (SWD), meadow marsh (MAM) and shallow marsh (MAS).	• Water quality improvement; and, • Habitat and resources for wetland flora and fauna.
WET-13	>0.1 (transmission line)	8.4	Swamp	Isolated	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy layer dominated by Freeman's maple, with green ash and white elm associates; sub-canopy consists of immature sugar maple, trembling aspen and basswood trees along the road. Vegetation communities outside the 120 m Area of Investigation composed of deciduous swamp (SWD).	• Habitat and resources for wetland flora and fauna.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
A	427	41 (turbine)	0.3	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): canopy layer dominated by green ash; sub-canopy dominated by green ash and common buckthorn; groundcover consists of Canada goldenrod, tall white aster, and Virginia strawberry. All of woodland A occurs within the 120 m Area of Investigation.	• Provides habitat for plant and wildlife species.
B	426	>0.1(access road and collection line)	0.4	Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Maple Mineral Deciduous Swamp Ecosite (SWD3): canopy consists of silver maple, ash species and black walnut; shrub layer consists of common buckthorn and red raspberry; herbaceous layer consists of garlic mustard, reed canary grass and goldenrods. All of woodland B occurs within the 120 m Area of Investigation.	• Provides habitat for plant and wildlife species.
D	442	2 (collection line)	4.4	Cultural Woodland	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Common Buckthorn – Apple – Trembling Aspen Cultural Woodland Type (CUW1f): canopy consists of willow, ash species, common pear common apple, common buckthorn, trembling aspen and Manitoba maple; shrub layer consists of common buckthorn, red-osier dogwood and staghorn sumac; herb layer includes aster species, goldenrod species, avens species, reed canary grass, tall white aster and tall goldenrod. Vegetation communities outside the 120 m Area of Investigation consist of cultural woodland (CUW).	• Provides habitat for plant and wildlife species, including snags and fallen logs.
E	450	>0.1(collection line)	2.8	Deciduous Forest	Mid-age to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple with white ash and choke cherry; sub-canopy consists of sugar maple and choke cherry; herbaceous layer consists of aster species and immature sugar maple. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including Downy Woodpecker, Grey squirrel and White-tailed Deer.

2. Reflects distance between feature and disturbance area associated with project infrastructure.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
F	463	>0.1(collection line)	31.5	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple with a minor component of beech and white ash; sub-canopy consists of sugar maple, ironwood, white ash, white elm and blue beech; shrub and herbaceous layers consist of calico aster, zigzag goldenrod, white baneberry, enchanter's nightshade, herb Robert, poison ivy, violet species, jewelweed and several grass species. • Dry-Fresh Sugar Maple-White Ash Deciduous Forest Type (FOD5-8): canopy includes sugar maple, white ash, beech and basswood; sub-canopy includes sugar maple, ironwood, white ash, and shagbark hickory; shrub layer species include red raspberry, choke cherry, black cherry and garlic mustard; herbaceous layer includes running-strawberry bush, blue cohosh, calico aster and common speedwell. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including mammals such as Raccoon and White-tailed Deer, and birds such as American Goldfinch, American Crow, Red-bellied Woodpecker, and White- breasted Nuthatch. Provides interior forest habitat.
G	459, 462	>0.1(collection line)	9.7	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Green Ash – Hardwood Lowland Deciduous Forest Type (FOD507): canopy includes green ash, white elm and choke cherry; sub-canopy dominated by alternate-leaved dogwood and spicebush; herbaceous layer consists of zigzag goldenrod, wild ginger and red currant. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp.	• Provides habitat for plant and wildlife species, including birds such as Black-capped Chickadee, American Robin, White-breasted Nuthatch and Blue Jay.
H	480	40 (turbine)	29.6	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type (FOD5-7): canopy layer co-dominated by sugar maple, sweet cherry, black cherry and white ash; sub-canopy consists of sugar maple, common apple, and hawthorn species; shrub layer dominated by choke cherry and alternate-leaved dogwood; groundcover consists of enchanter's nightshade, garlic mustard and choke cherry. • Fresh-Moist Sugar Maple Deciduous Forest Type (FOD6-5): canopy includes sugar maple, silver maple, basswood and trembling aspen; shrub layer includes red-osier dogwood, spotted jewelweed, and blue cohosh; herbaceous layer consists of wild mint, jack-in-the-pulpit, Virginia strawberry and herb robert. • Ash Mineral Deciduous Swamp Ecosite (SWD2): deciduous swamp community identified through air photo interpretation. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including mammals such as Eastern Chipmunk and birds such as Song Sparrow, American Goldfinch, Hairy Woodpecker, Indigo Bunting, Gray Catbird, Northern Cardinal, Wood Thrush, Great Crested Flycatcher, Mourning Dove, American Crow, American Robin, House Wren, Gray Catbird, Field Sparrow and Least Flycatcher. Provides interior forest habitat.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
I	480	>0.1(collection line)	2.3	Cultural Woodland	Young	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Mineral Cultural Woodland Ecosite (CUW1): species observed within the canopy layer of this young cultural woodland community include white pine, black walnut, white elm and white oak; herbaceous layer includes asters and goldenrod species. • Beech-Sugar Maple Cultural Woodland Type (CUW1a): canopy dominated by beech, sugar maple, ironwood, and white ash; sub-canopy consists of common buckthorn, sour cherry, sugar maple and ironwood; shrub layer dominated by riverbank grape, inserted Virginia-creeper and choke cherry; ground cover layer is mainly dominated by Virginia strawberry, white avens, common dandelion, and garlic mustard. Vegetation communities outside the 120 m Area of Investigation consist of cultural woodland (CUW).	• Provides habitat for plant and wildlife species, including birds such as Song Sparrow, Gray Catbird, American Robin, American Goldfinch, Tree Swallow, Ruby-Throated Hummingbird, Eastern Kingbird, American Crow and House Wren.
K	481, 487	2 (access road and collection line)	15.3	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy consists of sugar maple, white ash American beech; sub-canopy dominated by choke cherry; shrub layer consists of red-berried elderberry, choke cherry, immature white ash, and black raspberry; herbaceous layer and groundcover consists zig-zag goldenrod, calico aster, wild ginger, sugar maple seedlings, yellow dog's-tooth violet, white avens and downy yellow violet. • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): canopy consists of sugar maple, beech, basswood and white ash; sub-canopy consists of sugar maple, white elm, white ash and basswood; shrub layer consists of sugar maple, white ash, white birch, and ironwood; groundcover dominated by enchanter's nightshade, yellow avens, immature beech, and immature white ash. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including birds such as Wood Thrush, Rose-breasted Grosbeak, Yellow-rumped Warbler, Great Crested Flycatcher, American Robin, White-breasted Nuthatch, Eastern Wood-pewee and Ovenbird.
L	504	66 (turbine)	78.0	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple with a minor component of American beech and white ash; shrub layer consists of choke cherry, immature white ash and black raspberry; herbaceous layer dominated by zig-zag goldenrod, calico aster, wild ginger, violets and sugar maple seedlings. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including birds such as Blue Jay. Provides interior forest habitat.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
M	498	26 (turbine)	2.7	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-2): canopy consists of sugar maple, beech, and black cherry; sub-canopy dominated by green ash; shrub layer dominated by choke cherry; groundcover consists of yellow dog's-tooth violet and white avens. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including birds such as House Wren, Song Sparrow, Great Crested Flycatcher and Downy Woodpecker.
N	508, 509, 515, 517, 518	20 (access road)	87.0	Deciduous Forest, Mixed Forest, Deciduous Swamp and Cultural Woodland	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): canopy consists of sugar maple and American beech, white ash and ironwood; sub-canopy layer consists of green ash; shrub layer dominated by choke cherry and alternate-leaved dogwood; groundcover consists of yellow dog's-tooth violet, white avens, dog violet, common speedwell and white lettuce. • Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type (FOM3-2): canopy layer dominated by eastern hemlock, sugar maple, and some Norway spruce; sub-canopy contains American beech, green ash and yellow birch; shrub layer consists of alternate-leaved dogwood; groundcover consists of yellow dog's-tooth violet. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), mixed forest (FOM), deciduous swamp (SWD), cultural woodland (CUW).	• Provides habitat for plant and wildlife species, including mammals such as White-tailed Deer, and birds such as Rose-breasted Grosbeak, Wood Thrush, Blue Jay, American Crow, Red-Eyed Vireo, Brown-Headed Cowbird, Blue-Headed Vireo, Great Crested Flycatcher, Yellow-throated Vireo, Ovenbird and Chickadee. Provides interior forest habitat.
O	525	95 (turbine)	1.9	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple with some beech; sub-canopy contains white ash and ironwood; shrub layer consists mainly of choke cherry; groundcover consists of yellow dog's-tooth violet, zig-zag goldenrod, and Virginia water-leaf. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including birds such as House Wren and Red-winged Blackbird.
P	532	11 (access road and collection line)	7.7	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple; sub-canopy dominated by ironwood; shrub layer mainly choke cherry; groundcover consists of yellow dog's-tooth violet, Virginia water-leaf and blue cohosh. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including birds such as Red-tailed Hawk, Great Crested Flycatcher and Baltimore Oriole.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
Q	541	>0.1(collection line)	31.8	Deciduous Forest	Mid-age to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh Moist Basswood-Sugar Maple Lowland Deciduous Forest Type (FOD7b): canopy co-dominated by American basswood and sugar maple, while black cherry and white ash are common; sub-canopy consists of basswood, white ash, sugar maple, and eastern hemlock; shrub layer dominated by blue beech, white ash, eastern hemlock, and basswood; groundcover comprised of blue cohosh, jack-in-the-pulpit, white snakeroot, and fowl manna grass. • Fresh-Moist White Elm Lowland Deciduous Forest (FOD7-1): canopy dominated by white elm, white ash, trembling aspen, and green ash; sub-canopy consists of white elm, white ash, sour cherry and alternate-leaved dogwood; shrub layer dominated by Virgin's-bower, spotted joe-pye-weed, common buckthorn and spotted jewelweed; groundcover comprised of poison-ivy, sensitive fern and heal-all. • Dry-Fresh White Ash-Hardwood Deciduous Forest Type (FOD4-2): canopy dominated by green ash, white ash, and sugar maple; sub-canopy consists of alternate-leaved dogwood, poison-ivy, and sugar maple; shrub layer dominated by choke cherry and alternate-leaved dogwood; groundcover comprised of spotted jewelweed, alternate-leaved dogwood, and white ash. • Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type (FOD5-4): canopy dominated by sugar maple and ironwood, with white ash, black cherry, and basswood; sub-canopy consists of sugar maple, and ironwood; groundcover comprised of alternate-leaved dogwood, jack-in-the-pulpit, choke cherry and sugar maple. • Ash Mineral Deciduous Swamp Ecosite (SWD2-2): canopy dominated by green ash, and trembling aspen; sub-canopy layer consists of white elm, and sugar maple; shrub layer dominated by choke cherry, alternate-leaved dogwood, and spicebush; groundcover comprised of spotted jewelweed, fowl manna grass, alternate-leaved dogwood and rice cut grass. • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple, with occasional white ash and beech; sub-canopy consists of ironwood, sugar maple, and black cherry; shrub layer dominated by choke cherry and white ash; groundcover consists of blue-stemmed goldenrod, calico aster, zig-zag goldenrod, and bitter nightshade. • Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type (FOD5-6): canopy dominated by sugar maple, basswood, white ash, and beech; sub-canopy consists of sugar maple, ironwood; shrub layer dominated by choke cherry; groundcover comprised of blue-stemmed goldenrod, herb-robert, and garlic mustard. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), mixed forest (FOM), deciduous swamp (SWD) and cultural woodland (CUW).	• Provides habitat for plant and wildlife species, including mammals such as White-tailed deer, and birds such as Mourning Dove, Song Sparrow, Ruby-Throated Hummingbird, Northern Flicker, American Crow, Gray Catbird, Common Yellowthroat, American Goldfinch, Hairy Woodpecker, Red-Bellied Woodpecker, Wood Thrush, Downy Woodpecker and White-breasted Nuthatch.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
R	535, 539	22 (access road)	41.9	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4): dominant species include black walnut, eastern cottonwood, green ash, white ash and black ash. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), deciduous swamp (SWD) and cultural woodland (CUW).	• Provides habitat for plant and wildlife species. Mast-producing black walnut provides fall and winter food for wildlife.
S	545	17 (access road)	10.9	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Beech Deciduous Forest Type (FOD5-2): dominant tree species include sugar maple, beech and white ash. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species.
T	544	20 (access road)	3.9	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple, with some ironwood; sub-canopy largely white ash saplings; shrub layer mainly choke cherry; groundcover consists of yellow dog's-tooth violet, and jack-in-the-pulpit. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including birds such as Ovenbird, House Wren, Wood Thrush and Northern Flicker.
U	542	2 (access road and collection line)	13.8	Deciduous Forest and Deciduous Swamp	Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Mineral Deciduous Swamp Ecosite (SWD4): canopy consists of white elm, willows, trembling aspen, and basswood; sub-canopy dominated by white elm; shrub layer dominated by gray dogwood, common buckthorn, and riverbank grape; groundcover consists of cut-leaved water-horehound, fox sedge and other sedges. • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): canopy dominated by sugar maple and beech, with some black cherry and ironwood; sub-canopy consists of sugar maple, beech and ironwood; shrub layer consists of choke cherry and white ash seedlings; groundcover consists of bittersweet nightshade, tall white aster, enchanter's nightshade, purple trillium, and other species. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including mammals such as White-tailed Deer, and birds such as Palm Warbler, American Redstart, Magnolia Warbler, House Wren, Blue Jay, American Crow, Least Flycatcher, Hairy Woodpecker, Grey Catbird, and Great Crested Flycatcher.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
V	537	>0.1(collection line)	15.1	Deciduous Forest and Deciduous Swamp	Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): canopy consists of sugar maple, beech, and basswood; sub-canopy consists of sugar maple, sour cherry, ironwood, and beech; shrub layer dominated by sugar maple, white ash, sour cherry, and beech; groundcover mainly comprised of sugar maple, white ash, enchanter's nightshade, and wild black currant. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy layer consists of Freeman's maple with some willow and white elm trees; no subcanopy or shrub layer was noted; ponded water observed with isolated tufts of sedges/grasses within the groundcover layer. • Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type (FOD5-6): canopy dominated by basswood, sugar maple, ironwood, and beech; sub-canopy consists of ironwood, basswood, sugar maple, and white ash; shrub layer dominated by blue cohosh, garlic mustard, black cherry, and false solomon's seal; groundcover is mainly comprised of enchanter's nightshade. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including mammals such as Coyote and birds such as Eastern Wood-pewee, Red-eyed Vireo, Cedar Waxwing, Black-capped Chickadee, Hairy Woodpecker and White-breasted Nuthatch.
X	524	79 (turbine)	2.7	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple with a minor component of beech, ironwood, and basswood; shrub layer is mainly white ash; groundcover consists of blue cohosh, trillium, and baneberry. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species.
Y	510	>0.1(collection line)	41.3	Deciduous Forest and Deciduous Swamp	Young to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Green Ash Mineral Deciduous Swamp Type (SWD2-2): canopy dominated by green ash; sub-canopy consists of blue beech, green ash, and black maple; groundcover dominated by spotted jewelweed, sedge species, and calico aster. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy dominated by Freeman's maple and green ash; sub-canopy consists of Freeman's maple, white elm, and green ash; groundcover dominated by tall white aster, fowl meadow grass, poison-ivy, and spotted jewelweed. • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD6-5): canopy includes sugar maple, beech, green ash, white ash, white elm, and basswood; sub-canopy consists of sugar maple, common buckthorn and bitternut hickory; groundcover comprised of poison-ivy, tall white aster, Virginia creeper, wood avens, jack-in-the-pulpit, white trillium, foamflower and blue cohosh.	• Provides habitat for plant and wildlife species, including mammals such as White-tailed Deer, and birds such as American Robin, Gray Catbird, Eastern Pewee, Black-Capped Chickadee, House Wren, Rose-Breasted Grosebeak, Turkey Vulture, American Crow, American Goldfinch, Ovenbird, Song Sparrow, and Great-Crested Flycatcher. Provides interior forest habitat.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
						• Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy dominated by sugar maple, with some beech, black cherry and white ash; sub-canopy consists of sugar maple and ironwood; shrub layer dominated by choke cherry, red-berried elderberry, and sugar maple; groundcover consists of sugar maple and choke cherry seedlings, yellow dog's-tooth violet, blue cohosh, jack-in-the-pulpit and herb-robert. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	
Z	492	87 (turbine)	1.3	Deciduous Forest	Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist sugar Maple-Hardwood Deciduous Forest Type (FOD6-5): canopy includes sugar maple, black cherry, beech, and bitternut hickory; sub-canopy includes sugar maple, juneberry species, and white ash; herbaceous species include wild leek and viola species. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including mammals such as Chipmunk.
AA	483	>0.1(collection line)	6.2	Deciduous Forest and Deciduous Swamp	Mid-age to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Silver Maple Mineral Deciduous Swamp Type (SWD3-2): canopy consists of silver maple, red maple, black ash, and white elm; sub-canopy dominated by common buckthorn, and white elm; groundcover consists of poison ivy, thicket creeper, yellow avens, and bebb's sedge. • Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type (FOD6-5): canopy and sub-canopy species include sugar maple, beech, white ash, and bitternut hickory. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including mammals such as White-tailed Deer, and birds such as Red-winged Blackbird. Hickory nuts provide fall and winter food for wildlife including rodents.
AB	475	65 (collection line)	1.6	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): canopy dominated by sugar maple and beech, with some basswood and white ash; shrub and herbaceous layer consist of zigzag goldenrod, fowl manna grass, calico aster, avens species, running-strawberry bush, drooping wood sedge and poison ivy. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including mammals such as Eastern Chipmunk, and birds including Blue Jay, Black-capped Chickadee, Song Sparrow, Red-tailed Hawk and American Crow.
AC	470	43 (collection line)	1.0	Deciduous Forest	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Lowland Ash Deciduous Forest Type (FOD7-2): canopy includes green ash, Freeman's maple, sugar maple, and white elm; groundcover includes garlic mustard, poison ivy, white avens, and calico aster. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including birds such as Morning Dove, Red-tailed Hawk, Lincoln's Sparrow, Song Sparrow, Blue Jay, Common Yellow Throat, Northern Flicker, House Wren and American Crow.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
AD	456	>0.1(access road)	1.1	Deciduous Forest and Deciduous Swamp	Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh White ash-Beech Deciduous Forest Type (FOD4a): canopy consists of white ash, American beech, black cherry and sugar maple; groundcover includes garlic mustard, immature white ash, woodland strawberry, and downy yellow violet. • Green Ash Mineral Deciduous Swamp Type (SWD2-2): canopy dominated by green ash; groundcover consists of rice cut grass and tall white aster. • Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type (FOD5-7): canopy dominated by sugar maple and black cherry, while American basswood and white ash are also common; groundcover includes immature white ash, false solomon's seal and immature sugar maple. • Deciduous hedgerow: canopy consisting of sugar maple, white ash, basswood, and white elm. All of woodland AD occurs within the 120 m Area of Investigation.	• Provides habitat for plant and wildlife species, including birds such as Turkey Vulture, American Robin and Blue Jay.
AE	452, 460	67 (turbine)	12.6	Mixed Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type (FOM3-1): canopy consists of white ash, sugar maple, basswood, and eastern hemlock; sub-canopy comprised of white ash and sugar maple with spicebush and choke cherry; shrub and herbaceous layers consist of calico aster, fowl manna grass, geum species, drooping wood sedge, running strawberry bush and false solomon's seal. Vegetation communities outside the 120 m Area of Investigation consist of mixed forest (FOM) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including mammals such as White-tailed Deer, and birds such as Morning Dove, Song Sparrow, Black-capped Chickadee, Horned Lark, American Goldfinch, Blue Jay, and Hairy Woodpecker.
AF	437	93 (turbine)	5.2	Deciduous Swamp	Young	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy dominated by Freeman's maple, white elm, and green ash; sub-canopy consists of grey dogwood, green ash, and riverbank grape; groundcover dominated by Canada goldenrod, red raspberry, Indian hemp and reed canary grass. Vegetation communities outside the 120 m Area of Investigation consist of deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including birds such as American Crow, Turkey Vulture, House Wren, Yellow Warbler, Red-eyed Vireo, American robin, Gray Catbird, and Song Sparrow.
AH	439	66 (collection line)	4.7	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): canopy dominated by green ash, trembling aspen and black walnut; sub-canopy consists of hawthorn species and common apple; shrub layer dominated by grey dogwood and choke cherry; groundcover consists of inserted thicket creeper, tall hairy agrimony and calico aster. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including birds such as Mourning Dove, Baltimore Oriole, American Crow, Cedar Waxwing, House Wren, Gray Catbird, Eastern Wood-Pewee and Red-eyed Vireo.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
AJ	488, 514	101 (turbine)	44.5	Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Maple Mineral Deciduous Swamp Ecosite (SWD3): dominant species include Freeman's maple, silver maple, white elm, basswood and ash species. • (FOD5): community dominated by sugar maple, white elm, and basswood. Vegetation communities outside the 120 m Area of Investigation consist of deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including birds such as Yellow Finch, Killdeer and Red-Winged Blackbird. Provides interior forest habitat.
AK	514, 534	>0.1(collection line)	64.2	Deciduous Forest, Coniferous Forest, Deciduous Swamp and Cultural Woodland	Mid-age to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): canopy includes sugar maple, American basswood, beech, white ash, black cherry and white elm; sub-canopy consists of common buckthorn, white elm, sugar maple, hawthorn, white ash and bitternut hickory; shrub layer dominated by common buckthorn, choke cherry, sugar maple, and white ash; groundcover comprised of false solomon's seal, thicket creeper, star-flowered solomon's seal, graceful sedge, trilliums, jack in the pulpit and violets. • Swamp Maple Mineral Deciduous Swamp Ecosite (SWD3-3): canopy includes Freeman's maple, green ash, silver maple and American basswood; sub-canopy includes blue beech, silver maple, common buckthorn and white elm; groundcover consists of tall white aster, sensitive fern, spotted jewelweed, violets, poison-ivy, and bladder sedge. • Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest Type (FOD7-2): dominant species is green ash. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), coniferous forest (FOC), deciduous swamp (SWD), and cultural woodland (CUW).	• Provides habitat for plant and wildlife species, including birds such as Hairy Woodpecker, Black-capped Chickadee, American Robin, American Crow, Red-tailed Hawk, American Goldfinch, Ovenbird, Red-eyed Vireo, American Redstart, Eastern Pewee, and White-breasted Nuthatch. Provides interior forest habitat.
AL	494, 512, 520, 522, 528	>0.1(transmission line)	264.7	Deciduous Forest, Coniferous Forest, Mixed Forest, Deciduous Swamp, Mixed Swamp and Cultural Woodland	Mid-age to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Lowland Deciduous Forest Ecosite (FOD7): dominant species include eastern-white cedar, eastern cottonwood, willows, white elm, trembling aspen, Manitoba maple, basswood and black ash. • White Cedar Mineral Coniferous Swamp Ecosite (SWC1): dominated by eastern white cedar. • Maple Mineral Deciduous Forest Type (FOD5): dominated by sugar maple and trembling aspen. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), coniferous forest (FOC), mixed forest (FOM), deciduous swamp (SWD), mixed swamp (SWM) and cultural woodland (CUW).	• Provides habitat for plant and wildlife species. Provides interior forest habitat. Likely to provide a corridor function for the movement of species across the landscape.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
AM	484	35 (turbine)	50.0	Deciduous Forest and Deciduous Swamp	Young to Mature	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh-Moist Ash Lowland Deciduous Forest Type (FOD7-2): canopy comprised of green ash and white elm; sub-canopy dominated by common buckthorn and white elm; groundcover consists of poison ivy, thicket creeper and white avens. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy dominated by Freeman's maple green ash; sub-canopy consists of white elm and Freeman's' maple; groundcover dominated by gray's sedge and tall white aster. • Green ash Mineral Deciduous Swamp Type (SWD2-2): canopy consists of green ash and Freeman's maple; sub-canopy consists of white elm, Freeman's maple, and common buckthorn; groundcover dominated by tall white aster and gray's sedge. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD), and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species, including bird species such as Blue Jay, American Crow, Black-capped Chickadee and American Robin. Provides interior forest habitat. • •
AO	551, 552	>0.1(transmission line)	27.0	Mixed Forest, Deciduous Forest and Cultural Woodland	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry-Fresh White Pine-Black Walnut Mixed Forest Ecosite (FOM2): co-dominated by white pine and black walnut. • White Pine-Scot's Pine and Black Walnut Cultural Woodland Type (CUW1o): dominated by Scot's pine, white pine and black walnut, with some white as. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species, including bird species such as Baltimore Oriole and Black-capped Chickadee. Provides interior forest habitat.
AP	555, 556	>0.1(transmission line)	45.8	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh Moist Bitternut Hickory Deciduous Forest Type (FOD9-5): dominant species include bitternut hickory, sugar maple, white ash, and basswood. • Dry Fresh Sugar Maple – Hickory Deciduous Forest Type (FOD5-5): co-dominated by sugar maple, bitternut hickory, white ash, and basswood. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species. Provides interior forest habitat.
AQ	561	>0.1(transmission line)	22.1	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Dry Fresh Sugar Maple Deciduous Forest Ecosite (FOD5): dominated by sugar maple, beech, basswood and green ash. • Swamp Maple Mineral Deciduous Swamp Type (SWD3-3): canopy dominated by Freeman's maple, with green ash and white elm associates; sub-canopy consists of immature sugar maple, trembling aspen and basswood trees along the road. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species. Provides interior forest habitat.

Table 3.6 Woodland Features Identified Through the Site Investigation

Woodland ID	Natural Area #	Minimum Distance from Project Location[2]	Attributes			Composition	Functions
			Size (ha)	Forest Community Type	Woodland Age		
AR	562	>0.1(transmission line)	13.0	Deciduous Forest and Deciduous Swamp	Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Fresh Moist Ash Lowland Deciduous Forest Type (FOD7-2): dominated by green ash with some silver maple, black walnut and willow species. • Willow Mineral Deciduous Swamp Type (SWD4-1): consists of an old oxbow dominated by willow trees. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD) and deciduous swamp (SWD).	• Provides habitat for plant and wildlife species. Provides interior forest habitat.
AS	564	58 (transmission line)	1.3	Deciduous Forest	Likely Mid-age	Vegetation community and species composition within the 120 m Area of Investigation as follows: • Deciduous Forest (FOD): this community was identified through air photo interpretation. Vegetation communities outside the 120 m Area of Investigation consist of deciduous forest (FOD).	• Provides habitat for plant and wildlife species.

3.3.5 Valleylands

A total of one valleyland feature was identified within the 120 m Area of Investigation through the site investigation and records review. The boundaries of this valleyland feature are shown on Figure 3.5. A description of the attributes, composition, and function of the valleyland feature, as well as the distance from this feature to the nearest project component, is provided in Table 3.7 below. This feature will be carried forward to the evaluation of significance phase of the Natural Heritage Assessment.

Table 3.7 Valleyland Features Identified Through the Site Investigation

Valleyland ID	Minimum Distance from Project Location[3]	Attributes		Composition	Functions
		Size within Study Area (ha)	Catchment Area		
VAL-01	>0.1 (turbine)	116.7	The total catchment area of the surface water feature through the valleyland is 380.79 ha	Vegetation community and species composition within the 120 m Area of Investigation include: • Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type (FOM3-2): This community is a mid-age mixed forest. The broken canopy layer, which occupies 10-25% cover, is dominated by eastern hemlock, sugar maple, and some Norway spruce, while the sub-canopy contains American beech, green ash, and yellow birch. The sparse shrub layer is made up of alternate-leaved dogwood while the ground cover layer with 10-25% cover consists of yellow dog's-tooth violet. • Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2): The canopy layer of this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple and beech, while the sub-canopy layer consists of green ash. The sparse shrub layer is comprised of choke cherry. The ground cover layer is dominated by yellow dog's-tooth violet, common speedwell, and white lettuce. • Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1): The canopy layer this mid-age deciduous forest, which occupies greater than 60% cover, is dominated by sugar maple with some beech. The sub-canopy contains white ash and ironwood. The shrub layer consists mainly of choke cherry. The ground cover layer occupying between 25-60% cover consists of yellow dog's-tooth violet, zig-zag goldenrod, and Virginia water-leaf. • Dry-Moist Oldfield Meadow Type (CUM1-1): This community is dominated by oldfield species including grasses, goldenrods, asters, and wild carrot. The natural area is disturbed, currently used as a dirt bike trail. Vegetation communities outside the 120 m Area of Investigation include deciduous forest (FOD), mixed forest (FOM), deciduous swamp (SWD), cultural thicket (CUT), cultural woodland (CUW), cultural plantation (CUP), cultural meadow (CUM), meadow marsh (MAM), shallow marsh (MAS).	• Provides habitat and resources for wildlife including mammals such as White-tailed and numerous bird species including Blue Jay, American Crow, Wood Thrush, Red-Eyed Vireo, Brown-Headed Cowbird, Rose-Breasted Grosebeak, Blue-Headed Vireo and Great Crested Flycatcher, Ovenbird, Chickadee, House Wren and Red-winged Blackbird. • Provides important habitats for wildlife including vernal pools, snags and fallen logs. • Provides a corridor function for the movement of species across the broader landscape.

3. Reflects distance between feature and disturbance area associated with project infrastructure.

3.3.6 Wildlife Habitat

The presence or absence of candidate significant wildlife habitat within the 120 m Area of Investigation was confirmed through site investigations. A description of how a determination was made of the presence or absence of each type of candidate significant wildlife habitat identified through the Records Review and/or site investigation is provided in the sections that follow. The locations of candidate significant wildlife habitat carried forward to the evaluation of significance phase of the NHA are shown on Figure 3.6a, 3.6b and 3.6c.

3.3.6.1 Seasonal Concentration Areas

Seasonal concentration areas are described in the Significant Wildlife Habitat Technical Guide (MNR, 2000). The following habitats of seasonal concentrations of animals were identified as potentially occurring in the Project Study Area through the Records Review and site investigation:

- Colonial bird nesting sites;
- Waterfowl stopover and staging areas;
- Waterfowl nesting habitat;
- Shorebird migratory stopover areas;
- Raptor wintering areas;
- Reptile hibernacula;
- Bat hibernacula;
- Bat maternity colonies; and
- Bullfrog concentration areas.

A description of the results of site investigations pertaining to the identification of candidate significant seasonal concentration areas follows.

Colonial-Nesting Bird Breeding Habitat (Bank and Cliff Swallows)

Nesting colonies of Bank Swallows can be found on exposed eroding banks, such as shoreline bluffs, river banks sand piles and abandoned pits, and steep slopes. Cliff Swallows will nest on steep rock faces such as cliffs, but in this area nesting more commonly occurs on man-made structures such as bridges and barns (which do not qualify as significant wildlife habitat). Rock cliff faces do not occur in the 120 m Area of Investigation but bluffs can occur along some creeks or in abandoned pits. Bluffs (BLO) can be an ELC community on its own, or occasionally may occur in an abandoned pit or stream bank in cultural meadow, cultural thicket or cultural savannah communities. No bluff or cliff ecosites were identified during site investigations (refer Figures 3.1 and 3.2a, b and c).

While there were a total of 11 natural areas containing cultural vegetation communities (e.g., community types belonging to CUM1, CUT1 or CUS Ecosites) identified within the 120 m Area of Investigation during the site investigation, none of these contained suitable Bank Swallow or Cliff Swallow nesting habitat (refer to Table 3.8).

Candidate significant wildlife habitats for colonial Banks and Cliff Swallow nesting sites do not occur in the 120 m Area of Investigation. This type of significant wildlife habitat was not carried forward to the evaluation of significance.

Table 3.8 Candidate Significant Wildlife Habitat - Colonial-Nesting Birds (Bank and Cliff Swallows)

Natural Area No.	ELC Unit	Contains Bank, Cliff, Slope, etc. Habitat	Within 120 m of Turbine	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
437	CUT1	No	Yes	No	No	No banks present
442	CUM1-1	No	No	No	No	No banks present
460	CUT1f	No	Yes	No	No	No banks present
470	CUM1-1	No	Yes	No	No	No banks present
480	CUM1-1	No	No	No	No	No banks present
	CUM1-1	No	Yes	No	No	No banks present
	CUM1-1	No	No	No	No	No banks present
	CUM1-1	No	No	No	No	No banks present
	CUS1	No	Yes	No	No	No banks present
	CUS1	No	Yes	No	No	No banks present
	CUT1a	No	No	No	No	No banks present
	CUT1e	No	Yes	No	No	No banks present
488	CUM1-1	No	Yes	No	No	No banks present
	CUT1b	No	Yes	No	No	No banks present
493	CUM1	No	No	No	No	No banks present
514	CUM1-1	No	No	No	No	No banks present
525	CUM1-1	No	Yes	No	No	No banks present
541	CUM1-1	No	No	No	No	No banks present
556	CUM1-1	No	No	No	No	No banks present
	CUM1-1	No	No	No	No	No banks present

Colonial-Nesting Bird Breeding Habitat (Tree/ Shrub)

Nesting colonies of herons generally occur within trees in treed wetlands such as mixed or deciduous swamps or treed fen habitats (refer to Table 3.2 for corresponding ELC units). Colonies are specific sites where herons congregate to build nests and raise young but need to fly out and forage widely from the colony in all directions over many square kilometres. Consequently there are likely very few colonies in an area the size of the Project Study Area. No treed fens or mixed swamps were identified during site investigations, whereas a total of 15 natural areas containing deciduous swamp communities were identified within the 120 m Area of Investigation (refer to Table 3.9).

Table 3.9 Candidate Significant Wildlife Habitat - Colonial-Nesting Birds (Tree/ Shrub)

Natural Area No.	ELC Unit	Area of Woodland + Wetland Complex (ha)	Contains Suitable Habitat	Nests Observed During ELC Survey	Within 120 m of Turbine	Within 120 m of Road	Carried forward to EOS		Rationale
							Candidate SWH	Generalized Candidate SWH	
426	SWD3	0.4	No - too small, isolated	No	No	Yes	No	No	No nests observed
437	SWD3-3	5.2	Potential habitat	No	Yes	No	No	No	No nests observed
456	SWD2-2	1.1	No - too small, isolated	No	No	Yes	No	No	No nests observed
480	SWD2	31.5	Potential habitat	No	Yes	No	No	No	No nests observed
483	SWD3-2	6.2	Potential habitat	No	Yes	No	No	No	No nests observed
484	SWD3-3	49.9	Potential habitat	No	Yes	No	No	No	No nests observed
	SWD2-2			No					
488	SWD3	10.7	Potential habitat	No	No	No	No	No	No nests observed
510	SWD3-3	41.3	Potential habitat	No	No	No	No	No	No nests observed
	SWD2-2		Potential habitat	No	Yes	No	No	No	No nests observed
514	SWD3	31.3	Potential habitat	No	No	No	No	No	No nests observed
	SWD3		Potential habitat	No	No	No	No	No	No nests observed

Table 3.9 Candidate Significant Wildlife Habitat - Colonial-Nesting Birds (Tree/ Shrub)

Natural Area No.	ELC Unit	Area of Woodland + Wetland Complex (ha)	Contains Suitable Habitat	Nests Observed During ELC Survey	Within 120 m of Turbine	Within 120 m of Road	Carried forward to EOS		Rationale
							Candidate SWH	Generalized Candidate SWH	
534	SWD3-3	51.3	Potential habitat	No	Yes	No	No	No	No nests observed
	SWD3-3		Potential habitat	No	No	No	No	No	No nests observed
	SWD3-3		Potential habitat	No	No	No	No	No	No nests observed
	SWD3-3		Potential habitat	No	No	Yes	No	No	No nests observed
	SWD3		Potential habitat	No	No	Yes	No	No	No nests observed
	SWD3		Potential habitat	No	No	Yes	No	No	No nests observed
537	SWD3-3	14.6	Potential habitat	No	No	No	No	No	No nests observed
541	SWD2-2	33.7	Potential habitat	No	No	No	No	No	No nests observed
542	SWD4	15.5	Potential habitat	No	Yes	Yes	No	No	No nests observed
561	SWD3-3	22.1	Potential habitat	No	No	No	No	No	No nests observed
562	SWD4-1	13.0	Potential Habitat	No	No	No	No	No	No nests observed

According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for Great Blue Heron and Green Heron in the general vicinity of the Project Study Area. In southern Ontario, Great Blue Heron typically nests in dead trees in large deciduous swamps, large marshes or lakes. Green Heron usually nests over water or very close to it, often in shrubs adjacent to or in wetlands, as well as in flooded timber.

There is no evidence of Black-crowned Night Heron or Great Egret breeding in this area (Cadman *et al.* 2007). Heron nests, particularly of Great Blue Heron, are large and conspicuous, even outside of the breeding season. The birds often remain in the vicinity of colonies well after the breeding season. All vegetation units within the 120 m Area of Investigation were visited and nests searched for during ELC and vegetation surveys.

Most colonies (at least those large enough to qualify as significant wildlife habitat are known to MNR and none were identified in the Records Review, nor in the Ontario Breeding Bird Atlas (Cadman *et al*. 2007). The landscape in the Project Study Area generally lacks wetlands containing appreciable areas of open water and consequently does not support a large population of herons or other water birds. Nests were searched for during ELC surveys and none were observed at any locations.

Table 3.9 identifies swamp units within the Area of Investigation that have some potential for heronries. Site investigation field surveys conclude that no colonies are present within the 120 m Area of Investigation and consequently this type of significant wildlife habitat was not carried forward to the evaluation of significance.

Colonial Bird Nesting Sites: Ground

Colonies of ground-nesting birds may occur on any rocky island or peninsula (natural or artificial) within a lake or large river. No such habitats were identified in or within the 120 m Area of Investigation through the Records Review or site investigation. This type of significant wildlife habitat was not carried forward to the evaluation of significance.

Waterfowl Stopover and Staging Areas: Terrestrial

Waterfowl stopover and staging areas may occur in cultural meadow or cultural thicket communities where there is evidence of annual spring flooding from melt water or runoff. These melt water ponds can function as important feeding areas used by waterfowl during spring and fall migration.

A total of 11 natural areas containing cultural meadow or cultural thicket vegetation communities were identified within the 120 m Area of Investigation during the site investigation (refer to Table 3.10). None of these have

meadow marsh inclusions. Many are located within the limits of ABCA Regulated Area and therefore may be subject to some seasonal flooding. Overall the field areas are not extensive and did not show evidence of seasonal flooding that would be extensive enough to provide habitat for a large number of staging waterfowl. Only relatively large areas located in a floodplain and presenting evidence of extensive annual spring flooding are considered to have some potential to provide significant waterfowl staging habitat, as such areas have potential to attract large numbers of the target waterfowl species. The only waterfowl likely to congregate in fields within the 120 m Area of Investigation are Mallard and Canada Goose, neither which are target species. Consequently, none of the areas were carried forward to evaluation of significance under this criterion.

Table 3.10 Waterfowl Stopover and Staging Areas (Terrestrial)

Natural Area No.	ELC Unit	Area of Cultural Community Complex (ha)	Evidence of Annual Spring Flooding	Within 120 m of Turbine	Carried Forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
437	CUT1	0.2	Possible, within ABCA Regulated Area.	Yes	No	No	Insufficient size to support required numbers of waterfowl
442	CUM1-1	0.6	Possible, within ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl
460	CUT1f	0.6	Possible, riparian community to an agricultural drain within ABCA Regulated Area.	Yes	No	No	Insufficient size to support required numbers of waterfowl
470	CUM1-1	0.4	Possible, an agricultural drain bisects the natural area, within ABCA Regulated Area.	Yes	No	No	Insufficient size to support required numbers of waterfowl
480	CUT1a	1.1	Possible, riparian community, within ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl
	CUM1-1			No	No	No	Insufficient size to support required numbers of waterfowl
	CUM1-1	9.5	Possible, watercourse flows through natural area, within ABCA Regulated Area. No evidence of flooding.	Yes	No	No	No evidence of annual spring flooding
	CUM1-1			No	No	No	
	CUT1e	0.1	Possible, within ABCA Regulated Area.	Yes	No	No	Insufficient size to support required numbers of waterfowl
	CUM1-1	0.3	Possible, riparian community, within ABCA Regulated Area; however disturbed, not SWH.	No	No	No	Insufficient size to support required numbers of waterfowl
488	CUT1b	3.7	Possible, low-lying, within CA Regulated Area.	Yes	No	No	Insufficient size to support required numbers of waterfowl
	CUM1-1			Yes	No	No	
493	CUM1	0.1	Not likely.	No	No	No	Insufficient size to support required numbers of waterfowl
514	CUM1-1	2.3	Possible, community is riparian, in a low-lying area, within ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl
518	CUM1-1	4.7	Possible, braided channels present; however disturbed, not SWH. No evidence of flooding.	Yes	No	No	No evidence of annual spring flooding
541	CUM1-1	0.1	Possible, riparian community, within ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl
556	CUM1-1	0.3	Not likely, far from watercourses, not in low-lying area, outside ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl
	CUM1-1	0.2	Not likely, far from watercourses, not in low-lying area, outside ABCA Regulated Area.	No	No	No	Insufficient size to support required numbers of waterfowl

Waterfowl Stopover and Staging Areas: Aquatic

Waterfowl also use wetland habitat as staging areas. Larger wetlands and those associated with shorelines are usually preferred by waterfowl and tend to attract the largest concentrations. Marsh habitats where open water and emergent plant cover are interspersed tend to be higher quality sites because they provide an optimum mix of food and cover.

Aquatic waterfowl stopover and staging areas may be found within marsh, shallow water and deciduous swamp vegetation communities (refer to Table 3.2 to identify corresponding ELC units) with fairly extensive areas of shallow open water. Generally, the study area does not contain marshes with a sufficient extent of open water. A total of eight natural areas contained vegetation communities containing standing water and were determined to be located within the 120 m Area of Investigation during the site investigation (Table 3.11). Only one natural area (495) contains a sufficiently large pond surrounded by marsh that has any potential to provide this function. However, the marsh portion of the natural area is located just outside the 120 m Area of Investigation. In addition, the pond is immediately adjacent to an active farming operation and therefore is probably not secluded enough to provide significant waterfowl staging on a regular basis. It is possible that Mallard or Canada Goose may form aggregations of 100 or more on occasion but it is unlikely that any of the target species would. Consequently this type of significant wildlife habitat was not carried forward to the evaluation of significance.

Table 3.11 Waterfowl Stopover and Staging Areas (Aquatic)

Natural Area No.	ELC Unit	Area of Wetland + Open Water Complex (ha)	Standing Water Present	Within 120 m of Turbine	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
494	MAM2	0.2	Possibly – open pools of stream	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
495	MAS	3.5	Yes –dammed pond surrounded by marsh	No	No	No	active farm operation beside pond, therefore constant human presence nearby
512	OAO	0.1	Yes – possibly seasonal (water present in late June)	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
534	SWD3-3	0.7	Yes – open water present	Yes	No	No	Insufficient size and diversity to support required numbers of waterfowl
	SWD3	0.3	Yes – open water present	No	No	No	
537	SWD3-3	0.5	Yes – large vernal pool present	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
542	SWD4	1.1	Yes – wet pockets	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
564	MAM2	0.8	Yes – permanent (pool of watercourse)	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
565	MAM2	1.1	Yes – permanent (pool of watercourse)	No	No	No	Insufficient size and diversity to support required numbers of waterfowl
	MAM2	0.5	Yes – permanent (pool of watercourse)	No	No	No	

Waterfowl Nesting Areas

The species of waterfowl to which this habitat type pertains to commonly nest in upland habitat, frequently grasslands, located near (*i.e.,* within 150 m of) marshes and other wetland or open water habitats. Waterfowl species in this group typically nest in upland vegetation communities composed of grasses, sedges, rushes, and low shrubs. Wood Ducks, however, nest in cavities in large hollow trees within forests or swamps. Candidate significant wildlife habitats for waterfowl nesting should also be at least 120 m wide, so that predators have difficulty locating nests, as nest predation rates are generally high in upland habitats located around wetlands.

The 120 m Area of Investigation does not contain large open water wetlands that are likely to support a large number of breeding waterfowl. Mallards are widespread and it is reasonable to expect that they may occasionally nest in some of the cultural meadow or thicket areas within or immediately adjacent to the 120 m Area of Investigation. However, it is highly unlikely that there would be 10 nests in any of these areas because there are no extensive wetlands with a sufficient area of open water likely to contain that many broods. Consequently the areas would not qualify as significant wildlife habitat under this criterion.

Similarly the deciduous swamps within or immediately adjacent to the 120 m Area of Investigation may contain occasional Wood Ducks. However, there is not extensive open water in the swamps for a long duration in spring and as a result these swamps will not support a high density of Wood Ducks. In most cases, woodlots are likely to contain a single (if any) pair or nest of Wood Ducks. Only large swamps with extensive standing water are likely to contain as many as three Wood Duck nests, which would qualify the natural area as significant wildlife habitat under this criterion.

Only woodlots or swamps with large trees are likely to contain Wood Duck nests. Since the female will have to lead the young to water soon after hatching, mature forests close to open water wetlands are more likely to contain nests than forests further away. It is very unlikely that the 120 m Area of Investigation or immediately adjacent habitat contain the number of nesting waterfowl to meet this criteria for significant wildlife habitat at most locations. One of the sites (located in Natural Area 537) was carried forward to the evaluation of significance as generalized candidate significant wildlife habitat. It contained two ponds.

Table 3.12 Waterfowl Nesting Areas

Natural Area No.	ELC Unit	Width >120 m	Size of Adjacent Wetland (ha)	Type of Adjacent Wetland	Age of Trees	Within 120 m of Turbine	Carried forward to EOS		Rationale
							Candidate SWH	Generalized Candidate SWH	
456	FOD4a	Yes	0.1	SWD2-2	Mature	No	No	No	Small area
	FOD5-7				Mature	No	No	No	
462	FOD7-2	Yes	2.2	SWD	Mid-age	No	No	No	No standing water in wetland
480	CUT1e	Yes	2.0	SWD2	Young	Yes	No	No	Insufficient water in wetland to support target # of broods
	FOD5-7	Yes			Mid-age	Yes	No	No	
480	FOD6-5	Yes	0.1	SWT2-2	Mid-age	Yes	No	No	
483	FOD6-5	Yes	1.7	SWD3-2	Mature	No	No	No	Insufficient water in wetland to support target # of broods
484	FOD7-2	Yes	29.4	SWD2-2, SWD3-3	Young to mid-age	Yes	No	No	Insufficient water in wetland to support target # of broods
494	FOD7	Yes	0.2	MAM2	Mid-age	No	No	No	Insufficient water in wetland to support target # of broods
504	FOD5-1	Yes	11.2	SWD, SWT2 with pond	Mid-age	Yes	No	No	Pond present but insufficient size to support target # of broods
506, 508	FOD5-2	Yes	2.5	MAM2-10, MAS2-9	Mid-age	Yes	No	No	Insufficient water in wetland to support target # of broods

Table 3.12 Waterfowl Nesting Areas

Natural Area No.	ELC Unit	Width >120 m	Size of Adjacent Wetland (ha)	Type of Adjacent Wetland	Age of Trees	Within 120 m of Turbine	Carried forward to EOS		Rationale
							Candidate SWH	Generalized Candidate SWH	
510	FOD5-1	Yes	2.2	SWD2-2	Mid-age to mature	Yes	No	No	Insufficient water in wetland to support target # of broods
	FOD6-5	Yes	8.0	SWD3-3	Mature	No	No	No	Insufficient water in wetland to support target # of broods
512	FOD7	Yes	49.2	SWM1-1	Mid-age	No	No	No	Insufficient water in wetland to support target # of broods
532	FOD5-1	Yes	3.6	MAM2-10, SWT2-5	Mid-age	Yes	No	No	Insufficient water in wetland to support target # of broods
534	FOD5-1	Yes	1.7	SWD3-3	Mid-age	Yes	No	No	Insufficient water in wetland to support target # of broods
	FOD7-2	Yes	0.4	SWD3	Mid-age	No	No	No	
537	FOD5-2	Yes	0.5	SWD3-3, also woodland ponds with Wood Duck nest boxes	Mature	No	No	Yes	Suitable habitat present
541	CUM1-1	Yes	6.9	SWT2-2	n/a	No	No	No	Insufficient water in wetland to support target # of broods
	CUW1h	Yes		MAM	n/a	No	No	No	
	CUP2-1	Yes		SWT2-2	Mid-age	No	No	No	
	FOD7-1	Yes		MAM2-10	Mid-age	Yes	No	No	
	FOD4-2	Yes		SWT2-2	Mid-age	No	No	No	
	FOD5-1	Yes		SWD2-2	Mature	No	No	No	
	FOD5-4	Yes		SWD2-2	Mid-age	No	No	No	
	FOD5-6	Yes		SWT2-2	Mature	No	No	No	
	FOD7-1	Yes		MAM2-10	Mid-age	Yes	No	No	
	FOD7b	Yes		SWD2-2	Mature	Yes	No	No	
542	FOD5-2	Yes	1.2	SWD4, MAM2-5	Mature	Yes	No	No	Insufficient water in wetland to support target # of broods
561	FOD5	Yes	1.4	SWD3-3	Mid-age	No	No	No	Insufficient water in wetland to support target # of broods
562	FOD7-2	Yes	0.4	SWD4-1	Mid-age	No	No	No	Insufficient water in wetland to support target # of broods

Shorebird Migratory Stopover Areas

Shorebird stopover areas are used by migratory shorebirds to rest and feed along their migration route between their southern wintering area and northern breeding habitat. Natural areas that function as migration stopover areas for shorebirds typically provide a stretch of undisturbed shoreline and relatively abundant invertebrate food. These habitats can be found along the shorelines of lakes, rivers and wetlands, including beach areas, bars, seasonally flooded shoreline, mudflats, rock groins, and other forms of armour rock lakeshore.

Two Black-bellied Plover (spring survey), two Spotted Sandpiper (summer survey), two Upland Sandpiper (spring and summer surveys), and 152 Killdeer (61 in spring survey, 45 in summer survey, 46 in fall survey) were recorded during avian surveys conducted in the Project Study Area (Golder Associates, 2011). Consequently, the number of migrant shorebirds recorded is small, apart from the Killdeer which is mostly a resident breeder as opposed to a migrant.

A total of 13 natural areas containing marsh vegetation communities were identified within the 120 m Area of Investigation during the site investigation (Table 3.13). The meadow marsh communities in the Project Study Area contain minimal open water and therefore do not have the potential to form more than just small areas of mudflats.

None of the communities meet the habitat requirements for shorebird migratory stopover areas (e.g., presence of mudflats or shorelines adjacent to large open water area). Small numbers of migrant shorebirds may occasionally occur but would be far below the thresholds to qualify for significant wildlife habitat. This type of significant wildlife habitat was not carried forward to the evaluation of significance.

Table 3.13 Shorebird Migratory Stopover Areas

Natural Area No.	ELC Unit	Shoreline Habitat Present	Within 120 m of Turbine	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
480	MAM2-10	No	No	No	No	No suitable habitat
493	MAM2-2	No	No	No	No	No suitable habitat
494	MAM2	No	No	No	No	No suitable habitat
496	MAM2-2	No	No	No	No	No suitable habitat
	MAM2-2	No	No	No	No	No suitable habitat
501	CUP1-3/MAM	No	No	No	No	No suitable habitat
506	MAM2-10	No	Yes	No	No	No suitable habitat
	MAS2-9	No	Yes	No	No	No suitable habitat
512	MAM2	No	No	No	No	No suitable habitat
514	MAM2-2	No	Yes	No	No	No suitable habitat
532	MAM2-10	No	No	No	No	No suitable habitat
541	MAM2-10	No	No	No	No	No suitable habitat
542	MAM2-5	No	Yes	No	No	No suitable habitat
564	MAM2	No	No	No	No	No suitable habitat
565	MAM2	No	No	No	No	No suitable habitat
	MAM2	No	No	No	No	No suitable habitat

Raptor Winter Feeding and Roosting Areas

Fields and open meadows can function as important feeding habitats for a variety of raptors, since prey (e.g., small mammals and ground nesting birds) are exposed and abundant in these open areas. Open areas also provide good visibility and unimpeded flight, contributing to hunting success. Because the persistence of local raptor populations is highly influenced by the availability of food, fields and meadows are key habitat natural areas for many raptor species.

In southern Ontario, oldfields, pastures and open meadows provide critical winter roosting areas for Northern Harriers and Short-eared Owls, which roost on the ground in winter. Good roosting habitat consists of large fields (usually >20 ha) since these are generally not disturbed, have adequate cover, as well as abundant and nearby prey resources, typically consisting of Meadow Voles.

For fields and meadows to function as significant wildlife habitat for feeding and roosting raptors, they must provide suitable habitat for prey species. Prey population density and productivity will be maximized in fields with a diversity of herbaceous plant species offering a mix of green leafy plant matter, seeds, nuts and fruits throughout the year. Sufficient cover is also needed to ensure that predators do not exert too much pressure on prey populations, causing them to decline to low levels that no longer provide sufficient food for raptors. Areas with grasses or forbs 5 to 30 cm in height are ideal, as this provides adequate cover for small mammals, yet the cover is not so dense that raptors cannot detect prey.

During winter avian use surveys conducted in the Project Study Area, a total of eight Rough-legged Hawk, eight Red-tailed Hawk and one American Kestrel were observed (Golder Associates, 2011).

A total of nine natural areas with a combination of both forest and upland Ecosites were identified within the 120 m Area of Investigation during the site investigation, of which seven were considered large enough to be candidate significant wildlife habitat for raptor winter feeding and roosting (Table 3.14). However, only Natural Area 480

contained at least 15 ha of oldfield habitats throughout the entire natural area. None of the individual oldfield patches are larger than 15 ha in Natural Area 480, however the oldfield located north of Turbine 15 in Natural Area 480 is 14.5 ha in size. This location potentially qualifies as significant wildlife habitat under this criterion and therefore it was carried forward to the evaluation of significance. The location of this feature (RWA-01) is shown on Figure 3.6.

Table 3.14 Raptor Winter Feeding and Roosting Areas

Natural Area No.	ELC Unit	Contains Forest & Upland Habitats	Size >20 ha	Open Upland > 15 ha	Within 120 m of Turbine	Within 120 m of T-line	Carried forward to EOS		Rationale
							Candidate SWH	Generalized Candidate SWH	
463	FOD5-8	Yes	No		No	No	No	No	Insufficient total area
	FOD5-1	Yes	No		No	No	No	No	Insufficient total area
480	CUM1-1	Yes	Yes	No (14.5 ha)	Yes	No	Yes (Feature No. RWA-01)	No	Oldfield north of Turbine 15 potentially qualifies as candidate SWH based on habitat composition and area
	CUM1-1	Yes			No	No			
	CUM1-1	Yes			No	No			
	CUM1-1	Yes			No	No			
	CUS1	Yes			No	No			
	CUS1	Yes			No	No			
	CUT1a	Yes			Yes	No			
	CUT1e	Yes			No	No			
	CUW1a	Yes			Yes	No			
	CUW1	Yes			Yes	No			
	FOD5-7	Yes			Yes	No			
	FOD6-5	Yes			Yes	No			
494	FOD7	Yes	Yes	No	Yes	Yes	No	No	Insufficient area of upland habitat
	FOD7	Yes			No	Yes	No	No	
504	FOD5-1	Yes	Yes	No	Yes	No	No	No	Insufficient area of upland habitat
510	FOD5-1	Yes	No		Yes	No	No	No	Insufficient total area
	FOD6-5	Yes	No		Yes	No	No	No	
	FOD6-5	Yes	No		Yes	No	No	No	
518	FOD5-2	Yes	Yes	No	No	No	No	No	Insufficient area of upland habitat
	FOM3-2	Yes			No	No	No	No	
	CUM1-1	Yes			Yes	No	No	No	
	FOD5-1	Yes			Yes	No	No	No	
520	FOD5	Yes	Yes	No	No	Yes	No	No	Insufficient area of upland habitat
541	CUM1-1	Yes	Yes	No	Yes	No	No	No	Insufficient area of upland habitat
	CUW1h	Yes			Yes	No	No	No	
	FOD7-1	Yes			Yes	No	No	No	
	FOD4-2	Yes			No	No	No	No	
	FOD5-1	Yes			Yes	No	No	No	
	FOD5-4	Yes			No	No	No	No	
	FOD5-6	Yes			No	No	No	No	
	FOD7-1	Yes			No	No	No	No	
	FOD7b	Yes			No	No	No	No	
556	CUM1-1	Yes	Yes	No	No	Yes	No	No	Insufficient area of upland habitat
	CUM1-1	Yes			No	Yes	No	No	
	FOD5-5	Yes			No	Yes	No	No	
	FOD5-5	Yes			No	Yes	No	No	

Reptile Hibernacula

During autumn, many snake species search out wooded areas to be used for hibernation over the winter months. Ideal hibernating sites include wooded areas rich in dead organic materials, areas below the frost line and rock crevices. Decaying organic matter produces small amounts of heat of which the snakes take advantage. In addition snakes generally occur in ecotones and open habitats at greater densities than closed forests. Consequently forests

adjacent to extensive fields or thickets are more likely to contain hibernacula than forests not connected to open habitats. The only snakes encountered during field investigations were Eastern Garter Snakes. This species was observed in Natural areas 437, 439 and 510. No apparent hibernacula were observed within the 120 m Area of Investigation in these natural areas. The Project Study Area generally is a fragmented intensively agricultural area on mostly clay-based soils that is not known to harbour large or diverse snake populations.

Rock crevices, rock piles and abandoned foundations which allow snakes to enter ground below the frost line provide protection from the harsh winter temperatures and support overwinter survival. Some snake species hibernate in large groups, such as the Eastern Garter Snake, while other species tend to hibernate in isolation. Once spring has arrived, snakes will typically bask in the sun's warmth on sunny days and then return to their hibernating sites at night. Locating snake hibernacula is nearly impossible unless long term and invasive radio telemetry studies are employed, which is not realistic for this kind of study. Rock outcrops and therefore crevices are not present in the Project Study Area. Only one old foundation was encountered within the 120 m Area of Investigation in a disturbed area along the edge of a lawn and is therefore unlikely to be a hibernaculum.

Possible reptile hibernacula were noted within the 120 m Area of Investigation in a total of 5 natural areas, during site investigations (refer to Table 3.15). These consisted of identified stone piles, however these were mostly surficial and it is doubtful that many (if any) of these would allow the snakes to access below the frost line. Most of the stone piles were at the edge of a woodlot and cultivated fields. Three candidate significant reptile hibernacula were identified through the site investigation, including two features within 120 m of qualifying infrastructure (RH-01 and RH-02) and one feature treated as generalized candidate significant wildlife habitat. These features were carried forward to the evaluation of significance. The location of features RH-01 and RH-02 are shown on Figure 3.6a.

Table 3.15 Potential Reptile Hibernacula

Natural Area No.	ELC Unit	Possible Hibernacula Observed	Within 120 m of Turbine	Within 120 m of Road	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
426	SWD3	Yes	No	Yes	No	No	Small isolated woodlot, too small
480	CUW1	Yes	Yes	No	Yes (Feature No. RH-01)	No	Large rock pile is potential hibernaculum
488	CUM1-1	Yes	Yes	Yes	Yes (Feature No. RH-02)	No	Large debris pile is potential hibernaculum
524	FOD5-1	Yes	Yes	Yes	No	No	Small woodlot with no open habitat
541	CUW1h	Yes	No	No	No	Yes	Contains potential hibernaculum

Bat Hibernacula and Maternity Colonies

Bat winter hibernacula may be found in caves, mine shafts, underground formations and Karsts. No candidate bat winter hibernacula were identified in the 120 m Area of Investigation by AECOM or NRSI. This type of candidate significant wildlife habitat was not carried forward to the evaluation of significance.

Details regarding the identification of bat maternity colonies are provided in Appendix E. In summary, 13 candidate significant bat maternity roost habitats were identified in woodlands found within 120 m of proposed wind turbines (refer to Table 3.16). These locations potentially qualify as significant wildlife habitat for bat maternity colonies and were therefore carried forward to the evaluation of significance. Eighteen woodlands located within 120 m of the Project Location but more than 120 m from proposed turbines also contain suitable habitat for bat maternity colonies (NRSI, 2011). These were treated as generalized candidate significant wildlife habitat and carried forward to the evaluation of significance (Table 3.16). The locations of these features are shown on Figure 3.6b.

Table 3.16 Bat Maternity Colonies

Natural Area No.	Suitable Roost Trees Present	Within 120 m of Turbine?	Carried forward to EOS		Rationale
			Candidate SWH	Generalized Candidate SWH	
426	Yes	No	No	Yes	Potential habitat
427	Yes	Yes	Yes (Feature No. BMC-02)	No	Potential habitat
437	Yes	Yes	Yes (Feature No. BMC-13)	No	Potential habitat
439	Yes	No	No	Yes	Potential habitat
456	Yes	No	No	Yes	Potential habitat
463	Yes	Yes	Yes (Feature No. BMC-07)	No	Potential habitat
470	Yes	Yes	Yes (Feature No. BMC-12)	No	Potential habitat
475	Yes	No	No	Yes	Potential habitat
483	Yes	Yes	Yes (Feature No. BMC-11)	No	Potential habitat
487	Yes	No	No	Yes	Potential habitat
488	Yes	No	No	Yes	Potential habitat
492	Yes	Yes	Yes (Feature No. BMC-10)	No	Potential habitat
494	Yes	No	No	Yes	Potential habitat
504	Yes	Yes	Yes (Feature No. BMC-01)	No	Potential habitat
512	Yes	No	No	Yes	Potential habitat
514	Yes	No	No	Yes	Potential habitat
520	Yes	No	No	Yes	Potential habitat
524	Yes	Yes	Yes (Feature No. BMC-09)	No	Potential habitat
532	Yes	Yes	Yes (Feature No. BMC-05)	No	Potential habitat
534	Yes	Yes	Yes (Feature No. BMC-14)	No	Potential habitat
537	Yes	No	No	Yes	Potential habitat
539	Yes	No	No	Yes	Potential habitat
541	Yes	Yes	Yes (Feature No. BMC-04)	No	Potential habitat
542	Yes	Yes	Yes (Feature No. BMC-08)	No	Potential habitat
544	Yes	Yes	Yes (Feature No. BMC-03)	No	Potential habitat
545	Yes	No	No	Yes	Potential habitat
551	Yes	No	No	Yes	Potential habitat
552	Yes	No	No	Yes	Potential habitat
555	Yes	No	No	Yes	Potential habitat
556	Yes	No	No	Yes	Potential habitat
561	Yes	No	No	Yes	Potential habitat

Amphibian Woodland Breeding Habitat

Woodland breeding amphibians congregate in temporary wooded ponds (vernal or ephemeral ponds) in spring where they mate and eggs are laid in water. The larvae then hatch and live in the water for several months until they emerge as adults. To be suitable, woodland pools must hold water until at least July so that the larvae have sufficient time to develop and transform. Pools therefore must be sufficiently deep, preferably about 50 cm in the early spring. In the Project Study Area swamps show a considerable drop in the water table from spring through summer. Many swamps are seasonally flooded for only a brief period in spring or contain pools that are too shallow and ephemeral to support breeding amphibians. In addition pools should have shrubs or some emergent vegetation to be productive. Generally pools should be free of fish since fish will devour larvae. During site visits the conditions of encountered pools were recorded. Even in late summer or autumn when pools have dried up, it is possible to determine how deep pools are using waterline marks on trees and other indicators. This evidence provides a good indication of their hydroperiod. In addition the presence of emergents and shrubs will determine if the pool is likely to provide suitable amphibian habitat.

The adults of most woodland breeding amphibians live in terrestrial habitat away from the ponds for most of the active season, only to return in the spring to breed. Some may winter in the pools but many hibernate terrestrially and migrate to pools with spring thaws. Some pools were identified through breeding amphibian surveys and others during ELC investigations.

Table 3.17 indicates all locations where vernal pools were observed during ELC surveys. These are woodland or swamp vegetation communities wherein vernal pools or ponds were noted during site investigations. Some of the natural areas contained ephemeral pools within two or more different vegetation communities. These were identified on the basis of presence of ephemeral pools in forest or swamp that appeared to hold water for at least two months. In total, eleven features were identified as candidate significant wildlife habitat requiring evaluation of significance studies (AWO-01, AWO-02, AWO-03, AWO-04, AWO-05, AWO-06, AWO-07, AWO-08, AWO-09, AWO-10 and AWO-11), and seven natural areas were identified as containing generalized candidate significant wildlife habitat. The locations of these features are shown on Figure 3.6. These amphibian woodland breeding habitats were carried forward to the evaluation of significance.

Table 3.17 Amphibian Breeding Habitat (Woodland)

Natural Area No.	ELC Unit	Vernal Pools or Ponds Observed	Within 120 m of Road	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
426	SWD3	Yes but small isolated natural area	Yes	No	No	Unlikely to hold water until July
450	FOD5-1	Yes - skidder tracks in vernal pools	No	No	Yes	Suitable habitat present
463	FOD5-1	Yes	Yes	Yes (Feature No. AWO-01)	No	Suitable habitat present
	FOD5-8	Yes	No	No	Yes	Suitable habitat present
480	FOD6-5	Yes	Yes	Yes (Feature No. AWO-02)	No	Suitable habitat present
481	FOD5-1	Yes	Yes	Yes (Feature No. AWO-03)	No	Suitable habitat present
483	FOD6-5	Yes	No	No	Yes	Suitable habitat present
484	FOD7-2	Yes – pools present but too shallow	Yes	No	No	Unlikely to hold water until July
	SWD2-2	Yes	Yes	Yes (Feature No. AWO-04)	No	Suitable habitat present
	SWD3-3	Yes - seasonally flooded	Yes	Yes (Feature No. AWO-05)	No	Suitable habitat present
487	FOD5-2	Yes, also 7 Wood Frogs observed in mid-August	Yes	Yes (Feature No. AWO-06)	No	Suitable habitat present
498	FOD5-2	Yes	Yes	Yes (Feature No. AWO-07)	No	Suitable habitat present
504	FOD5-1	Yes	Yes	Yes (Feature No. AWO-08)	No	Suitable habitat present
510	FOD6-5	Yes, abundant vernal pools noted	Yes	Yes (Feature No. AWO-09)	No	Suitable habitat present
	FOD5-1	Yes – pools present but too shallow	Yes	No	No	Unlikely to hold water until July
	FOD6-5	Yes, possible vernal pools noted	No	No	Yes	Suitable habitat present
	SWD3-3	Yes, possible vernal pools noted	No	No	Yes	Suitable habitat present
524	FOD5-1	Yes, abundant vernal pools observed but may be too shallow	Yes	No	No	Unlikely to hold water until at least July
525	FOD5-1	Yes reported but 120 m AOI barely touches natural area	Yes	No	No	Vernal pool is >120 m from project location
534	FOD5-1	Yes	Yes	Yes (Feature No. AWO-10)	No	Suitable habitat present
	SWD3-3	Yes – several pools present but dry in September	Yes	No	No	Unlikely to hold water until at least July
	SWD3-3		Yes	No	No	Unlikely to hold water until at least July
	FOD7-2	Yes – large vernal pool	Yes	Yes (Feature No. AWO-11)	No	Suitable habitat present
	SWD3-3	Yes, 30 m long pool, still with water in early July	No	No	Yes	Suitable habitat present
537	FOD5-2	Yes – large vernal pool	No	No	Yes	Suitable habitat present
	SWD3-3	Yes – large vernal pool	No	No	Yes	Suitable habitat present
	FOD5-6	Yes	No	No	Yes	Suitable habitat present
541	FOD7b	Yes	No	No	Yes	Suitable habitat present

Amphibian Wetland Breeding Habitat

Wetland breeding amphibians congregate in temporary or permanent standing water in spring where they mate and lay eggs. The larvae then hatch and live in the water for several months to over a year in the case of Green Frogs and Bullfrogs. Amphibian species require a sufficient water depth with submergent and/or emergent shoreline vegetation to support populations of invertebrates on which the larvae feed, and to provide protection from predators. To be suitable, pools must hold water until at least July so that the larvae have sufficient time to develop and transform. Pools therefore must be sufficiently deep, preferably about 50 cm in the early spring. In the Project Study Area wetlands show a considerable drop in water table from spring through summer. Many meadow marshes are seasonally flooded for only a brief period in spring and are too shallow and ephemeral to support breeding amphibians. During site visits the conditions of encountered pools were recorded. Even in late summer or autumn when pools have dried up, it is possible to determine the depth of pools in spring which is a good indication of their hydroperiod. In addition the presence of emergents and shrubs will determine if the pool is likely to provide suitable amphibian habitat.

The adults of some wetland breeding amphibians such as Spring Peeper and Leopard Frog live in terrestrial habitat away from the ponds for most of the active season. Others such as Green Frog and Eastern Newt mainly stay in or near the water. Some may winter in the pools but many hibernate terrestrially and migrate to pools with spring thaws. Areas of open water were identified during breeding amphibian surveys and ELC investigations.

A total of 13 natural areas containing marsh vegetation communities were identified in or within 120 m of the Project Location during site investigations. Table 3.18 shows all locations where meadow marsh was observed during ELC surveys. Three natural areas that are within 120 m of a proposed access road were deemed to have potential as candidate wildlife habitat and therefore were carried forward to the evaluation of significance for amphibian wetland breeding habitat. The locations of these features (SWE-01, AWE-02 and AWE-03) are shown on Figure 3.6. An additional three natural areas were treated as generalized candidate significant wildlife habitat and carried forward to the evaluation of significance.

Table 3.18 Amphibian Breeding Habitat (Wetland)

Natural Area No.	ELC Unit	Permanent or Ephemeral Standing Water Present?	Within 120 m of Road	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
480	MAM2-10	Intermittent stream but minimal water	No	No	No	Unlikely to support significant breeding habitat
493	MAM2-2	No apparent standing water, small area	Yes	No	No	Unlikely to support significant breeding habitat
494	MAM2	Stream in meadow marsh	No	No	Yes	Suitable habitat apparently present
495	SWT2-2	Marsh (MAS) adjacent to permanent pond	Yes	Yes (Feature No. AWE-01)	No	Suitable habitat apparently present
501	CUP1-3/MAM	No apparent standing water	No	No	No	Unlikely to support significant breeding habitat
506	MAM2-10	Finger of meadow marsh along intermittent stream, no pools	Yes	No	No	Unlikely to support significant breeding habitat
512	MAM2	Channelized stream	No	No	No	Unlikely to support significant breeding habitat
514	MAM2-2	Minimal area within 120 m AOI stream in ditch	No	No	No	Unlikely to support significant breeding habitat
532	MAM2-10	Stream in meadow marsh	Yes	Yes (Feature No. AWE-02)	No	Suitable habitat apparently present
541	MAM2-10	Stream in meadow marsh	Yes	Yes (Feature No. AWE-03)	No	Suitable habitat apparently present
542	MAM2-5	No pools observed	Yes	No	No	Unlikely to support significant breeding habitat
564	MAM2	Marsh along slow river	No	No	Yes	Suitable habitat apparently present
565	MAM2	Marsh along slow river	No	No	Yes	Suitable habitat apparently present
	MAM2	Marsh along slow river	No	No	Yes	Suitable habitat apparently present

3.3.6.2 Rare Vegetation Communities or Specialized Habitats for Wildlife

Rare vegetation communities or specialized habitats for wildlife are described in the Significant Wildlife Habitat Technical Guide (MNR, 2000). The following rare vegetation communities or specialized habitats for wildlife were identified as potentially occurring in the Project Study Area through the Records Review and site investigation:

- Rare vegetation communities including:
  - Alvars;
  - Rare forest types;
  - Sand barrens;
  - Tall-grass prairies;
  - Talus slopes;
  - Great Lake dunes;
  - Savannahs;
  - Rock barrens;
- Habitat for area sensitive species (interior forest breeding birds, open country breeding birds);
- Old-growth or mature forest stands;
- Turtle habitat (nesting, over-wintering);
- Woodland raptor nesting habitat;
- Bald Eagle nesting habitat;
- Osprey nesting, foraging and perching habitat;
- Cliffs and talus slopes;
- Seeps and springs; and
- Marsh breeding bird habitat.

A description of the results of the site investigation pertaining to rare vegetation communities or candidate significant specialized habitats for wildlife follows.

Rare Vegetation Communities

The presence/absence of rare vegetation communities in the 120 m Area of Investigation was confirmed through the site investigations. No alvars, tall-grass prairies, savannahs, rare forest types, cliffs and talus slopes, sand barrens or Great Lakes dune vegetation communities were identified in or within 120 m of the Project Location.

The provincial rankings for all vegetation communities identified within the 120 m Area of Investigation were obtained from the Natural Heritage Information Centre (NHIC), Southern Ontario Vegetation Communities. These are provided in Table 3.19.

Table 3.19 S-Ranks of Vegetation Communities Identified through the Site Investigation

ELC Community	Global Rank (G-rank)	Provincial Rank (S-rank)
Cultural Meadow (CUM)		
CUM1-1: Dry-Moist Oldfield Meadow Type	Cultural Communities not ranked	
Cultural Plantation (CUP)		
CUP1-3: Black Walnut Deciduous Plantation Type	Cultural Communities not ranked	
CUP2-1: Black Walnut-White Pine Mixed Plantation Type	Cultural Communities not ranked	
CUP3: Coniferous Plantations	Cultural Communities not ranked	
CUP3-2: White Pine Coniferous Plantation Type	Cultural Communities not ranked	
CUP3-9: Norway Spruce Coniferous Plantation Type	Cultural Communities not ranked	
Cultural Savannah (CUS)		
CUS1a: White Pine-White Ash Cultural Savannah Type	Cultural Communities not ranked	
Cultural Thicket (CUT)		
CUT1a: Sour Cherry Cultural Thicket Type	Cultural Communities not ranked	
CUT1b: Nannyberry-Common Pear-Hawthorn Cultural Thicket Type	Cultural Communities not ranked	

Table 3.19 S-Ranks of Vegetation Communities Identified through the Site Investigation

ELC Community	Global Rank (G-rank)	Provincial Rank (S-rank)
CUT1e: Sandbar Willow Cultural Thicket Type	Cultural Communities not ranked	
CUT1f: White Elm-Buckthorn Cultural Thicket Type	Cultural Communities not ranked	
Cultural Woodland (CUW)		
CUW1: Mineral Cultural Woodland Ecosite	Cultural Communities not ranked	
CUW1a: Beech-Sugar Maple Cultural Woodland Type	Cultural Communities not ranked	
CUW1f: Common Buckthorn – Apple – Trembling Aspen Cultural Woodland Type	Cultural Communities not ranked	
CUW1o: White Pine – Scot's Pine – Black Walnut Cultural Woodland Type	Cultural Communities not ranked	
Deciduous Forest (FOD)		
FOD3-1: Dry-Fresh Poplar Deciduous Forest Type	G5	S5
FOD4-2: Dry-Fresh White Ash Deciduous Forest Type	G?	S5
FOD4a: Dry-Fresh White Ash-Beech Deciduous Forest Type	Community not ranked	
FOD5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite	Ecosites not ranked	
FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type	G5?	S5
FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	G5?	S5
FOD5-4: Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type	G?	S5
FOD5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type	G?	S5
FOD5-7: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type	Community not ranked	
FOD5-8: Dry-Fresh Sugar Maple-White Ash Deciduous Forest Type	G?	S5
FOD6-5: Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type	G5?	S5
FOD7: Fresh-Moist Lowland Deciduous Forest Ecosite	Ecosites not ranked	
FOD7-1: Fresh-Moist White Elm Lowland Deciduous Forest Type	Community not ranked	
FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	Community not ranked	
FOD7-3: Fresh-Moist Willow Lowland Deciduous Forest Type	Community not ranked	
FOD7-4: Fresh-Moist Black Walnut Lowland Deciduous Forest Type	G4?	S2S3
FOD7b: Fresh-Moist Basswood – Sugar Maple Lowland Deciduous Forest Type	Ecosites not ranked	
FOD9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite	Ecosite not ranked	
Mixed Forest (FOM)		
FOM2: Dry-Fresh White Pine-Maple-Oak Mixed Forest Ecosite	Ecosites not ranked	
FOM3-1: Dry-Fresh Hardwood-Hemlock Mixed Forest Type	Community not ranked	
FOM3-2: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type	Community not ranked	
Meadow Marsh (MAM)		
MAM2: Mineral Meadow Marsh Ecosite	Ecosite not ranked	
MAM2-10: Forb Mineral Meadow Marsh Type	G?	S4S5
MAM2-2: Reed Canary Grass Mineral Meadow Marsh Type	Community not ranked	
MAM2-5: Narrow-leaved Sedge Mineral Meadow Marsh Type	G4?	S5
MAM2-9: Jewelweed Mineral Meadow Marsh Type	G?	S4
Shallow Marsh (MAS)		
MAS2-1: Cattail Mineral Shallow Marsh Type	G5	S5
Open Aquatic (OAO)		
Coniferous Swamp (SWC)		
SWC1: White Cedar Mineral Coniferous Swamp Ecosite	Ecosites not ranked	
Deciduous Swamp Type (SWD)		
SWD2: Ash Mineral Deciduous Swamp Ecosite	Ecosites not ranked	
SWD2-2: Green Ash Mineral Deciduous Swamp Type	G?	S5
SWD3: Maple Mineral Deciduous Swamp Ecosite	Ecosites not ranked	
SWD3-1: Red Maple Mineral Deciduous Swamp Type	G4?	S5
SWD3-2: Silver Maple Mineral Deciduous Swamp Type	G4?	S5
SWD3-3: Swamp Maple Mineral Deciduous Swamp Type	Community not ranked	
SWD4: Mineral Deciduous Swamp Ecosite	Ecosites not ranked	
Thicket Swamp (SWT)		
SWT2: Mineral Thicket Swamp Ecosite	Ecosites not ranked	
SWT2-10: Nannyberry Mineral Thicket Swamp Type	G?	S4
SWT2-2: Willow Mineral Thicket Swamp Type	G5	S5
SWT2-5: Red-osier Mineral Thicket Swamp Type	G5	S5

Only one provincially rare vegetation community was identified within the 120 m Area of Investigation. This community, Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4), is a rare forest type with a provincial ranking of S2S3. This community occurs in Natural Area 539 and is located within 120 m of a proposed access road. This type of significant wildlife habitat was carried forward to the evaluation of significance. The location of this feature (RVC-01) is shown on Figure 3.6.

Habitat for Area Sensitive Species: Interior Forest Breeding Birds

Forest-interior birds, also referred to as area-sensitive birds are susceptible to forest fragmentation and require large tracts of forest for nesting. These large sections of continuous forest provide shelter and nesting habitat, in addition to food for its inhabitants. Birds that prefer forest interiors tend to avoid edges, whereas birds that are considered area-sensitive tend to prefer forests with certain size characteristics.

While some area sensitive breeding birds may occur in much smaller woodlots, these may be unproductive sinks for those species due to low populations, greater susceptibility to nest parasitism and predation that flourishes in edge habitats. To meet this criterion a natural area must contain a contiguous area of forest of at least 30 ha, of which at least 10 ha must comprise interior habitat (i.e., at least 200 m from a forest edge). While several woodlots in the study are greater than 30 ha, most are narrow linear natural areas between concession lines that do not meet the interior criterion (Table 3.20). One woodland has more than 4 ha of interior forest habitat however it was found to be mid-age during site investigations therefore it does not qualify under the mature forest criterion (Table 3.2). This type of candidate significant wildlife habitat was not carried forward to the evaluation of significance.

Table 3.20 Habitat for Interior Forest Breeding Birds

Woodland Unit	Forest >30 ha	Mature Forest	Woodland Contains >4 ha of Interior Forest Habitat	Woodland Area is Located Within Project Location	Carried forward to EOS Generalized Candidate SWH		Rationale
					Candidate SWH	Generalized Candidate SWH	
F	Yes	Mid-Age	No	No	No	No	Insufficient area of interior forests
L	Yes	No	No	No	No	No	Insufficient area of interior forests
N	Yes	Mid-Age	Yes	No	No	No	Not a mature forest
Q	Yes	Mid-age to Mature	No	No	No	No	Insufficient area of interior forests
R	Yes	Mid-Age	No	No	No	No	Insufficient area of interior forests
Y	Yes	Young to Mature	No	No	No	No	Insufficient area of interior forests
AJ	Yes	Mid-Age	No	No	No	No	Insufficient area of interior forests
AK	Yes	Mid-age to Mature	No	No	No	No	Insufficient area of interior forests
AL	Yes	Mid-age to Mature	No	No	No	No	Insufficient area of interior forests
AM	Yes	Young to Mature	No	No	No	No	Insufficient area of interior forests
AP	Yes	Mid-age	No	No	No	No	Insufficient area of interior forests
AQ	Yes	Mid-age	No	No	No	No	Insufficient area of interior forests

Habitat for Area Sensitive Species (Open Country Breeding Birds)

Area sensitive open country breeding birds are dependent on large patches of grassland or oldfield habitat for successful breeding. To qualify for this criterion grassland patches must be greater than 30 ha in size. No such suitable habitats for open country breeding birds were identified in the 120 m Area of Investigation during site investigations. The largest single patch of grassland is 14.5 ha at natural area 480 which is well below this threshold. Consequently no sites were brought forward to the evaluation of significance.

Old-growth or Mature Forest Stands

True old growth forest consists of very old forest that has never been cutover while mature forest stands consist of very large trees and a broad range of tree size classes, and large standing snags of abundant downed wood of variable sizes creating a diverse structure. No true old growth forest was encountered in the 120 m Area of Investigation. However mature forests greater than 100 years of age with many large trees and lack of recent disturbances or evidence of logging can qualify under this criterion. These conditions were met at 10 polygons in six natural areas within the 120 m Area of Investigation. Table 3.21 lists all locations with forest and identifies those with mature forest within the 120 m Area of Investigation. No Project infrastructure is proposed within these features; therefore all of the features will be brought forward to the evaluation of significance as generalized candidate significant wildlife habitat.

Table 3.21 Old Growth or Mature Forest Stands Locations

Natural Area ID	ELC Community	Mature or Old Growth Forest	Within Project Location	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
427	FOD7-2	No	No	No	No	Mature trees absent
439	FOD7-2	No	No	No	No	Mature trees absent
	FOD7-2	No	No	No	No	Mature trees absent
450	FOD5-1	Mid-aged to Mature	No	No	No	Mature trees absent
456	FOD4a	Mature but disturbed	No	No	No	Evidence of disturbance
	FOD5-7	Mature	No	No	Yes	Relatively undisturbed mature forest
459	FOD7-2	No	No	No	No	Mature trees absent
460	FOM3-1	No	No	No	No	Mature trees absent
462	FOD7-2	No	No	No	No	Mature trees absent
463	FOD5-1	No	No	No	No	Mature trees absent
	FOD5-8	No	No	No	No	Mature trees absent
470	FOD7-2	No	No	No	No	Mature trees absent
	FOD7-2	No	No	No	No	Mature trees absent
475	FOD5-2	No	No	No	No	Mature trees absent
480	FOD5-7	No	No	No	No	Mature trees absent
	FOD6-5	No	No	No	No	Mature trees absent
481	FOD5-1	No	No	No	No	Mature trees absent
483	FOD6-5	Mature	No	No	Yes	Relatively undisturbed mature forest
484	FOD7-2	No	No	No	No	Mature trees absent
487	FOD5-2	Mature	No	No	Yes	Relatively undisturbed mature forest
492	FOD6-5	Mature but evidence of logging	No	No	No	Evidence of disturbance
494	FOD7	No	No	No	No	Mature trees absent
498	FOD5-2	No	No	No	No	Mature trees absent
504	FOD5-1	No	No	No	No	Mature trees absent
508	FOD5-2	No	No	No	No	Mature trees absent
510	FOD5-1	Mid-age to Mature	No	No	No	Mature trees absent
	FOD6-5	Mature	No	No	Yes	Relatively undisturbed mature forest
	FOD6-5	No	No	No	No	Mature trees absent
512	FOD7	No	No	No	No	Mature trees absent
514	FOD5	Mature	No	No	Yes	Relatively undisturbed mature forest
518	FOD5-2	No	No	No	No	Mature trees absent
	FOM3-2	No	No	No	No	Mature trees absent
520	FOD5	No	No	No	No	Mature trees absent
524	FOD5-1	No	No	No	No	Mature trees absent
525	FOD5-1	No	No	No	No	Mature trees absent
532	FOD5-1	No	No	No	No	Mature trees absent
	FOD5-1	No	No	No	No	Mature trees absent
534	FOD5-1	Mid-age to Mature	No	No	No	Mature trees absent
	FOD5-1	No	No	No	No	Mature trees absent
	FOD7-2	No	No	No	No	Mature trees absent

Table 3.21 Old Growth or Mature Forest Stands Locations

Natural Area ID	ELC Community	Mature or Old Growth Forest	Within Project Location	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
537	FOD5-2	Mature	No	No	Yes	Relatively undisturbed mature forest
	FOD5-6	Mature	No	No	Yes	Relatively undisturbed mature forest
539	FOD7-4	No	No	No	No	Mature trees absent
541	FOD7-1	No	No	No	No	Mature trees absent
	FOD4-2	No	No	No	No	Mature trees absent
	FOD5-1	Mature	No	No	Yes	Relatively undisturbed mature forest
	FOD5-4	No	No	No	No	Mature trees absent
	FOD5-6	Mature	No	No	Yes	Relatively undisturbed mature forest
	FOD7-1	No	No	No	No	Mature trees absent
	FOD7b	Mature	No	No	Yes	Relatively undisturbed mature forest
542	FOD5-2	Mature	No	No	Yes	Relatively undisturbed mature forest
	FOD5-2	Mature	No	No	Yes	Relatively undisturbed mature forest
544	FOD5-1	No	No	No	No	Mature trees absent
545	FOD5-2	No	No	No	No	Mature trees absent
551	FOD	No	No	No	No	Mature trees absent
	FOM2	No	No	No	No	Mature trees absent
552	FOD	No	No	No	No	Mature trees absent
555	FOD9-5	No	No	No	No	Mature trees absent
556	FOD5-5	No	No	No	No	Mature trees absent
	FOD5-5	No	No	No	No	Mature trees absent
561	FOD5	No	No	No	No	Mature trees absent
562	FOD7-2	No	No	No	No	Mature trees absent
	FOD7-2	No	No	No	No	Mature trees absent
	FOD7-2	No	No	No	No	Mature trees absent
564	FOD	No	No	No	No	Mature trees absent

Turtle Habitat (Nesting, Over-wintering)

Turtles typically nest in areas of open vegetation near ponds, marshes, lakes or other water bodies that support turtle populations. Ideal turtle nesting habitat is located directly adjacent to a permanent water feature, is elevated to protect the nest from being inundated, and consists of sand or gravel as these are light enough to allow turtles to dig out nests. In addition, sand and gravel absorb heat from the sun which aids in incubating the eggs thus accelerating hatching. Nests will be laid in other soils if sand is not available, preferably exposed and on south or west facing slopes to maximize radiant heat.

Larger beaches provide more nesting habitat and reduce the chances of a nest being discovered by a predator, such as the striped skunk or raccoon. In areas where sand and gravel beaches are limited, small pockets of these beaches become essential for turtle nesting and species maintenance. Large beaches or extensive sand deposits are not present in the Project Study Area, and there are few large bodies of water that support turtles within 120 m of the proposed Project Location.

Areas where turtles nest are often easily identifiable because high rates of nest predation result in egg shells being exposed at the ground surface for a year or more. No predated turtle nests were observed during site investigations.

A total of 14 natural areas containing meadow marsh communities were identified in the 120 m Area of Investigation during the site investigations (refer to Table 3.22). The amount of open water within most of these vegetation communities consists mainly of small streams which do not provide ideal habitat for turtles and therefore immediately adjacent areas have a very low density if any nesting turtles. Consequently, this type of candidate significant wildlife habitat was not carried forward to evaluation of significance.

Table 3.22 Turtle Nesting and Overwintering Habitat

Natural Area No.	ELC Unit	Suitable Habitat Present	Within 120 m of Turbine	Within 120 m of Road	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
480	MAM2-10	No, stream mostly intermittent	No	No	No	No	Unlikely to support significant habitat
493	MAM2-2	No, as no standing water observed; however community could support water in spring.	No	Yes	No	No	Unlikely to support significant habitat
494	MAM2	Possibly – a river flows through this natural area	No	No	No	No	Unlikely to support significant habitat
496	MAM2-2	Possibly – shallow marsh (MAS) present	No	Yes	No	No	Unlikely to support significant habitat
501	CUP1-3/MAM	No, as no standing water was observed; however community could support water in spring.	No	No	No	No	Unlikely to support significant habitat
506	MAM2-10	No, as no standing water was observed; however community could support water in spring.	Yes	Yes	No	No	Unlikely to support significant habitat
	MAS2-9	No, as no standing water was observed; however community could support water in spring.	Yes	No	No	No	Unlikely to support significant habitat
512	MAM2	Yes – possibly seasonal (water was present in late June)	No	No	No	No	Unlikely to support significant habitat
514	MAM2-2	No, water only in ditch	Yes	No	No	No	Unlikely to support significant habitat
518	Roadside near edge of FOD3-2	Snapping Turtle observed nesting	Yes	No	No	No	Roadside does not qualify as significant habitat
532	MAM2-10	No, as no standing water was observed; however community could support water in spring.	No	Yes	No	No	Unlikely to support significant habitat
541	MAM2-10	No, as no standing water was observed; however community could support water in spring.	No	Yes	No	No	Unlikely to support significant habitat
542	MAM2-5	No, as no standing water was observed; however community could support water in spring.	Yes	Yes	No	No	Unlikely to support significant habitat
564	MAM2	Yes – associated with a river, community is within meander belt and may seasonally flood	No	No	No	No	Unlikely to support significant habitat
565	MAM2	Yes – associated with a river, community is within meander belt and may seasonally flood	No	No	No	No	Unlikely to support significant habitat

One adult Snapping Turtle was observed laying eggs alongside Pavilion Road at the south edge of natural area 518 during spring 2011 breeding bird surveys. Roadsides, however, do not qualify as significant wildlife habitat under the MNR technical guidelines and therefore this site was not carried forward (MNR, personal communication, 2010).

Woodland Raptor Nesting Habitat

Woodland raptors find shelter, build nests and hunt for prey in forested habitat. These species are sensitive to seemingly minor changes in habitat as they have specialized habitat requirements. Woodland raptors are very territorial and seldom nest closer than one kilometre to another of the same species. As a result, the species are highly sensitive to fragmentation because they require large tracts of forest cover. In addition, woodland raptors are intolerant of human activity which can result in disturbance to nests and ultimately may affect brood survival.

Cooper's Hawk and Sharp-shinned Hawk were found in the first Breeding Bird Atlas only (Cadman *et al.* 2007). These as well as Northern Goshawk, Red-shouldered Hawk and Broad-winged Hawk were recorded in adjacent

squares (Cadman *et al*. 2007) and therefore could be present in the Project Study Area. Cooper's Hawk were recorded in the Project Study Area during spring/summer avian surveys conducted by Golder Associates (2011).

Cooper's Hawk usually nests in deciduous forests greater than 50 ha in size. This species prefers upland forests, tends to nest in intermediate-aged or mature forests and forest interior, and often nests within 300 m or less of water (Wildlife Habitat Decision Support System, Index #45; MNR, 2010b).

The nests are well concealed and woodland raptors are very cryptic around their nests, consequently it is difficult to confirm this type of significant wildlife habitat. The natural areas within 120 m which are part of woodlots or swamp over 30 ha in area are identified in Table 3.23. Only one contains greater than 4 ha of interior forest habitat therefore this feature was carried forward to the evaluation of significance as generalized candidate significant wildlife habitat. The location of this feature is shown on Figure 3.6c.

Table 3.23 Woodland Raptor Nesting Habitat

Woodland	ELC Community	At least 30 ha in Size	Contains >4 ha interior forest	Within Project Location	Carried Forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
F	FOD5-1 FOD5-8	Yes	No	No	No	No	Insufficient area of interior forest
L	FOD5-1	Yes	No	No	No	No	Insufficient area of interior forest
N	FOD5-2 FOM3-2	Yes	Yes	No	No	Yes	suitable habitat present
Q	FOD7b FOD7-1 FOD4-2 FOD5-4 SWD2-2 FOD5-1 FOD5-6	Yes	No	No	No	No	Insufficient area of interior forest
R	FOD7-4	Yes	No	No	No	No	Insufficient area of interior forest
Y	SWD2-2 SWD3-3 FOD6-5 FOD5-1	Yes	No	No	No	No	Insufficient area of interior forest
AJ	SWD3 FOD5	Yes	No	No	No	No	Insufficient area of interior forest
AK	FOD5-1 SWD3-3 FOD7-2 SWD3	Yes	No	No	No	No	Insufficient area of interior forest
AL	FOD5 SWM1 SWM1-1 FOD7	Yes	No	No	No	No	Insufficient area of interior forest
AM	FOD7-2 SWD3-3 SWD2-2	Yes	No	No	No	No	Insufficient total area
AP	FOD9-5 FOD5-5	Yes	No	No	No	No	Insufficient area of interior forest
AQ	FOD5 SWD3-3	Yes	No	No	No	No	Insufficient area of interior forest

Bald Eagle and Osprey Nesting Habitat

Osprey and Bald Eagles nest near open water where fish species are abundant. Nests are built in large trees, or in artificial structures, and can become very large as new material is added with each year. These species can be sensitive to human activity, so remoteness may be a factor in determining a nest site.

Osprey nests in Ontario are usually 9 to 18 m from the ground and are within 10 km of large lakes, marshes or productive foraging areas. Osprey prefer dead coniferous tree tops with unobstructed views and there is typically a tall perch near-by for the male. As such, the majority of nests are found in mature, isolated trees, rather than groups of trees.

Like Osprey, most Bald Eagle nests are associated with large lakes. Bald Eagle nests are typically 15 to 22 m from the ground and are often found in mature forest with discontinuous or open canopy but may also be in isolated groups of trees. In Ontario, Bald Eagles show a preference for live trees and conifers, typically at least 60 centimetres diameter at breasts height. Finally, Bald Eagles choose trees with an unobstructed view and flight path. Both the Osprey and Bald Eagle may use the same nest every year, for decades.

Finally, the Osprey and Bald Eagle prey on fish species in clear, shallow water. The Osprey typically hunts in water less than 1 m deep while the Bald Eagle will hunt in areas less than 6 m deep. As such, nesting habitats must be located near large water bodies with large shallow areas and an abundance of fish populations.

According to the Atlas of the Breeding Birds of Ontario, there is no evidence of breeding for Bald Eagle or Osprey in the general vicinity of the Project Study Area (Cadman *et al.* 2007). A total of five Bald Eagles were recorded during avian surveys conducted in the Project Study Area (Golder Associates, 2011). Bald Eagle and Osprey nests are usually very conspicuous because of their large size and prominent locations since the birds prefer unobstructed views. Consequently, it is unlikely that nests would have been missed during field surveys within the 120 m Area of Investigation. None of the sites were carried forward to evaluation of significance.

Cliffs and Talus Slopes

No cliffs or talus slopes were identified in or within 120 m of the Project Location. This type of significant wildlife habitat was not carried forward to the evaluation of significance.

Seeps and Springs

Wildlife may rely on open water available at seeps and springs during the winter. Seeps are also important for recharging to streams thereby contributing to fish habitat, and as habitat for a number of specialized plant species.

A total of 9 natural areas were identified as containing seep indicators during site investigations (refer to Table 3.24). None of these natural areas occur within the Project Location and therefore all were carried forward to the evaluation of significance as generalized candidate significant wildlife habitat.

Table 3.24 Seeps and Spring Location

Natural Area No.	ELC Unit	Seep Indicators Present	Within Project Location	Carried Forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
437	SWD3-3	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
439	FOD7-2	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
463	FOD5-8	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
510	FOD5-1 SWD3-3	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
518	FOM3-2	Watercress (*Rorippa nasturtium-aquaticum)*	No	No	Yes	Seep indicator present
532	SWT2-5	Bank Seepage Noted	No	No	Yes	Seep indicator present
534	SWD3-3	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
537	FOD5-2	Jewelweed (*Impatients capensis*)	No	No	Yes	Seep indicator present
539	FOD7-4	Watercress (*Rorippa nasturtium-aquaticum)*	No	No	Yes	Seep indicator present

Marsh Bird Breeding Habitat

A number of bird species in Ontario require high quality marsh habitat for successful breeding. Loss of wetland habitat across the province has proved to be detrimental to many of these species. It can be difficult to identify which species are being affected by habitat decline as birds that breed in these areas are difficult to detect and are not often observed.

According to the Atlas of the Breeding Birds of Ontario, there is possible evidence of breeding for Green Heron in the general vicinity of the Project Study Area (Cadman *et al.* 2007) but none of the other target marsh species were recorded in either atlas square, indicating the general lack of suitable marsh habitat in the Project Study Area. A total of nine Common Loons and one Sandhill Crane were recorded during avian surveys conducted in the Project Study Area (Golder Associates, 2011) but these were migrants (refer to Table 3.24).

The target marsh bird species generally require large marshes with a good interspersion of deeper water (at least 30 cm) and emergent marsh vegetation. Shallow water or open water without much emergent vegetation will not suffice. For example, Sandhill Crane nests in large wetlands, typically at least 200 ha but occasionally smaller, usually bogs and fens, but occasionally in marshes, and usually nests at least 1 km from any human activity. There is no suitable nesting habitat for this species within the 120 m Area of Investigation.

All of the locations with marsh in the 120 m Area of Investigation are listed on Table 3.25. These consist mainly of meadow marshes along stream floodplains. One of the marsh habitats (natural area 495) contained good interspersion that has the potential to meet this criterion. Although it is probably too small to fully meet SWH criteria, it was carried forward to evaluation of significance as generalized candidate significant wildlife habitat.

Table 3.25 Marsh Bird Breeding Habitat

Natural Area No.	ELC Unit	Habitat Diversity	Within 120 m of Turbine	Carried forward to EOS		Rationale
				Candidate SWH	Generalized Candidate SWH	
480	MAM2-10	Minimal open water	No	No	No	Insufficient open water for marsh birds
493	MAM2-2	Minimal open water	No	No	No	Insufficient open water for marsh birds
494	MAM2	Minimal open water	No	No	No	Insufficient size and habitat diversity
495	SWT2-2	Open water present, good interspersion	No	No	Yes	Marsh >1 ha with good interspersion
496	MAM2-2	Minimal open water	No	No	No	Insufficient open water for marsh birds
501	CUP1-3/MAM	Minimal open water	No	No		Insufficient open water for marsh birds
506	MAM2-10	No open water	Yes	No	No	Insufficient open water for marsh birds
	MAS2-9		Yes	No	No	
512	MAM2	Minimal open water	No	No	No	Insufficient size and habitat diversity
514	MAM2-2	Minimal open water	Yes	No	No	Insufficient size and habitat diversity
532	MAM2-10	Minimal open water	No	No	No	Insufficient open water for marsh birds
541	MAM2-10	Minimal open water	No	No	No	Insufficient open water for marsh birds
542	MAM2-5	No open water	Yes	No	No	Insufficient open water for marsh birds
564	MAM2	Small marsh beside road, large creek	No	No	No	Insufficient size and disturbance from adjacent road
565	MAM2	Small marsh beside road, large creek	No	No	No	Insufficient size and disturbance from adjacent road

3.3.6.3 Animal Movement Corridors

Amphibian Corridors

Many woodland and open wetland breeding amphibians move from their hibernation sites to breeding areas in spring and then to their summer habitats. The Project Study Area is characterized by isolated woodlots spread out on a mostly agricultural landscape. Many amphibians will move from one woodlot to another for breeding, crossing inhospitable agricultural cropland in the process, then return to their home woodlot. These movements mostly take place at night, particularly during rainy nights in the spring. Amphibians may also make movements on any rainy nights through the active season.

Identifying likely amphibian corridors first involves determining important breeding locations which would qualify as significant wildlife habitat under the Amphibian Woodland Breeding and Amphibian Wetland Breeding Habitat criteria. Significant breeding areas need to be 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, nearness of natural areas or context of roads. Narrow strips of vegetation connecting two larger blocks of habitat where at least one has a significant breeding location could be identified as a candidate significant amphibian corridor.

This report is recommending an approach to conduct an Evaluation of Significance for several Amphibian Woodland Breeding sites and Amphibian Wetland Breeding sites. These sites have not yet been evaluated and therefore it is premature to attempt to identify amphibian corridors at the present time. Consequently no specific locations are identified to be carried forward to the evaluation of significance, but this will be conducted once sufficient information to determine significant breeding sites is available. Amphibian corridors are of particular concern for proposed roads because moving amphibians are highly susceptible to road mortality.

3.3.6.4 Species of Conservation Concern

Any plant or animal species designated as Special Concern or ranked S1, S2 or S3 and not already recognized as Endangered or Threatened by COSSARO are provincially significant and considered to be species of conservation concern. A total of thirty-seven species of conservation concern were identified as potentially occurring within the Project Study Area during the Records Review (Table 2.3). Most of these species are very rare locally and highly specialized to their preferred habitat.

A number of the animal species identified during the Records Review have been assessed under other categories of significant wildlife habitat, as follows:

- **Bald Eagle** (*Haliaeetus leucocephalus*)
  Special Concern – Breeding habitat for this species was assessed as Bald Eagle Nesting Habitat (Section 3.3.6.1). No candidate significant Bald Eagle nesting habitats were identified within the 120 m Area of Investigation, therefore habitat of this species of conservation concern was not carried forward to evaluation of significance.
- **Short Eared Owl** (*Asio flammeus*)
  Special Concern – Seasonal concentration areas for this species were assessed as part of Raptor Winter Feeding and Roosting Areas (Section 3.3.6.1), and breeding habitat of this species was assessed as part of Open Country Bird Breeding Habitat (Section 3.3.6.2). One candidate raptor winter feeding and roosting area (RWA-01) was carried forward to evaluation of significance (refer to Figure 3.6b for location).

- **Yellow-breasted Chat** (*Icteria virens*)
  Special Concern – Breeding habitat for this species was assessed as part of Shrub/Early Successional Bird Breeding Habitat (Section 3.3.6.4). No candidate significant shrub/early successional bird breeding habitats were identified within the 120 m Area of Investigation, therefore habitat of this species of conservation concern was not carried forward to evaluation of significance.

- **Eastern Ribbonsnake** (*Thamnophis sauritus*)
  Special Concern – Seasonal concentration areas for this species were assessed as part of Reptile Hibernacula (Section 3.3.6.1). Two candidate reptile hibernacula (RH-01 and RH-02) and one generalized candidate reptile hibernacula SWH were carried forward to evaluation of significance (refer to Figure 3.6a for locations).

- **Milksnake** (*Lampropeltis triangulum*)
  Special Concern – Seasonal concentration areas for this species were assessed as part of Reptile Hibernacula (Section 3.3.6.1). Two candidate reptile hibernacula (RH-01 and RH-02) and one generalized candidate reptile hibernacula SWH were carried forward to evaluation of significance (refer to Figure 3.6a for locations).

- **Snapping Turtle** (*Chelydra serpentine*)
  Special Concern – Specialized habitats for this species were assessed as part of Turtle Nesting Habitat and Turtle Over-wintering Habitat (Section 3.3.6.2). No candidate significant turtle nesting or over-wintering habitats were identified within the 120 m Area of Investigation, therefore habitat of this species of conservation concern was not carried forward to evaluation of significance.

Habitats of the remaining species of conservation concern identified through the Records Review were assessed individually as follows:

- **American Gromwell** (*Lithospermum latifolium*)
  S3 (Vulnerable) – This species prefers shaded river banks, and wooded floodplains. The species may also be found within river floodplains, woods and edges of woods. No infrastructure is proposed within the required habitat for this species, nor was the species recorded during site investigations. The last known occurrence for this species in the area dates from 1983. The species is believed to be only known in Huron County from the Maitland River valley (M.J. Oldham, pers. comm.). Suitable habitat for this species was found in one large undisturbed forested floodplain within the 120 m Area of Investigation, where Fresh-Moist Lowland Deciduous Forest Ecosites (FOD7) were identified in Natural Areas 494 and 512. These ELC polygons are located more than 120 m away from proposed access roads but within 16 m and 5 m, respectively, of the proposed transmission line therefore these were carried forward to evaluation of significance as Generalized Candidate Significant Wildlife Habitat for American Gromwell (refer to Figure 3.6c for locations).

- **Autumn Coral-root** (*Corallorhiza odontorhiza*)
  S2 (Imperiled) – This species prefers dry oak or oak-pine woods or occasionally in open, red pine or white pine plantations. Scattered occurrences of this species are mainly restricted to the Carolinian zone, and the species is not listed for Huron County in Oldham (1993). Autumn Coral-root was not recorded within the 120 m Area of Investigation during site investigations. Open oak dominated woodlands were considered candidate SWH for this species but plantations were not because it is not a favoured habitat and probability of occurrence there is very low. Within the 120 m Area of Investigation, suitable habitat for this species was found at one location, where a Dry-Fresh White Pine – Maple – Oak Mixed Forest (FOM2) was identified in Natural Area 551 (refer to ELC map for location). This ELC polygon is located more than 120 m away from proposed access roads but within 19 m of the proposed transmission line therefore it was carried forward to evaluation of significance as Generalized Candidate Significant Wildlife Habitat for Autumn Coral-root (refer to Figure 3.6c for location).

- **Beaked Spike-Rush** (*Eleocharis rostellata*)
  S3 (Vulnerable) – This species can be found among fens, and calcareous shores and meadows. The last known record for this species in the area dates from 1976. No suitable habitat was identified within the 120 m Area of Investigation, nor was the species recorded during site investigations, therefore habitat of this species was not carried forward to evaluation of significance.

- **Carolina Whitlow-grass** *(Draba reptans)*
  S3 (Vulnerable) – This species can be found primarily within dry sandy areas, dry open flats and limestone pavements. The last known record for this species in the area dates from 1958. The species is not listed for Huron County in Oldham (1993). No suitable habitat was identified within the 120 m Area of Investigation, nor was the species recorded during site investigations, therefore habitat of this species was not carried forward to evaluation of significance.

- **Chinese Hemlock Parsley** (*Conioselinum chinense*)
  S2 (Imperiled) – This species prefers swampy places with deciduous trees (cedars, tamarack), springy river banks, and creek borders. The species can also be found in calcareous white cedar swamps, wet borders of streams and rivers as well as found among calcareous seepage slopes. The last known record for this species in the area dates from 1986. Chinese Hemlock Parsley was not recorded within the 120 m Area of Investigation during site investigations. The species is believed to be only known in Huron County from Maitland River valley (M.J. Oldham, pers. comm.). Suitable habitat for this species was found in one large undisturbed forested floodplain within the 120 m Area of Investigation, where a White Cedar Mineral Mixed Swamp Ecosite (SWM1) was identified in Natural Area 512. This ELC polygon is located more than 120 m away from proposed access roads but within 4 m of the proposed transmission line therefore it was carried forward to evaluation of significance as Generalized Candidate Significant Wildlife Habitat for Chinese Hemlock Parsley (refer to Figure 3.6c for location).

- **Crowned Beggarticks** (*Bidens trichosperma*)
  S2 (Imperiled) – This species can be found in openings in swamps, marshes, along shores and wet fields within the Carolinian zone and southeastern Georgian Bay. The species can also be found in bogs, fens, and tamarack swamps. Crowned Beggarticks was not recorded within the 120 m Area of Investigation during site investigations. No infrastructure is proposed within the required habitat for this species. The last known local record for this species dates from 1936, the species is not listed for Huron County in Oldham (1993), and M.J. Oldham (pers. comm.) is not aware of any more recent records. For these reasons, this species was not carried forward to evaluation of significance.

- **Eastern Green-violet** (*Hybanthus concolor*)
  S2 (Imperiled) – This species can be found in rich, wet-mesic floodplain forests as well as mesic forests over limestone. The species may also be located in floodplains and river banks. No infrastructure is proposed within the required habitat for this species, and the species was not recorded within the 120 m Area of Investigation during site investigations. The species is believed to be only known in Huron County from the Maitland River valley (M.J. Oldham, pers. comm.). Suitable habitat for this species was found in one large undisturbed forested floodplain within the 120 m Area of Investigation, where Fresh-Moist Lowland Deciduous Forest Ecosites (FOD7) were identified in Natural Areas 494 and 512. These ELC polygons are located more than 120 m away from proposed access roads but within 16 m and 5 m, respectively, of the proposed transmission line therefore these were carried forward to evaluation of significance as Generalized Candidate Significant Wildlife Habitat for Eastern Green-violet (refer to Figure 3.6c for locations).

- **Green Dragon** (*Arisaema dracontium*)
  Special Concern, S3 (Vulnerable) – This species found in damp deciduous forest especially along floodplains. It also grows in wet forests dominated by maple, red ash and white elm. The species is believed to be only known in Huron County from the Maitland River valley (M.J. Oldham, pers. comm.). Green Dragon is distinctive and

was not observed during field investigations, however it may have been missed during late season site investigations. Since it occurs in a common habitat all potential habitats for this species (i.e., all FOD6, FOD7 or FOD9 ecosites; refer to ELC map for locations) were treated as Generalized Candidate SWH for Green Dragon and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

- **Hairy Valerian** (*Valeriana edulis*)
  S1 (Critically Imperiled) – This species inhabits swampy river flats and meadows, wet prairies, wooded, rocky riverbanks and fens. No infrastructure is proposed within the required habitat for this species, and the species was not recorded within the 120 m Area of Investigation during site investigations. The species is believed to be only known in Huron County from Maitland River valley (M.J. Oldham, pers. comm.). Suitable habitat for this species was found in one large undisturbed forested floodplain within the 120 m Area of Investigation, where a White Cedar Mineral Mixed Swamp Ecosite (SWM1) was identified in Natural Area 512. This ELC polygon is located more than 120 m away from proposed access roads but within 4 m of the proposed transmission line therefore it was carried forward to evaluation of significance as Generalized Candidate Significant Wildlife Habitat for Hairy Valerian (refer to Figure 3.6c for locations).

- **Hairy Wood Mint** (*Blephilia hirsuta*)
  S1 (Critically Imperiled) – This species can be found within rich woods, swamp forests, and floodplains. The species may also be found in woodlands, preferably rocky, and especially among rivers. No infrastructure is proposed within the required habitat for this species, and the species was not recorded within the 120 m Area of Investigation during site investigations. The last known local record for this species dates from 1959. This very rare species is unlikely to occur in Huron County and the record may be an error (M.J. Oldham, pers. comm.). Habitat of this species was not carried forward to evaluation of significance.

- **Harbinger-of-spring** (*Erigenia bulbosa*)
  S3 (Vulnerable) – This species occurs in rich, moist deciduous woods, especially on floodplains. No infrastructure is proposed within the required habitat for this species. The species is ephemeral and has a very short flowering period early in the spring, after which it is easily overlooked. No site investigations took place during the flowering period for this species. Since it occurs in a common habitat and the period of detection is very short, all potential habitats for this species (i.e., all FOD6, FOD7, FOD8 or FOD9 ecosites; refer to ELC map for locations) were treated as Generalized Candidate SWH for Harbinger-of-spring and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

- **Hill's Pond Weed** (*Potamogeton hillii*)
  SC, S2 (Imperiled) – This is an aquatic plant found in highly alkaline waters of ditches, ponds, beaver ponds, and slow-moving cold waters chiefly confined to the Bruce Peninsula and Manitoulin Island, with a few additional areas elsewhere in the province. The species is not listed for Huron County in Oldham (1993). No areas of suitable habitat were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Large Round-leaved Orchid** (*Platanthera macrophylla*)
  S2 (Imperiled) – This species inhabits moist mixed woods. The species can be found in fairly mature, upland sugar maple-beech-eastern hemlock woodlands, a relatively common type of habitat in Ontario although this species is rarely encountered. At least one historic record was found in Huron County, dating from 1867. No areas of suitable habitat were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Lizard's Tail** (*Saururus cernuus*)
  S3 (Vulnerable) – This species inhabits shores and streambanks along shallow water, as well as swamps (usually deciduous but sometimes cedar), floodplains, shallow water and mudflats at the border of streams and ponds. Lizard's Tail is a distinctive and easily identifiable plant that was not observed during field investigations,

however it may have been missed during late season surveys. No infrastructure is proposed within the required habitat for this species. Therefore, suitable habitat was carried forward as Generalized Candidate SWH for Lizard's Tail wherever late season site investigations were conducted (Table 3.26; refer to Figure 3.6c for locations).

Table 3.26 Potential Louisiana Waterthrush Habitat

Natural Area No.	ELC Unit	Date of Site Investigation	Species Observed	Within Project Location	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
512	MAM2	June 29, 2011	No	No	No	No	Species not detected during site investigation
494	MAM2	June 29, 2011	No	No	No	No	Species not detected during site investigation
564	MAM2	July 4, 2011	No	No	No	No	Species not detected during site investigation
565	MAM2	July 4, 2011	No	No	No	No	Species not detected during site investigation
565	MAM2	July 4, 2011	No	No	No	No	Species not detected during site investigation
480	MAM2-10	August 17, 2011	No	No	No	No	Species not detected during site investigation
532	MAM2-10	November 23, 2011	No	No	No	Yes	Suitable habitat present
541	MAM2-10	August 19, 2011	No	No	No	No	Species not detected during site investigation
506	MAM2-10	November 23, 2011	No	No	No	Yes	Suitable habitat present
493	MAM2-2	October 20, 2011	No	No	No	No	Disturbed site dominated by reed canary grass
496	MAM2-2	October 20, 2011	No	No	No	No	Disturbed site dominated by reed canary grass
496	MAM2-2	October 20, 2011	No	No	No	No	Disturbed site dominated by reed canary grass
514	MAM2-2	October 20, 2011	No	No	No	No	Disturbed site dominated by reed canary grass
542	MAM2-5	July 5, 2011 November 4, 2011	No	No	No	No	Species not detected during site investigation
506	MAS2-9	August 18, 2011 November 23, 2011	No	No	No	No	Species not detected during site investigation
506	MAS2-9	August 18, 2011 November 23, 2011	No	No	No	No	Species not detected during site investigation
480	SWD2	n/a (polygon identified through air photo interpretation)	No	No	No	Yes	Suitable habitat present
456	SWD2-2	September 28, 2011	No	No	No	Yes	Suitable habitat present
484	SWD2-2	September 28, 2011 November 4, 2011	No	No	No	Yes	Suitable habitat present
541	SWD2-2	September 6, 2011	No	No	No	No	Species not detected during site investigation
510	SWD2-2	September 2, 2011	No	No	No	No	Species not detected during site investigation
426	SWD3	October 19, 2011	No	No	No	Yes	Suitable habitat present
514	SWD3	October 20, 2011	No	No	No	Yes	Suitable habitat present
488	SWD3	June 29, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3	July 7, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3	September 2, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3	November 4, 2011	No	No	No	Yes	Suitable habitat present

Natural Area No.	ELC Unit	Date of Site Investigation	Species Observed	Within Project Location	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
483	SWD3-2	July 5, 2011 October 19, 2011	No	No	No	No	Species not detected during site investigation
437	SWD3-3	September 1, 2011	No	No	No	No	Species not detected during site investigation
484	SWD3-3	September 28, 2011 November 4, 2011	No	No	No	Yes	Suitable habitat present
510	SWD3-3	September 2, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3-3	July 7, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3-3	July 7, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3-3	July 7, 2011	No	No	No	No	Species not detected during site investigation
534	SWD3-3	July 7, 2011	No	No	No	No	Species not detected during site investigation
561	SWD3-3	July 4, 2011	No	No	No	No	Species not detected during site investigation
537	SWD3-3	August 19, 2011 October 19, 2011	No	No	No	No	Species not detected during site investigation
542	SWD4	July 5, 2011 November 4, 2011	No	No	No	No	Species not detected during site investigation
562	SWD4-1	July 4, 2011	No	No	No	No	Species not detected during site investigation

- **Ram's-head Lady's-slipper** (*Cypripedium arietinum*)
  S3 (Vulnerable) – This species can be found in undisturbed cedar woodlands and swamps, limestone plains and wooded fens, primarily in calcareous areas. No areas of suitable habitat were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Rattlesnake Hawkweed** (*Hieracium venosum*)
  S2 (Imperiled) – This species can be found in open, dry sandy woods consisting of Jack pine, oak, and/or aspens. The last known local record for this species dates from 1956, and the species was not recorded within the 120 m Area of Investigation during site investigations. This very rare species is unlikely to occur in Huron County and the record may be an error (M.J. Oldham, pers. comm.). Habitat of this species was not carried forward to evaluation of significance.

- **Scarlet Beebalm** (*Monarda didyma*)
  S3 (Vulnerable) – This species can be found in moist, rich woods, thicket swamps, banks and floodplains. The last known local record for this species dates from 1958. Scarlet Beebalm is a distinctive and easily identifiable plant that was not observed during site investigations, therefore its habitat was not carried forward to evaluation of significance.

- **Slender Vulpia** (*Vulpia octoflora*)
  S2 (Imperiled) – This species inhabits dry, sandy habitats, including rocky woods meadows, dry forests, and stabilized dunes. The last known local record for this species dates from 1970. It is unlikely to occur in the study area (M.J. Oldham, pers. comm.) and its habitat was not encountered during site investigations, therefore its habitat was not carried forward to evaluation of significance.

- **Slim-flowered Muhly** (*Muhlenbergia tenuiflora*)
  S2 (Imperiled) – This species can be found in rich deciduous forest, often on rocky or sandy soils. The species may also be found on wooded dunes, hillsides, and riverbanks dominated by either oak or beech-maple. No

infrastructure is proposed within the required habitat for this species. Although no treed sand dunes were identified within the 120 m Area of Investigation, potentially suitable deciduous forest habitat are common. Since the species occurs in a common habitat and it is an obscure grass not easily recognized, all potential habitats for this species (i.e., all FOD5 or FOD9 ecosites; refer to ELC map for locations) were treated as Generalized Candidate SWH for Slim-flowered Muhley and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

- **Stiff Gentian** (*Gentianella quinquefolia*)
  S2 (Imperiled) – This species is often found in moist soils of streambanks, edges of woods and wet prairies, as well as marshy meadows, bluffs and wooded hillsides. The last known local record for this species dates from 1982, and the species was not recorded within the 120 m Area of Investigation during site investigations. The species is not listed for Huron County in Oldham (1993) and M.J. Oldham (pers. comm.) was not aware of any more recent records, therefore this species was not carried forward to evaluation of significance.

- **Sundial Lupine** (*Lupinus perennis*)
  S3 (Vulnerable) – This species is known to inhabit dry, sandy oak savannahs and prairies, as well as open barrens or clearings in woodlands of oak, jack pine, and/or aspen. The last known local record for this species dates from 1950. The species is not listed for Huron County in Oldham (1993) and M.J. Oldham (pers. comm.) is not aware of any more recent records. No suitable habitats were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Tuberous Indian Plantain** (*Arnoglossum plantagineum*)
  S3 (Vulnerable) – This species is largely restricted to the coast of Lake Huron but may also be found in fens, wet meadows, and calcareous river flats. Where not in association with shorelines, found in association with open seepage slopes. No suitable habitats were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Woodland Pinedrops** (*Pterospora andromedea*)
  S2 (Imperiled) – This species may be found in conifer forest, particularly under pines, but also hemlock, spruce, fir, and white cedar. It may also occur in dry or rocky soil, often with common juniper and sometimes aspen or birch. The most recent known record for this species in the area dates from 1936. Woodland Pinedrops is a distinctive and easily identifiable plant that was not observed during site investigations. No suitable habitats were identified within the 120 m Area of Investigation, therefore its habitat was not carried forward to evaluation of significance.

- **Yellow Ladies'-tresses** (*Spiranthes ochroleuca*)
  S2 (Imperiled) – This species occurs on dry, open sites, usually on acidic sandy soil, and particularly prairie or savannah. It may also be found in dry to mesic open woodland, thickets, meadows, barrens, ledges, outcrops, and banks. Yellow Ladies'-tresses was not recorded within the 120 m Area of Investigation during site investigations. The species is not listed for Huron County in Oldham (1993) and NHIC records for the County are pre-1950. Since these records are more than 60 years old, they are considered historic and therefore habitat of this species was not carried forward to evaluation of significance.

- **Common Nighthawk** (*Chordeiles minor*)
  Special Concern – This species is an aerial forager that hunts insects over a wide variety of habitats, in particular open or semi-open areas such as farmland or open woodlands. The species nests on the ground in a wide range of open, sparse or vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, rock outcrops, rocky barrens, gravel pits and urban rooftops. It may sometimes nest in grasslands, pastures, peat bogs, marshes or lakeshores. Common Nighthawk was not recorded in the area in either the first or second Breeding Bird Atlas (Cadman, *et al*. 2007). No infrastructure is proposed within the required habitat for this species. Because this species is a nocturnal aerial forager and its nests are difficult to locate, all suitable habitats (i.e., all CUW ecosites; refer to ELC map for locations) were treated as Generalized Candidate SWH for Common Nighthawk and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

- **Louisiana Waterthrush** (*Seiurus motacilla*)
  Special Concern – This species inhabits mature forests along steeply sloped ravines adjacent to running water, and nests primarily along streams (Stucker 2000). It is an area sensitive species. Breeding habitat for this species was assessed as part of Old-growth or Mature Forest Habitat (Section 3.3.6.2). Large, mature deciduous or mixed forests containing riparian habitat were found in Natural Areas 483, 487, 537 and 541 (Table 3.27). No infrastructure is proposed within these features therefore they were treated as Generalized Candidate SWH for Louisiana Waterthrush and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

Table 3.27 Potential Louisiana Waterthrush Habitat

Natural Area ID	ELC Community	Forest Age	Area (ha)	Riparian Habitat Present	Within Project Location	Carried forward to EOS		Rationale
						Candidate SWH	Generalized Candidate SWH	
456	FOD5-7	Mature	0.5	No	No	No	No	No riparian habitat
483	FOD6-5	Mature	4.4	Yes	No	No	Yes	Suitable habitat present
487	FOD5-2	Mature	6.3	Yes	No	No	Yes	Suitable habitat present
510	FOD6-5	Mature	11.2	No	No	No	No	No riparian habitat
514	FOD5	Mature	5.1	No	No	No	No	No riparian habitat
537	FOD5-2	Mature	13.0	Yes	No	No	Yes	Suitable habitat present
	FOD5-6	Mature	1.7	No	No	No	No	No riparian habitat
541	FOD5-1	Mature	7.1	Yes	No	No	Yes	Suitable habitat present
	FOD5-6	Mature	3.3	Yes	No	No	Yes	Suitable habitat present
	FOD7b	Mature	2.6	Yes	No	No	Yes	Suitable habitat present
542	FOD5-2	Mature	4.8	No	No	No	No	No riparian habitat
	FOD5-2	Mature	1.8	No	No	No	No	No riparian habitat

- **Red-headed Woodpecker** (*Melanerpes erythrocephalus*)
  Special Concern – This species inhabits open woodland and woodland edges, especially in oak savannahs and riparian forest, open, deciduous forest with little understorey; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees. The species generally requires cavity trees with at least 40 cm dbh. Red-headed Woodpecker was recorded in the area in the first Breeding Bird Atlas but not in the second (Cadman, *et al*. 2007). No infrastructure is proposed within the required habitat for this species. Breeding habitat for this species was partially assessed as Old-growth or Mature Forest Habitat (Section 3.3.6.2). In addition to the Old-growth or Mature Forest Habitats carried forward to evaluation of significance as Generalized Candidate SWH, cultural woodland polygons containing mature trees were considered suitable habitat for this species however none were found within the 120 m Area of Investigation. Therefore all Old-growth or Mature Forest Habitats were treated as Generalized Candidate SWH for Red-headed Woodpecker and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

- **Dusted Skipper** (*Atrytonospsis hianna*)
  S1 (Critically Imperilled) – This species is confined to remnants of dry prairie and sand dune areas. No prairie or sand dune areas were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Monarch Butterfly** (*Danaus plexippus*)
  Special Concern – According to MNR criteria, Monarch Migratory Stopover Areas are not associated with the study area and were therefore not assessed during the site investigation. Monarch Feeding and Breeding Habitat consists of old field habitats with an abundance of milkweed (*Asclepius*). No old fields containing a particular abundance of milkweed were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **Sleepy Duskywing** (*Erynnis brizo*)
  S1 (Critically Imperilled) – This species occurs in open oak woodland, oak savannah or oak-pine scrub, chaparral or barrens occurring on well-drained sandy or shaly soils. No suitable habitats were identified within the 120 m Area of Investigation, therefore habitat of this species was not carried forward to evaluation of significance.

- **West Virginia White** (*Pieris virginiensis*)
  Special Concern – This species is restricted to rich, deciduous woods, where its foodplants toothworts (*Cardamine concatenata* and *C. diphylla*) are abundant. Toothworts were found during site investigations in three locations within the 120 m Area of Investigation, all within Dry-Fresh Sugar Maple Deciduous Forests (FOD5-1). West Virginia White has a very short flight period in early spring and closely resembles a more common butterfly, therefore West Virginia White is easily missed. Consequently all suitable forest habitat where toothworts occur (i.e., all FOD5 ecosites; refer to Figure 5.6c) were treated as Generalized Candidate SWH for West Virginia White and carried forward to evaluation of significance (refer to Figure 3.6c for locations).

Only two animal species of conservation concern were encountered during site investigations: Monarch Butterfly and Snapping Turtle. In most cases the presence of conservation concern species would constitute significant wildlife habitat. However, the Snapping Turtle was found nesting on a roadside which does not qualify as significant wildlife habitat according to criteria established by MNR. The Monarch is so widespread in meadows and so wide ranging that it is not practical to designate all locations where they occur as significant wildlife habitat. Therefore, Monarch Feeding and Breeding Habitat was assessed as described above.

One Provincially Rare (S1-S3) plant species, honey locust (*Gleditsia triacanthos*), was observed within Natural Area 442, located north of Kippen Road and east of Bronson Line; however it was determined not to be naturally occurring as it was found within a cultural woodland and is almost certainly planted. Therefore, this occurrence was not treated as significant wildlife habitat for species of conservation concern.

Shrub/Early Successional Bird Breeding Habitat

This type of significant wildlife habitat consists of shrublands or successional fields greater than 30 ha in size, excluding Class 2 agricultural lands and lands actively used for farming (i.e., no row-cropping in the last 5 years). No such habitats were identified in or within the 120 m Area of Investigation during site investigations. This type of significant wildlife habitat was not carried forward to the evaluation of significance.

Terrestrial Crayfish

Evidence of crayfish tubes or ‘chimneys’ was observed in proximity to 4 vegetation community polygons associated with three natural areas (refer to Table 3.28). The burrows were often present in the edge of agricultural fields immediately next to natural areas as opposed to actually in the vegetation community (i.e., the crayfish do not occur in FOD). The crayfish occur in areas of wet or seasonally wet clay-based soils that allow burrowing crayfish to form the tubes. These crayfish are an important keystone species as their burrows are used for hibernation by other wildlife species including amphibians, some snakes, and a variety of invertebrates. However, no crayfish burrows were located in meadow marsh or shallow marsh vegetation communities therefore terrestrial crayfish habitat was not carried forward to evaluation of significance.

Table 3.28 Terrestrial Crayfish Habitat

Natural Area No.	ELC Unit	Area within 120 m of Project Location (ha)	Evidence of Chimney Crayfish Observed	Within Project Location	Carried forward to EOS		Rationale
					Candidate SWH	Generalized Candidate SWH	
463	FOD5-8	0.3	Yes	No	No	No	Not in meadow marsh or shallow marsh habitat
534	SWD3-3	0.8	Yes	No	No	No	Not in meadow marsh or shallow marsh habitat
534	SWD3-3	0.2	Yes	No	No	No	Not in meadow marsh or shallow marsh habitat
541	SWT2-2	1.1	Yes	No	No	No	Not in meadow marsh or shallow marsh habitat

3.3.6.5 Summary of Candidate Significant Wildlife Habitats Carried Forward to Evaluation of Significance

Several candidate Significant Wildlife Habitats were identified within the 120 m Area of Investigation through the site investigation. The boundaries of these features are shown on Figures 3.6a, 3.6b and 3.6c. Generalized candidate significant wildlife habitats are also shown on Figures 3.6a, 3.6b and 3.6c. A description of the attributes, composition, and function of each candidate significant wildlife habitat and distance to the nearest project component is provided in Table 3.29 below. All of these candidate significant wildlife habitats will be carried forward to the evaluation of significance phase of the Natural Heritage Assessment.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
Waterfowl Nesting Areas	Generalized Candidate SWH	537	>0.1(collection line)	This significant wildlife habitat type is a combination of wetland and adjacent upland habitat. Typically upland vegetation communities composed of grasses, sedges, rushes, and low shrubs, or cavities in large hollow trees within forests or swamps; at least 120 m wide, so that predators have difficulty locating nests.	Provides nesting habitat for waterfowl species, as well as brood rearing habitat in close association with upland habitat.
Raptor Winter Feeding and Roosting Areas	RWA-01	480	>0.1(access road and collection line)	The open upland habitat is predominantly composed of cultural savannah intersected by a cultural woodland. The cultural savannah is dominated by white pine, white ash, common apple, and black walnut, with white pine and black walnut becoming more dominant toward the northwest. The shrub layer occupying between 25 - 60% cover consists of smooth brome, wild carrot, Canada thistle, and blackberry. The herbaceous layer consisted of alsike clover, cowvetch, Virginia Strawberry and field bindweed. This open habitat is adjacent to a large deciduous forest dominated by sugar maple, silver maple, basswood and trembling aspen in the vicinity of the open upland habitat.	Fields and open meadows can function as important feeding habitats for a variety of raptors, since prey (e.g., small mammals and ground nesting birds) are exposed and abundant in these open areas. Adjacent woodland edges function as roosting habitat and cover.
Reptile Hibernacula	RH-01	480	64 (access road and collection line)	This potential snake hibernaculum consists of a large rock pile located within a cultural woodland. Species observed within the canopy layer of this young cultural woodland community include white pine, black walnut, white elm and white oak. The herbaceous layer includes asters and goldenrod species.	Rock pile may allow snakes to enter ground below the frost line, providing protection from harsh winter temperatures and supporting overwinter survival.
	RH-02	488	104 (collection line) (120 m from turbine)	This potential snake hibernaculum consists of a large pile of debris located within a cultural meadow. The cultural meadow community is dominated by oldfield meadow species with scattered shrubs. Dominant species observed include common pear, orchard grass, brown knapweed (*Centaurea jacea*), Canada goldenrod, smooth brome, and wild carrot.	Debris pile may allow snakes to enter ground below the frost line, providing protection from harsh winter temperatures and supporting overwinter survival.
	Generalized Candidate SWH	541	40 (collection line)	Ideal hibernating sites include wooded areas rich in dead organic materials, areas below the frost line and rock crevices.	Allow snakes to enter ground below the frost line, providing protection from harsh winter temperatures and supporting overwinter survival.
Bat Maternity Colonies	BMC-02	427	43 (turbine)	10.00 wildlife trees per hectare; Dominant ash species. Abundant sugar maple.	May provide habitat for bat maternity colonies.
	BMC-13	437	91 (turbine)	Contains two candidate trees within 15 m of each other, including two large silver maples with dead branches, exfoliating bark, woodpecker holes, and enclosed cavities. The overhead vegetation cover is 40%. Ash swamp.	May provide habitat for bat maternity colonies.
	BMC-07	463	>0.1(collection line) (80 m from turbine)	Contains a candidate tree is found on the edge of the woodland, which is a dead elm snag. This edge of the woodland is found adjacent to a wet meadow riparian corridor. The overhead vegetation cover above the candidate tree is 20%. This woodland contains basswood and hickory.	May provide habitat for bat maternity colonies.
	BMC-12	470	43 (collection line) (89 m from turbine)	12.00 wildlife trees per hectare; Dominant white ash. Abundant white elm and sugar maple.	May provide habitat for bat maternity colonies.

4. Reflects distance between feature and disturbance area associated with project infrastructure.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
	BMC-11	483	>0.1(collection line) (94 m from turbine)	Contains a live silver maple, ~1 m dbh. One large branch has snapped off, and the tree has a crack and hollow. The hollow is 3 m above the ground, 15 to 20 cm wide at its widest, with an opening 1 m in length.	May provide habitat for bat maternity colonies.
	BMC-10	492	87 (turbine)	40.00 wildlife trees per hectare; Abundant sugar maple. Occasional white ash and red maple. Rare black cherry and ironwood.	May provide habitat for bat maternity colonies.
	BMC-01	504	66 (turbine)	Contains a large sugar maple located approximately 20 m in from the edge of the woodland. It is approximately 100 cm dbh and contains a large cavity. The overhead vegetation cover is 80% in this location. Sugar maple–American beech forest.	May provide habitat for bat maternity colonies.
	BMC-09	524	86 (access road and collection line) (110 m from turbine)	Contains a candidate tree which is a large, living basswood 10 m into the woodlot. It contains a large cavity ~ 3 m long, which begins at ground level. The dbh of this tree is ~70 cm. Sugar maple-mixed hardwood deciduous forest.	May provide habitat for bat maternity colonies.
	BMC-05	532	>0.1(collection line) (53 m from turbine)	Contains an area with several maple and American beech snags which are 4 to 15 m in height, and 20 to 40 cm dbh. There are a few weaker candidate snags within 30 m of this group as well.	May provide habitat for bat maternity colonies.
	BMC-14	534	>0.1(collection line) (39 m from turbine)	Contains a candidate tree which is a large (~70 cm dbh) beech snag. It is ~30 m tall with a large cavity 3 m from the ground and some exfoliating bark.	May provide habitat for bat maternity colonies.
	BMC-04	541	>0.1(collection line) (43 m from turbine)	Contains a willow snag in a very open clearing, which is largely hollow. It also has exfoliating bark and woodpecker holes. The snag is located 7 m north of a creek running through the woodland.	May provide habitat for bat maternity colonies.
	BMC-08	542	2 (access road and collection line) (40 m from turbine)	Contains one candidate tree, which is a large dying black cherry; lowland deciduous maple-beech dominated forest, determined to have relatively weak candidate trees because there are many young trees, and the large trees which exist are very healthy. Some snags are present, but most are very small or without holes, cracks or exfoliating bark. Canopy cover is dense.	May provide habitat for bat maternity colonies.
	BMC-03	544	24 (access road) (73 m from turbine)	15.56 wildlife trees per hectare; Dominant white ash. Occasional ironwood, sugar maple, basswood, and American beech.	May provide habitat for bat maternity colonies.
	Generalized Candidate SWH	426, 439, 456, 475, 487, 488, 494, 512, 514, 520, 537, 539, 545, 551, 552, 555, 556, 561	varied	Bat maternity colonies generally occur in snags or tree cavities, vegetation as well as buildings (buildings are not considered to be SWH).	May provide habitat for bat maternity colonies.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
Amphibian Woodland Breeding Habitat	AWO-01	463	>0.1(collection line) (110 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age deciduous forest community. The canopy layer consists of sugar maple and white ash, whereas the sub-canopy is dominated by beech, white elm, and sugar maple. Species observed within the herbaceous layer include violet species, jewelweed and several grass species. A nearby watercourse was flowing at the time of the site investigation.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-02	480	80 (turbine) (120 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age deciduous forest community. The canopy layer includes sugar maple, silver maple, basswood and trembling aspen. Species dominating the shrub layer include red-osier dogwood, spotted jewelweed, and blue cohosh. The herbaceous layer consists of wild mint, jack-in-the-pulpit, Virginia strawberry, and herb robert.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-03	481	2 (access road and collection line)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age deciduous forest. The canopy consists of sugar maple, and white ash. The sub-canopy is dominated by choke cherry. The shrub layer is dominated by red-berried elderberry. The ground cover layer consists of yellow dog's-tooth violet, white avens, and downy yellow violet.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-04	484	35 (turbine) (115 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within an ash deciduous swamp. The canopy layer consists of green ash and Freeman's maple, while the sub-canopy is composed of white elm, Freeman's maple, and common buckthorn. The ground cover layer is dominated by tall white aster, and gray's sedge.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-05	484	60 (turbine) (115 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mature deciduous swamp. The canopy is dominated by Freeman's maple, and green ash while the sub-canopy consists of white elm and Freeman's' maple. The ground cover layer is dominated by gray's sedge and tall white aster. This community exhibits evidence of seasonal flooding but was dry at the time of the site investigation (September/November).	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-06	487	15 (access road and collection line)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mature deciduous forest. The canopy layer consists of sugar maple, beech, basswood, and white ash. The sub-canopy consists of sugar maple, white elm, white ash and basswood. The shrub layer consists of sugar maple, white ash, white birch, and ironwood, while the ground cover layer is dominated by enchanter's nightshade, yellow avens, immature beech, and immature white ash. Seven Wood Frogs observed here in mid-August.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-07	498	26 (turbine) (58 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age deciduous sugar maple forest. The canopy layer consists of sugar maple, beech, and black cherry. The sub-canopy is dominated by green ash. The shrub layer occupying approximately 10-25% cover is dominated by choke cherry while the ground cover layer consists of yellow dog's-tooth violet, and white avens.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
	AWO-08	504	66 (turbine) (105 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age, managed deciduous forest. The dominant species observed within the canopy layer is sugar maple with a minor component of American beech and white ash, while the shrub layer consists of choke cherry, immature white ash, and black raspberry. The herbaceous layer is dominated by zig-zag goldenrod, calico aster, wild ginger, violets and sugar maple seedlings.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-09	510	22 (turbine) (85 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age mature deciduous forest. The canopy consists of sugar maple, white ash, white elm, and basswood. The shrub layer is dominated by common buckthorn. The ground cover layer consists of jack-in-the-pulpit, white trillium, foamflower and blue cohosh.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-10	534	>0.1(collection line) (59 m from access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age to mature deciduous forest with deciduous swamp inclusions. Dominant species include sugar maple, American basswood, beech, and white ash in the forest and freeman's maple in the swamp communities.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	AWO-11	534	77 (access road)	This potential amphibian woodland breeding habitat consists of a vernal pool within a mid-age deciduous forest with deciduous swamp inclusions. Dominant species include green ash and freeman's maple in the forest and swamp communities, respectively.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
	Generalized Candidate SWH	450, 463, 483, 510, 534, 537, 541	varied	This type of significant wildlife habitat can occur in woodland or swamp communities with a wetland, lake or pond, including breeding pools that may be permanent, seasonal, ephemeral, and located within or adjacent to (within 120 m of) the woodland.	Woodland breeding amphibians congregate in temporary wooded ponds in the spring where they mate and lay eggs in the water. The larvae then hatch and live in the water for several months until they emerge as adults.
Amphibian Wetland Breeding Habitat	AWE-01	495	51 (access road and collection line)	Consists of a Willow Mineral Thicket Swamp Type (SWT2-2) adjacent to a large pond. The canopy layer within the mid-age swamp thicket is dominated by peach-leaved willow, and crack willow, while the sub-canopy consists of Missouri willow, red-osier dogwood, and reddish willow. The shrub and herb layers consist of rice-cut grass, jewelweed, broad- leaved cattail, joe-pye-weed, meadow horsetail, and Pennsylvania bittercress.	Wetland breeding amphibians congregate in temporary or permanent standing water in spring where they mate and lay eggs. The larvae then hatch and live in the water for several months to over a year in the case of Green Frogs and Bullfrogs.
	AWE-02	532	52 (collection line) (55 m from access road)	Consists of a Forb Mineral Meadow Marsh (MAM2-10) with a stream flowing through it. The marsh community is dominated by asters and goldenrods.	Wetland breeding amphibians congregate in temporary or permanent standing water in spring where they mate and lay eggs. The larvae then hatch and live in the water for several months to over a year in the case of Green Frogs and Bullfrogs.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
	AWE-03	541	>0.1(access road)	Consists of a Forb Mineral Meadow Marsh (MAM2-10) with a stream flowing through it. The canopy layer within the mid-age meadow marsh occupying between 0 and 25% cover is dominated by white ash, green ash, and white elm. The sub-canopy cover consists of red-osier dogwood, long-beaked willow, common buckthorn and Missouri willow. The shrub layer is dominated by tall white aster, spotted joe-pye-weed, grass-leaved goldenrod, giant goldenrod. The ground cover layer is comprised of small yellow sedge, bristly sedge, meadow horsetail, and spotted jewelweed.	Wetland breeding amphibians congregate in temporary or permanent standing water in spring where they mate and lay eggs. The larvae then hatch and live in the water for several months to over a year in the case of Green Frogs and Bullfrogs.
	Generalized Candidate SWH	494, 564, 565	varied	This type of significant wildlife habitat generally occurs in meadow marsh, shallow marsh, submerged shallow aquatic, mixed shallow aquatic, floating-leaved shallow aquatic or swamp thicket communities where standing water is present in the spring or throughout the year.	Wetland breeding amphibians congregate in temporary or permanent standing water in spring where they mate and lay eggs. The larvae then hatch and live in the water for several months to over a year in the case of Green Frogs and Bullfrogs.
Rare Vegetation Communities	RVC-01	537	22 (access road)	This rare vegetation community is a Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4), a rare forest type with a provincial ranking of S2S3. Dominant tree species found within this mid-age moist deciduous forest include black walnut, eastern cottonwood, green ash, white ash and black ash.	Rare forest types may provide specialized habitats and resources for plant and wildlife species. Mast (nuts) produced by black walnut is an important fall and winter food for forest wildlife species.
Old Growth or Mature Forest Stands	Generalized Candidate SWH	456, 483, 487, 510, 514, 537, 541, 542	varied	True old growth forest consists of very old forest that has never been cutover while mature forest stands consist of very large trees and a broad range of tree size classes, and large standing snags of abundant downed wood of variable sizes.	Old growth or mature forests may provide specialized habitats and resources for plant and wildlife species. A broad range of tree sizes creates a diversity of structure. Large standing snags are an important habitat for many wildlife species.
Woodland Raptor Nesting Habitat	Generalized Candidate SWH	Woodland Unit N	20 (access road)	Mid-age deciduous forest with more than 4 ha of interior forest habitat. Vegetation communities include Dry-Fresh Sugar Maple-Beech Deciduous Forest Type (FOD5-2), in which the canopy consists of sugar maple and American beech, white ash and ironwood, and Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type (FOM3-2), in which the canopy layer is dominated by eastern hemlock, sugar maple, and some Norway spruce.	Large tract of unfragmented forest may provide important habitat for woodland raptors to use for shelter, build nests and hunt for prey.
Seeps and Spring	Generalized Candidate SWH	437, 439, 463, 510, 518, 532, 534, 537, 539	varied	Naturally vegetated areas with evidence of groundwater upwelling. Within the 120 m Area of Investigation, these have varied plant species compositions, with the presence of seep indicator species such as jewelweed or watercress.	Wildlife may rely on open water available at seeps and springs during the winter. Seeps are also important for recharging to streams thereby contributing to fish habitat, and as habitat for a number of specialized plant species.
Marsh Bird Breeding Habitat	Generalized Candidate SWH	495	51 (access road and collection line)	Wetland habitats containing shallow water and emergent aquatic vegetation.	Provides breeding habitat for marsh breeding birds.

Table 3.29 Summary of Significant Wildlife Habitats Identified Through the Site Investigation

Type of Significant Wildlife Habitat	Feature ID	Natural Areas	Minimum Distance from Project Location[4]	Attributes and Composition	Function
Habitat of Species of conservation Concern	Generalized Candidate SWH	Numerous; refer to Figure 3.6c	varied	Varied; refer to Table 3.2 and Section 3.3.6.4 for descriptions of the attributes and composition of the preferred habitat for each species.	Any plant or animal species designated as Special Concern or ranked S1, S2 or S3 and not already recognized as Endangered or Threatened by COSSARO are provincially significant and considered to be species of conservation concern. Habitats of species of conservation concern are comprised of the habitats required by those species to undertake critical life functions (e.g., breeding habitat).

3.4 Summary of Corrections to Records Review

Table 3.30 summarizes any corrections that were made to the Records Review based on the findings from the Site Investigations.

Table 3.30 Summary of Corrections to Records Review

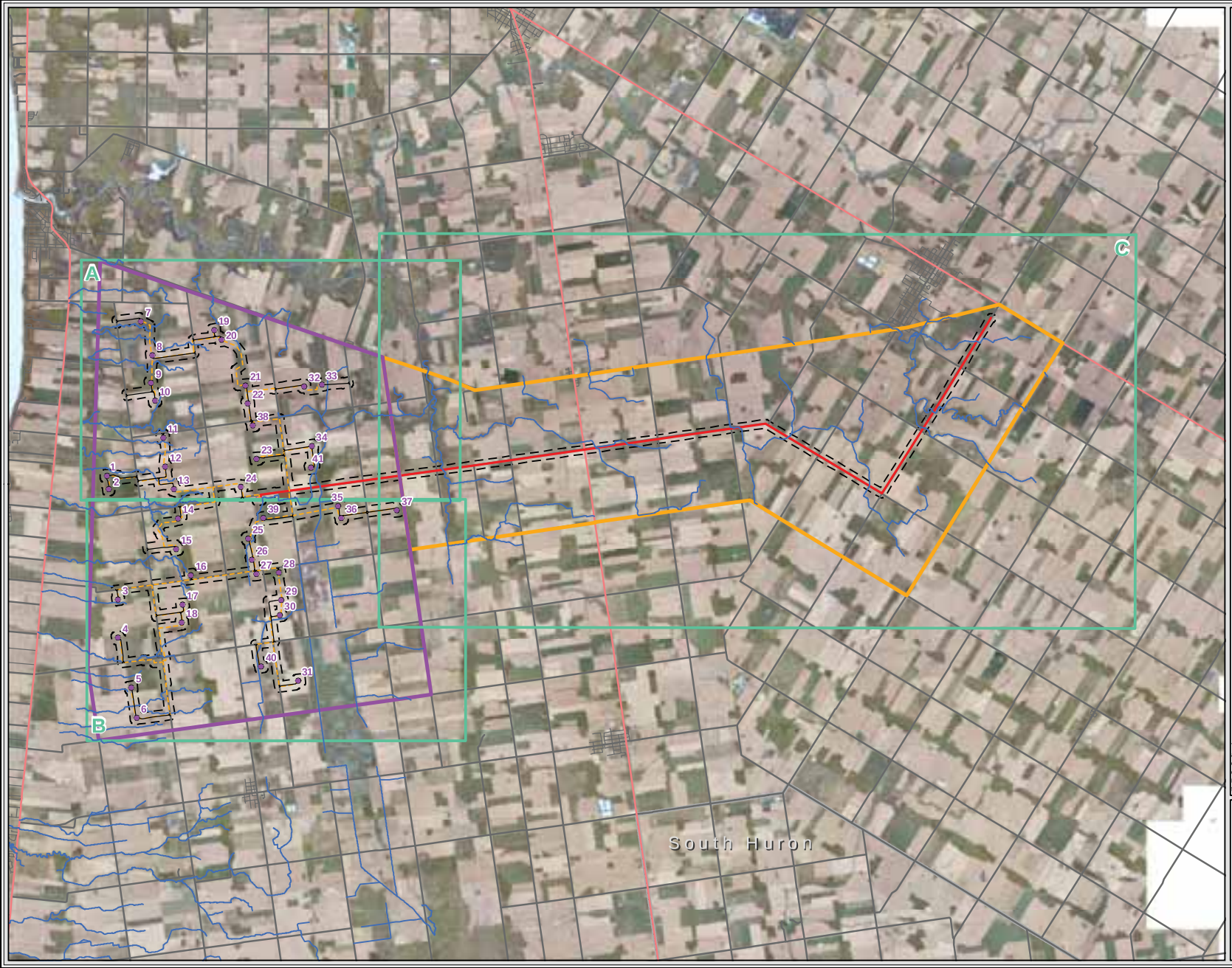
Natural Area #	Correction	Reason for Correction
Natural Area 427 (Woodland A)	Woodlot size reduced	Much of the woodlot had been removed

3.5 Summary of Key Findings of the Site Investigation

Table 3.31 summarizes the natural features identified through the records review and confirmed through site investigation as occurring in the Project Location or its associated 120 m Area of Investigation that were carried forward to the evaluation of significance.

Table 3.31 Summary of Natural Features Carried Forward to Evaluation of Significance

Feature	Results of Site Investigation
Wetlands	The following ten wetland units or wetland complexes were confirmed within the 120 m Area of Investigation and were carried forward to evaluation of significance: WET-01, WET-03, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10,WET-12 and WET-13.
Woodlands	A total of 39 woodlands were confirmed within the 120 m Area of Investigation and were carried forward to evaluation of significance.
Valleylands	The following valleyland feature was confirmed within the 120 m Area of Investigation and will be carried forward to evaluation of significance: • VAL-01
Candidate Significant Wildlife Habitat	The following candidate significant wildlife habitats were identified within the 120 m Area of Investigation and within 120 m of qualifying project infrastructure, and were therefore carried forward to evaluation of significance: • Raptor winter feeding and roosting areas (RWA-01); • Reptile hibernacula (RH-01 and RH-02); • Bat maternity colonies (BMC-01, BMC-02, BMC-03, BMC-04, BMC-05, BMC-07, BMC-08, BMC-09, BMC-10, BMC-11, BMC-12, BMC-13 and BMC-14); • Amphibian woodland breeding habitat (AWO-01, AWO-02, AWO-03, AWO-04, AWO-05, AWO-06, AWO-07, AWO-08, AWO-09, AWO-10 and AWO-11); • Amphibian wetland breeding habitat (AWE-01, AWE-02 and AWE-03); and • Rare vegetation communities (RVC-01). 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*: • Waterfowl nesting areas (Natural Area 537); • Reptile hibernacula (Natural Area 541); • Bat maternity roosts (Natural Areas 426, 439, 456, 475, 487, 488, 494, 512, 514, 520, 537, 539, 545, 551, 552, 555, 556 and 561); • Amphibian woodland breeding habitat (Natural Areas 450, 463, 483, 510, 534, 537 and 541); • Amphibian wetland breeding habitat (Natural Areas 494, 564 and 565); • Old growth and mature forest stands (Natural Areas 456, 483, 487, 510, 514, 537, 541 and 542); • Woodland raptor nesting habitat (Woodland Unit N); • Seeps and springs (Natural Areas 437, 439, 463, 510, 518, 532, 534, 537 and 539); • Marsh bird breeding habitat (Natural Area 495); and • Habitats of species of conservation concern (numerous).



Legend

Project Location

- GE Turbine
- Wind Energy Centre Study Area
- Transmission Line Study Area
- ELC Map Coverage
- Access Roads
- Collection Line
- Transmission Line
- 120 m Area of Investigation
- Substation
- Laydown Yard
- Municipal Division
- Waterbody
- Cartographic Wetland

Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2006

N W E S

m
0 500 1,000 2,000 3,000 4,000

1:100,000

UTM Zone 17N, NAD 83

Bluewater Wind Energy Centre
Natural Heritage Assessment Report

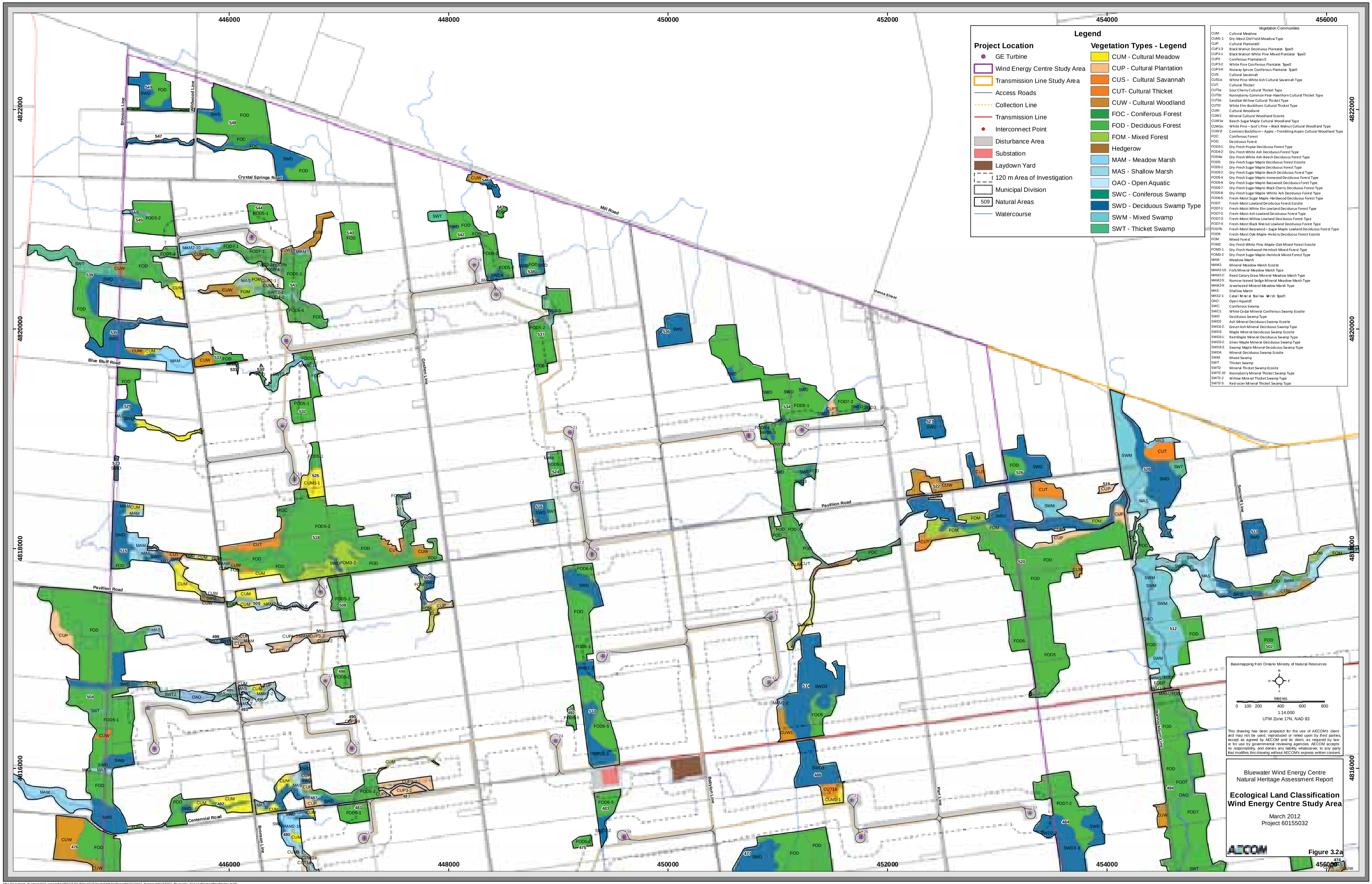
Ecological Land Classification Key Map

February 2012
Project 60155032

AECOM

Figure 3.1

Map Document: (N:\projects\0-aecom\60155032\0010\Final\GIS\Spatial\MXDs\ReportMXDs\NHA_Mapping\Bluewater\60155032_BLU_ELC_KeyMap.mxd)
2/9/2012 - 4:41:13 PM


Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Natural Areas
Watercourse
Vegetation Types - Legend
CUM - Cultural Meadow
CUP - Cultural Plantation
CUS - Cultural Savannah
CUT- Cultural Thicket
CUW - Cultural Woodland
FOC - Coniferous Forest
FOD - Deciduous Forest
FOM - Mixed Forest
Hedgerow
MAM - Meadow Marsh
MAS - Shallow Marsh
OAO - Open Aquatic
SWC - Coniferous Swamp
SWD - Deciduous Swamp Type
SWM - Mixed Swamp
SWT - Thicket Swamp
Vegetation Communities
Crystal Springs Road
Mill Road
Vienna Street
Goshen Line
Blue Bluff Road
Pavilion Road
Bronson Line
Centennial Road
Babylon Line
Parr Line
Bannockburn Line
Smirnoff Line
Basemapping from Ontario Ministry of Natural Resources
Metres
0 100 200 400 600 800
1:14,000
UTM Zone 17N, NAD 83
This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Ecological Land Classification
Wind Energy Centre Study Area
March 2012
Project 60155032
AECOM
Figure 3.2a

446000
448000
450000
452000
454000
456000
4816000
4814000
4812000
4810000
Centennial Road
Staffa Road
Bronson Line
Tower Line
Goshen Line
Babylon Line
Kippen Road
Parr Line
Concession 5 Road
Gulley Line
Bannockburn Line
Blackbush Line
Danceland Road
Blind Line
Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
509 Natural Areas
Watercourse
Vegetation Types
CUM - Cultural Meadow
CUP - Cultural Plantation
CUS - Cultural Savannah
CUT- Cultural Thicket
CUW - Cultural Woodland
FOC - Coniferous Forest
FOD - Deciduous Forest
FOM - Mixed Forest
Hedgerow
MAM - Meadow Marsh
MAS - Shallow Marsh
OAO - Open Aquatic
SWC - Coniferous Swamp
SWD - Deciduous Swamp Type
SWM - Mixed Swamp
SWT - Thicket Swamp
Vegetation Communities
CUM: Cultural Meadow
CUM1-1: Dry-Moist Old Field Meadow Type
CUP: Cultural Plantation
CUP1-3: Black Walnut Deciduous Plantation Type
CUP2-1: Black Walnut-White Pine Mixed Plantation Type
CUP3: Coniferous Plantations
CUP3-2: White Pine Coniferous Plantation Type
CUP3-9: Norway Spruce Coniferous Plantation Type
CUS: Cultural Savannah
CUS1a: White Pine-White Ash Cultural Savannah Type
CUT: Cultural Thicket
CUT1a: Sour Cherry Cultural Thicket Type
CUT1b: Nannyberry-Common Pear-Hawthorn Cultural Thicket Type
CUT1e: Sandbar Willow Cultural Thicket Type
CUT1f: White Elm-Buckthorn Cultural Thicket Type
CUW: Cultural Woodland
CUW1: Mineral Cultural Woodland Ecosite
CUW1a: Beech-Sugar Maple Cultural Woodland Type
CUW1o: White Pine – Scot's Pine – Black Walnut Cultural Woodland Type
CUW1f: Common Buckthorn – Apple – Trembling Aspen Cultural Woodland Type
FOC: Coniferous Forest
FOD: Deciduous Forest
FOD3-1: Dry-Fresh Poplar Deciduous Forest Type
FOD4-2: Dry-Fresh White Ash Deciduous Forest Type
FOD4a: Dry-Fresh White Ash-Beech Deciduous Forest Type
FOD5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite
FOD5-1: Dry-Fresh Sugar Maple Deciduous Forest Type
FOD5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type
FOD5-4: Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type
FOD5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Foret Type
FOD5-7: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type
FOD5-8: Dry-Fresh Sugar Maple-Whiite Ash Deciduous Forest Type
FOD6-5: Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type
FOD7: Fresh-Moist Lowland Deciduous Forest Ecosite
FOD7-1: Fresh-Moist White Elm Lowland Deciduous Forest Type
FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest Type
FOD7-3: Fresh-Moist Willow Lowland Deciduous Forest Type
FOD7-4: Fresh-Moist Black Walnut Lowland Deciduous Forest Type
FOD7b: Fresh-Moist Basswood – Sugar Maple Lowland Deciduous Forest Type
FOD9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite
FOM: Mixed Forest
FOM2: Dry-Fresh White Pine-Maple-Oak Mixed Forest Ecosite
FOM3-1: Dry-Fresh Hardwood-Hemlock Mixed Forest Type
FOM3-2: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type
MAM: Meadow Marsh
MAM2: Mineral Meadow Marsh Ecosite
MAM2-10: Forb Mineral Meadow Marsh Type
MAM2-2: Reed Canary Grass Mineral Meadow Marsh Type
MAM2-5: Narrow-leaved Sedge Mineral Meadow Marsh Type
MAM2-9: Jewelweed Mineral Meadow Marsh Type
MAS: Shallow Marsh
MAS2-1: Cattail Mineral Shallow Marsh Type
OAO: Open Aquatic
SWC: Coniferous Swamp
SWC1: White Cedar Mineral Coniferous Swamp Ecosite
SWD: Deciduous Swamp Type
SWD2: Ash Mineral Deciduous Swamp Ecosite
SWD2-2: Green Ash Mineral Deciduous Swamp Type
SWD3: Maple Mineral Deciduous Swamp Ecosite
SWD3-1: Red Maple Mineral Deciduous Swamp Type
SWD3-2: Silver Maple Mineral Deciduous Swamp Type
SWD3-3: Swamp Maple Mineral Deciduous Swamp Type
SWD4: Mineral Deciduous Swamp Ecosite
SWM: Mixed Swamp
SWT: Thicket Swamp
SWT2: Mineral Thicket Swamp Ecosite
SWT2-10: Nannyberry Mineral Thicket Swamp Type
SWT2-2: Willow Mineral Thicket Swamp Type
SWT2-5: Red-osier Mineral Thicket Swamp Type
Basemapping from Ontario Ministry of Natural Resources
N
W
E
S
Metres
0 100 200 400 600 800
1:14,000
UTM Zone 17N, NAD 83
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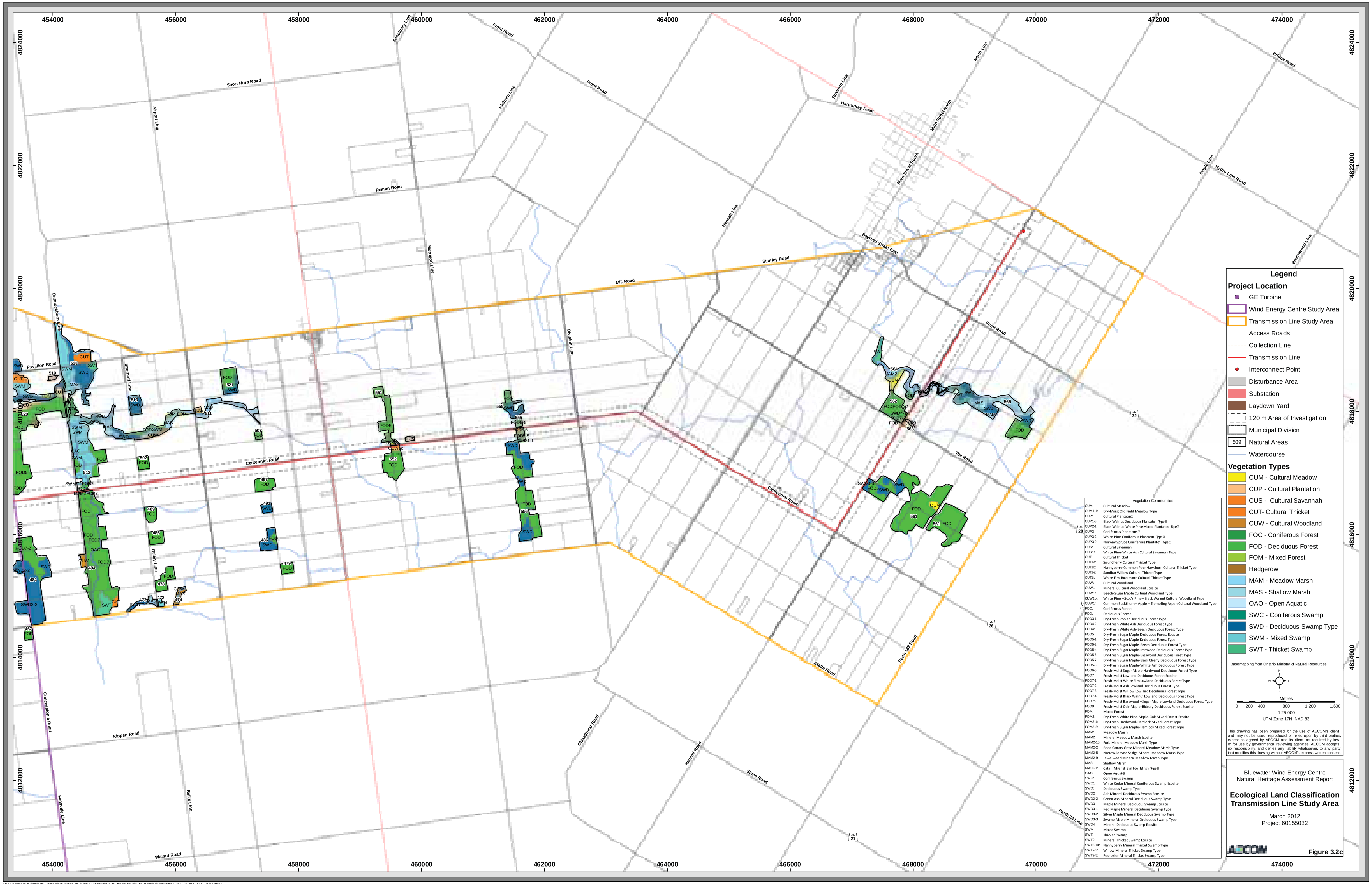
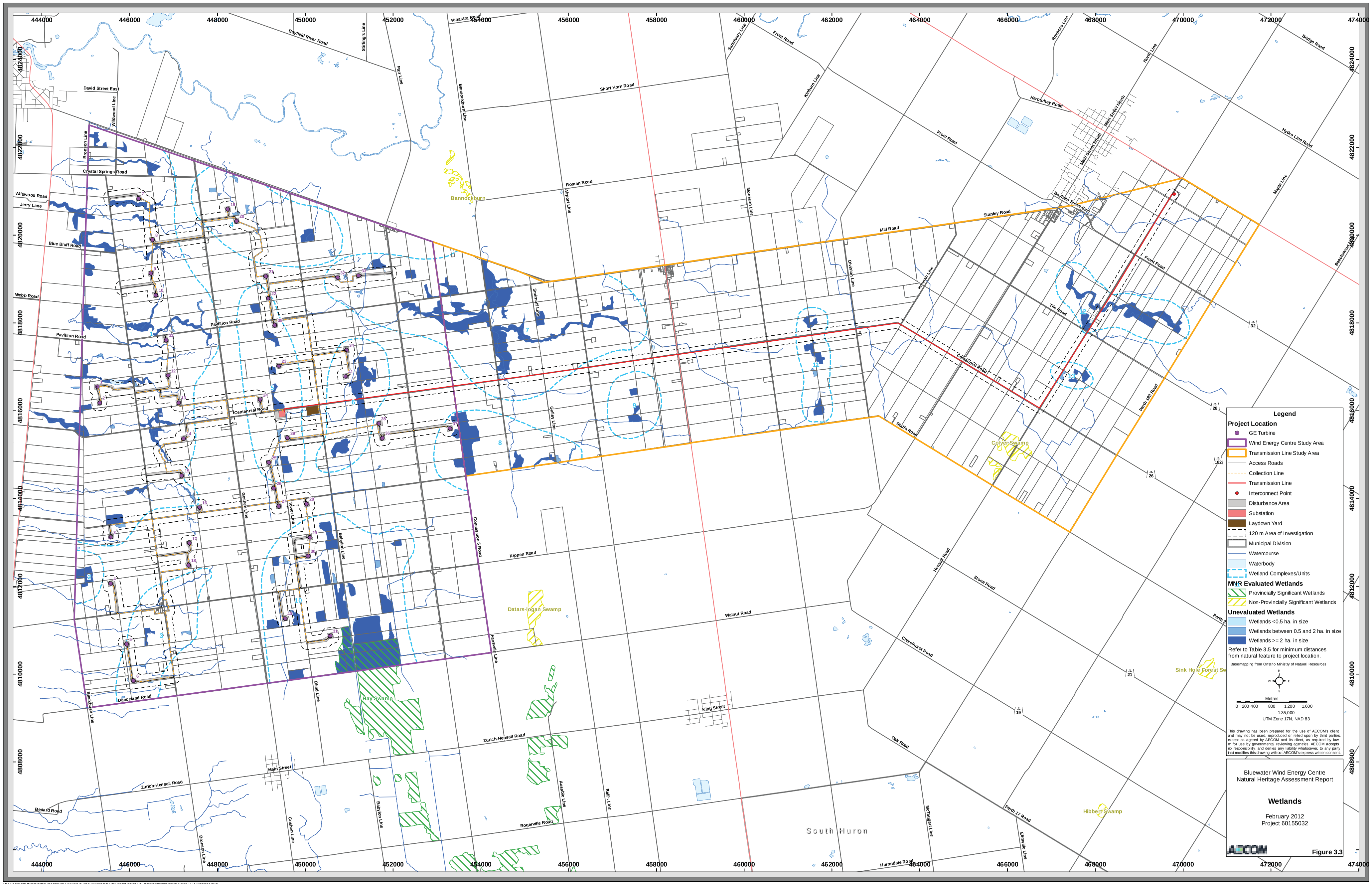
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Ecological Land Classification
Wind Energy Centre Study Area
March 2012
Project 60155032
AECOM
Figure 3.2b



Map Document: (N:\projects\0-aecom\60155032\2010\Final\GIS\Spatial\MXDs\Report\MXDs\NHA_Mapping\Bluewater\60155032_BLU_ELC_TLine.mxd)
2/8/2012 -- 6:53:13 PM


Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Watercourse
Waterbody
Wetland Complexes/Units
MNR Evaluated Wetlands
Provincially Significant Wetlands
Non-Provincially Significant Wetlands
Unevaluated Wetlands
Wetlands <0.5 ha. in size
Wetlands between 0.5 and 2 ha. in size
Wetlands >= 2 ha. in size
Refer to Table 3.5 for minimum distances from natural feature to project location.
Basemapping from Ontario Ministry of Natural Resources
Metres
0 200 400 800 1,200 1,600
1:35,000
UTM Zone 17N, NAD 83
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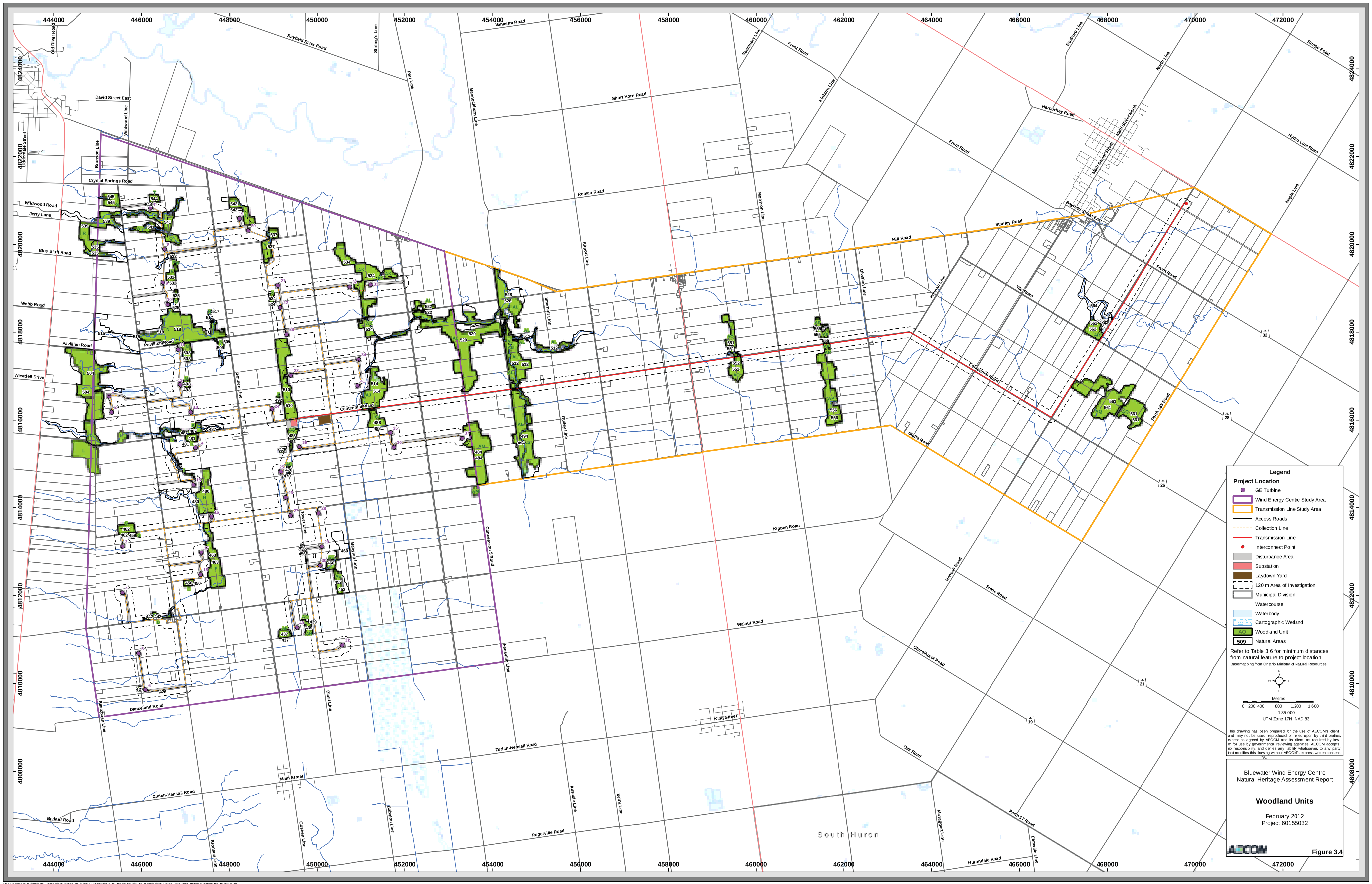
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Wetlands
February 2012
Project 60155032
AECOM
Figure 3.3
Bannockburn
Datars-logan Swamp
Hay Swamp
Colyer Swamp
Sink Hole Forest Sw
Hibbert Swamp
South Huron
Centennial Road
Mill Road
Stanley Road
Kippen Road
Walnut Road
Zurich-Hensall Road
Hensall Road
Roman Road
Short Horn Road
Bayfield River Road
Babylon Line
Goshen Line
Blind Line
Fairsville Line
Concession 5 Road
Pavilion Road
Blue Bluff Road
Crystal Springs Road
Danceland Road


Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Watercourse
Waterbody
Cartographic Wetland
Woodland Unit
Natural Areas
Refer to Table 3.6 for minimum distances from natural feature to project location.
Basemapping from Ontario Ministry of Natural Resources
Metres
0 200 400 800 1,200 1,600
1:35,000
UTM Zone 17N, NAD 83
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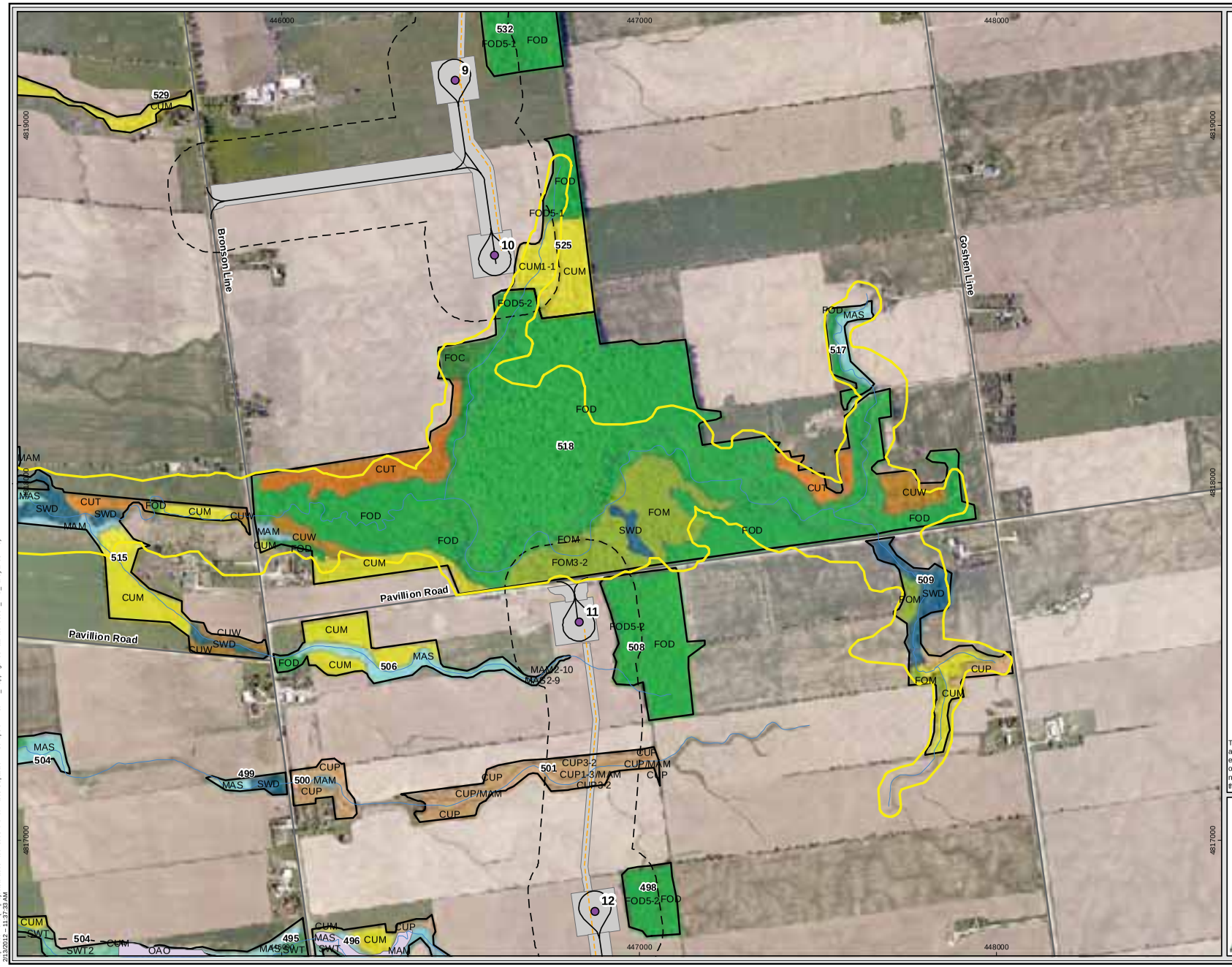
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Woodland Units
February 2012
Project 60155032
AECOM
Figure 3.4
South Huron
Centennial Road
Mill Road
Stanley Road
Kippen Road
Walnut Road
Zurich-Hensall Road
Concession 5 Road
Bayfield River Road
Hensall Road
Staffa Road
Perth 183 Road
Perth 17 Road



Legend

- GE Turbine
- 120 m Area of Investigation
- Disturbance Area
- Valleylands
- Natural Areas
- Watercourse

Vegetation Types

- CUM - Cultural Meadow
- CUP - Cultural Plantation
- CUS - Cultural Savannah
- CUT- Cultural Thicket
- CUW - Cultural Woodland
- FOC - Coniferous Forest
- FOD - Deciduous Forest
- FOM - Mixed Forest
- Hedgerow
- MAM - Meadow Marsh
- MAS - Shallow Marsh
- OAO - Open Aquatic
- SWC - Coniferous Swamp
- SWD - Deciduous Swamp Type
- SWM - Mixed Swamp
- SWT - Thicket Swamp

Refer to Table 3.7 for minimum distances from natural feature to project location.

Basemapping from Ontario Ministry of Natural Resources

N
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S

m
0 125 250 500

1:10,000

UTM Zone 17N, NAD 83

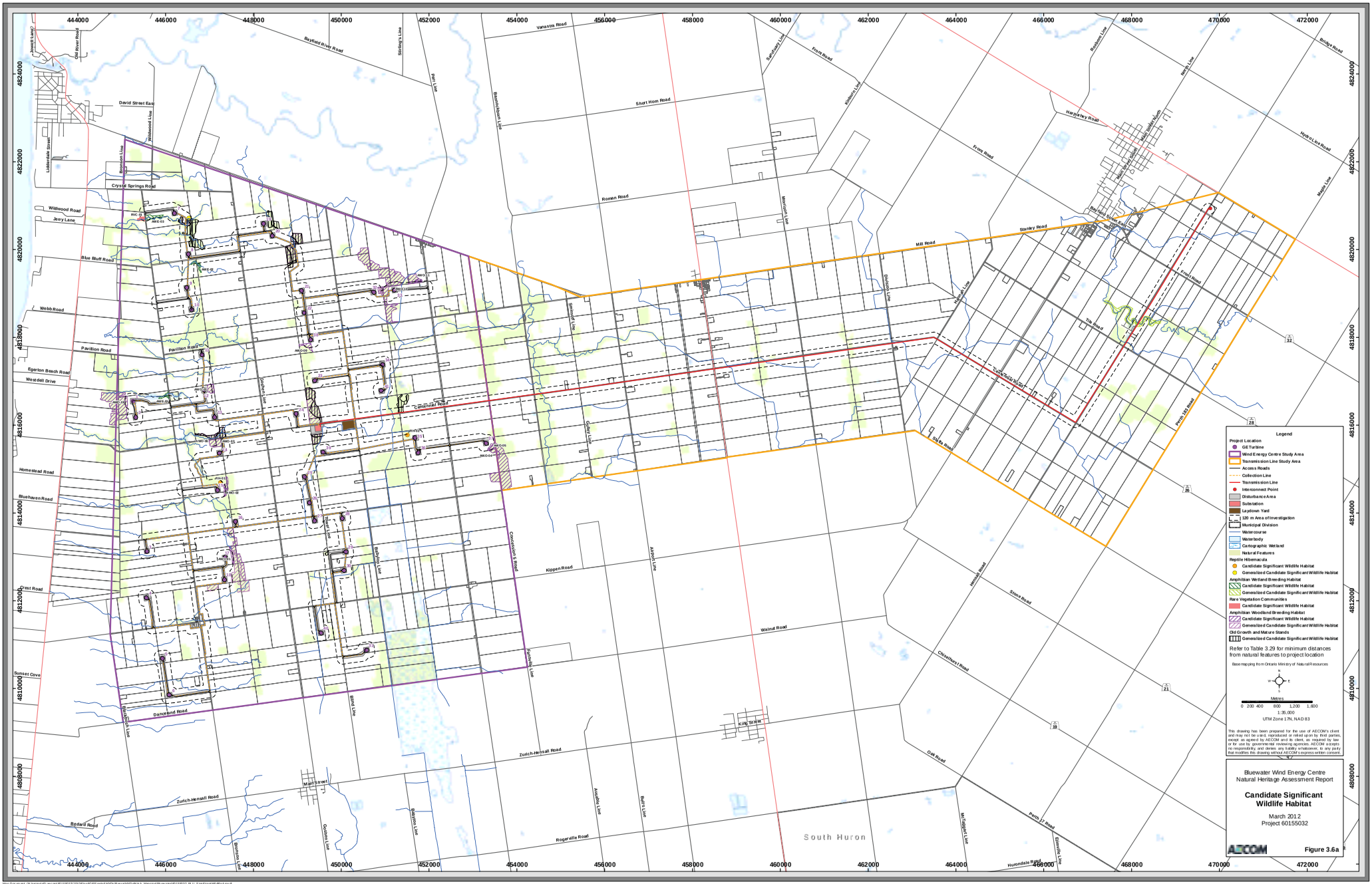
Nextera Energy Inc.

Bluewater Valleylands

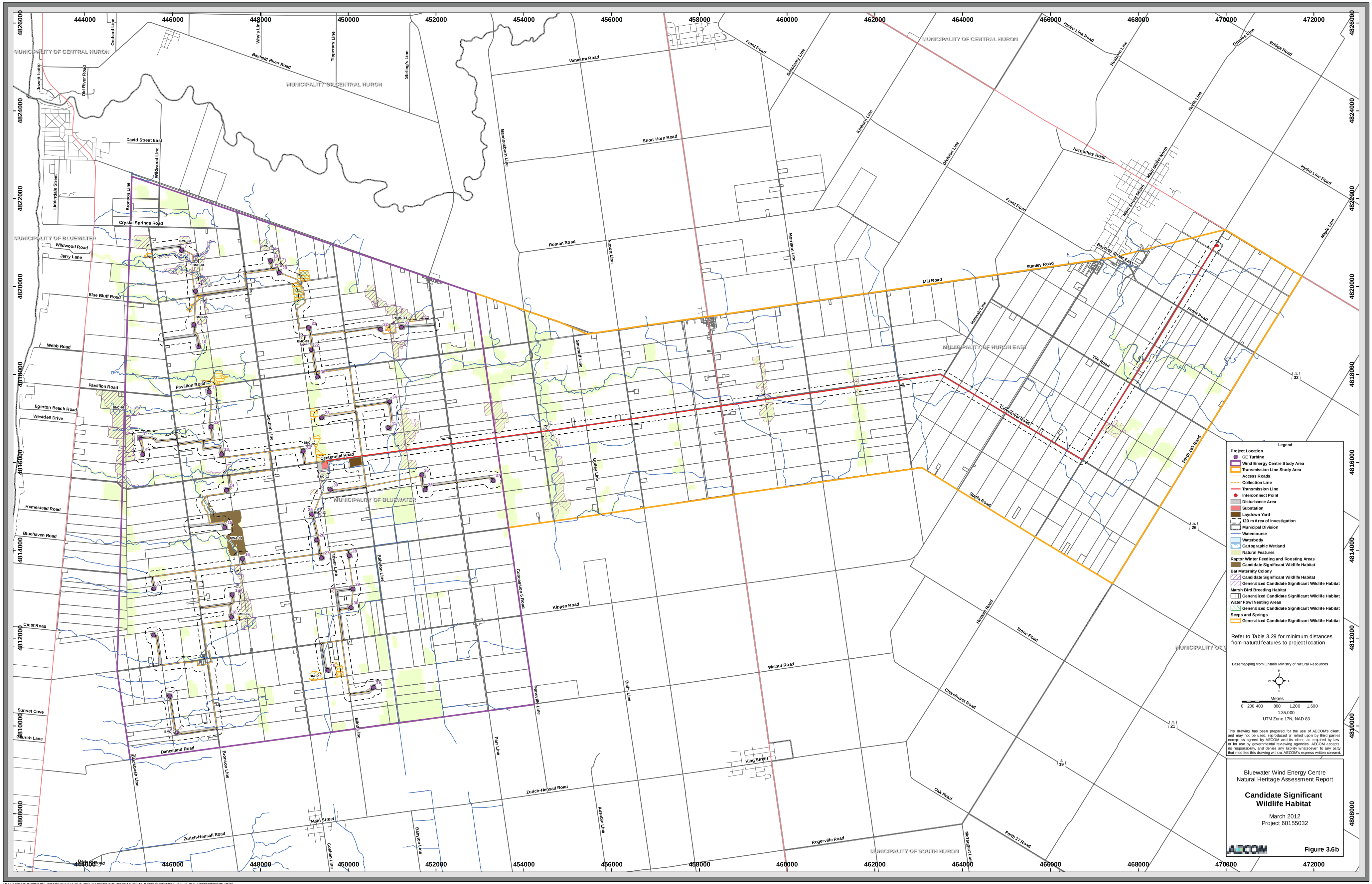
February 2012
Project 60155032

AECOM

Figure 3.5



Map Document: (N:\projects\60-ascent\60155032\GIS\mxd\GIS\Latest\MXDs\Report\MXD\NHA_Mapping\Bluewater\60155032_BLU_3_SignificantWildlifeHA.mxd)
2012-03-02 -- 10:36:46 AM


MUNICIPALITY OF CENTRAL HURON
MUNICIPALITY OF BLUEWATER
MUNICIPALITY OF HURON EAST
MUNICIPALITY OF SOUTH HURON
Centennial Road
Mill Road
Stanley Road
Bayfield Street East
Front Road
Tile Road
Perth 183 Road
Staffa Road
Kippen Road
Concession 5 Road
Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Watercourse
Waterbody
Cartographic Wetland
Natural Features
Raptor Winter Feeding and Roosting Areas
Candidate Significant Wildlife Habitat
Bat Maternity Colony
Candidate Significant Wildlife Habitat
Generalized Candidate Significant Wildlife Habitat
Marsh Bird Breeding Habitat
Generalized Candidate Significant Wildlife Habitat
Water Fowl Nesting Areas
Generalized Candidate Significant Wildlife Habitat
Seeps and Springs
Generalized Candidate Significant Wildlife Habitat
Refer to Table 3.29 for minimum distances from natural features to project location
Basemapping from Ontario Ministry of Natural Resources
Metres
0 200 400 800 1,200 1,600
1:35,000
UTM Zone 17N, NAD 83
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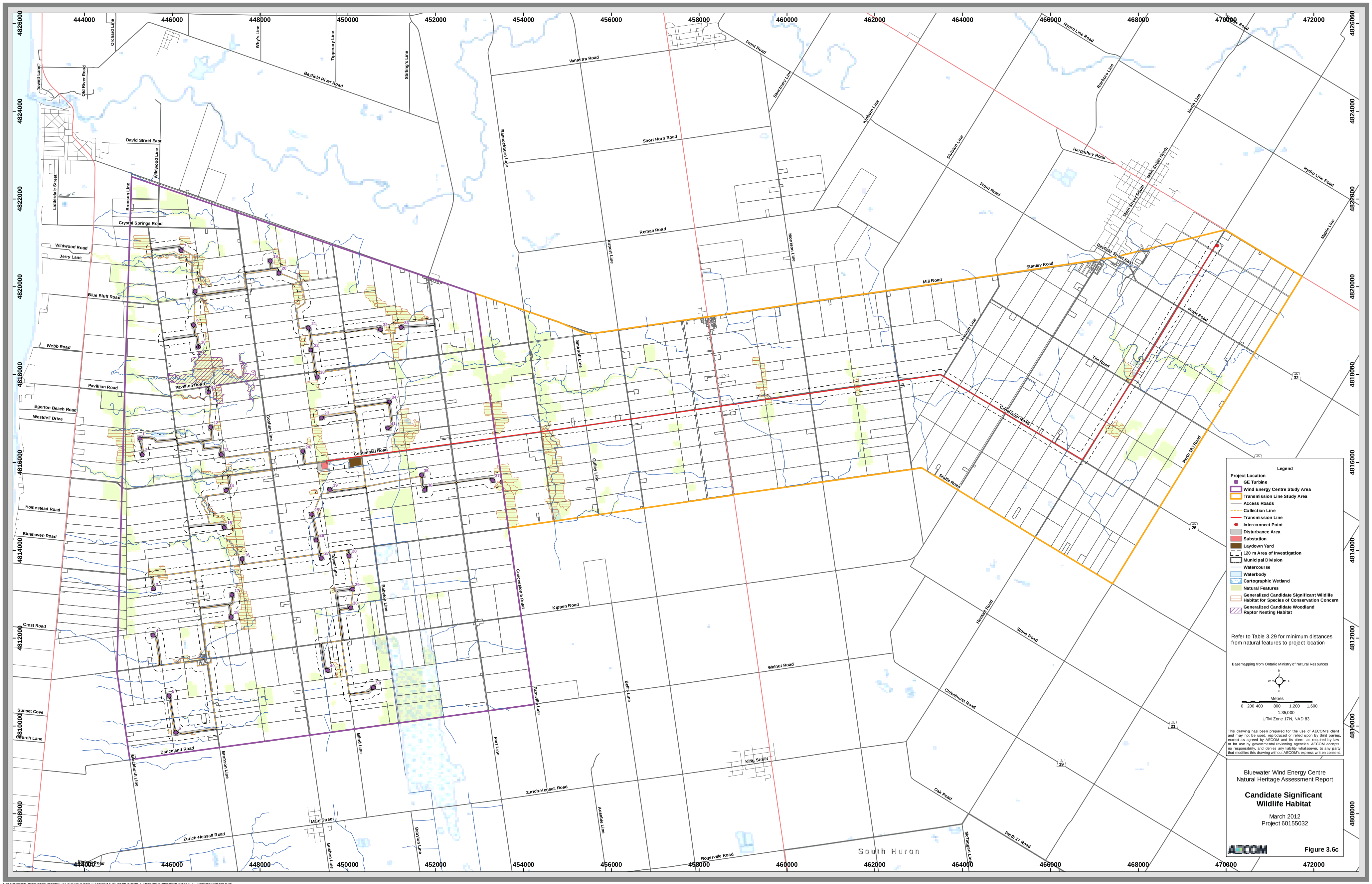
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Candidate Significant Wildlife Habitat
March 2012
Project 60155032
AECOM
Figure 3.6b



Map Document: (N:\projects\0-aecom\60155032\2010\Final\GISSpatial\MXDs\ReportMXDs\NHA_Mapping\Bluewater\60155032_BLU_SignificantWildlifeB.mxd)
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4. Evaluation of Significance

4.1 REA Requirements

Under the REA process, applicants are required to identify natural features in the vicinity of the proposed Project Location and determine whether prohibitions and setbacks apply (O. Reg. 359/09, Sections 37 and 38). In instances where the Project is proposed within such a setback, the applicant must prepare an Environmental Impact Study (EIS) report (Section 38) to identify and assess the potential negative environmental effects that may result from the proposed renewable energy project, identify appropriate mitigation measures and describe how the potential effects will be addressed through the environmental effects monitoring plan and construction plan.

In order to determine whether development prohibitions and setbacks apply, applicants are required to determine whether natural features identified in the Project Location or within 120 m of the Project Location (herein defined as the 120 m Area of Investigation) are significant or provincially significant according to procedures or criteria established or accepted by the Ministry of Natural Resources (MNR). Under Part IV, Section 27 of O. Reg. 359/09, establishing the significance of a natural feature is only a requirement if the Project Location is proposed within 120 m of the natural feature (*i.e.*, wetland, woodland, valleyland, candidate significant wildlife habitat or life science ANSI), or within 50 m of an earth science ANSI. As an alternative, applicants may choose to treat a natural feature as significant and amend the Project Location to be outside the established setback from the natural feature, in which case an evaluation of significance and EIS are not required.

In conducting an evaluation of significance, Part IV, Section 27 of O. Reg. 359/09 requires that applicants make use of any available information related to the natural feature including information obtained through the records review, through site investigations or alternative site investigations, and through consultations. If a feature is evaluated and determined to be neither significant nor provincially significant, the feature is not subject to development prohibitions.

For some features (e.g., wetlands located outside the Project Location but within the 120 m Area of Investigation), MNR will deem it reasonable for the applicant to treat the feature as significant, provided the applicant follows criteria and procedures established by MNR to ensure that those attributes of the feature that are necessary to prepare the evaluation of significance report and conduct an EIS are considered.

4.2 Methods

The following is a description of the criteria and procedures used to evaluate the significance of features carried forward from the records review and site investigation to the evaluation of significance phase of this NHA.

4.2.1 Wetlands

A total of ten wetland units or complexes were identified within the 120 m Area of Investigation through the records review and site investigation process and were therefore carried forward to the evaluation of significance. In the context of the REA process, wetland features can be assessed in two ways: i) by undertaking a full evaluation according to the MNR's Ontario Wetland Evaluation System (3rd edition; December, 2002), or ii) by treating any unevaluated wetland within 120 m of the proposed Project Location (but not within the Project Location itself) as provincially significant. More details regarding these two approaches are provided below.

4.2.1.1 Ontario Wetland Evaluation System

Section 6.2.1 of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011) states that, "Provincially significant wetlands are those areas identified or confirmed by MNR as being the most valuable within

the landscape." Wetlands are scored using a scientific point-based ranking system found as part of the Ontario Wetland Evaluation System (OWES). Points are based on four components: Biological, Hydrological, Social and Rare Species. A provincially significant wetland, which needs to be identified or confirmed by MNR, is defined as any OWES evaluated wetland which scores a total of 600 or more points or 200 or more points in either the Biological Component or the Special Features Component.

A wetland that has been evaluated using the criteria outlined in the OWES is known as an "evaluated wetland" and will have a wetland evaluation file relating to it. No evaluated wetlands were identified within the 120 m Area of Investigation during the records review. However, Hay Swamp, a Provincially Significant Wetland, is located within the Project Study Area and is considered to form a portion of wetland complex 10, which includes wetlands within the 120 m Area of Investigation (refer to Figure 3.3).

4.2.1.2 Treatment of Unevaluated Wetlands as Significant without a full OWES

Within the REA process, an unevaluated wetland within 120 m of a proposed project can be treated as a provincially significant wetland. However note that treating a wetland as significant will not officially define the status of the wetland (either as significant or not significant). An EIS must be conducted on these wetland features that are treated as significant and the procedures outlined in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011) must be followed.

As identified through the records review and site investigations phases of this NHA, those wetlands which fall within 120 m of the proposed Project that require evaluation of significance include wetland complex/units WET-01, WET-03, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10, WET-12 and WET-13, as presented in Figure 3.3. These will be treated as provincially significant without going through a full OWES, and will therefore be evaluated using the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects (MNR, 2011). This assessment focuses on identifying wetland attributes relevant to the completion of an EIS for renewable energy projects, as described in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects.

Through consultation with MNR (personal communication, 2011), it was determined that an unevaluated wetland can be treated as significant if it isn't directly affected by the proposed Project (i.e., the Project Location is not within the wetland itself). This includes the installation of collection lines by method of directional drilling underneath wetlands, provided the entry and exit pits are located outside of the wetland area and that other mitigation measures are implemented, as described in the EIS (refer to Section 5). Therefore the ten wetlands were treated as significant and evaluated using the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects (MNR, 2011).

Field data required to complete the wetland evaluations were collected during site investigations. The dates of these field investigations are provided in Table 3.3. Detailed field notes are provided in Appendix B and the qualifications of field personnel are provided in Appendix C. The evaluation of significance for wetlands was undertaken by an OWES certified biologist, Jillian deMan.

4.2.2 Woodlands

A total of 40 woodlands were confirmed within the 120 m Area of Investigation through the site investigations and carried forward to evaluation of significance. The locations of these woodlands are shown on Figure 3.4. Each woodland feature was evaluated following the criteria set out in Table 8: Significant Woodland Evaluation Criteria and Standards of the REA regulation under Section 6 - Evaluation of Significance of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011). The following table (Table 4.1) presents the criterion used to evaluate each woodland feature along with a description of the sources used. This evaluation

system is based on the percentage of woodland cover found within the corresponding municipality where the project is located. The Project Study Area overlaps with two municipal boundaries; therefore two woodland cover percentages were taken into account. As identified in the respective Official Plans, the Municipality of Bluewater has 16.5% woodland cover (Municipality of Bluewater Official Plan, 2005) and the Municipality of Huron East has 10.8% woodland cover (The Municipality of Huron East Official Plan, 2009).

Details regarding woodland size, age, species composition, ecological function and uncommon characteristics were collected through a combination of vegetation community surveys and GIS analysis. The water protection criterion was evaluated by overlaying ABCA's Source Water Protection Map 4.3 (ABCA, 2011) for significant groundwater recharge areas with woodlands identified through the site investigation in a GIS environment. The dates of field investigations are shown in Table 3.3, field notes are provided in Appendix B, and the qualifications of field personnel are provided in Appendix C. The evaluation of significance for woodlands was undertaken by a qualified biologist, Jessica Piette.

Table 4.1 Woodland Evaluation Criteria

Criterion		Sources
1	**Woodland Size**	Completed through a combination of: • Aerial photograph interpretation; • Boundary confirmation during field investigations; and • GIS interpretation and calculations.
2	**a) Woodland Interior**	Completed through: • GIS calculations for individual features within the larger woodland units.
	b) Proximity to Other Significant Woodland or Habitats	Completed through a combination of: • GIS interpretation and calculations; • Input from Significant Wildlife Habitat Section; and • Input from biologists undertaking site investigations for the Bluewater Wind Energy Centre Water Assessment and Water Body Report (AECOM, 2011).
	c) Linkages	Completed through a combination of: • Input from Significant Wildlife Habitat Section and Records Review data; and • GIS interpretation and calculations.
	d) Water Protection	Completed through a combination of: • Use of Map 4.3 – Ausable Bayfield SPA, Significant Groundwater Recharge Areas (Ausable Bayfield Conservation Authority, 2011); • Data collected through site investigations; • GIS interpretation and calculations; and • Groundwater indicator species observed during field investigations.
	e) Woodland Diversity Representation	Completed through: • ELC data collected during site investigations; and • Inferences on larger woodland composition based on data collected.
3	**Uncommon characteristics**	Completed through a combination of: • NHIC database ELC community rankings; • Data collected through site investigations; and • NHIC database on Coefficient of Conservatism

4.2.3 Valleylands

Following the records review and site investigation process, one candidate significant valleyland was identified within Natural Area 518. Section 6.2.3 of the Natural Heritage Assessment Guide for Renewable Energy Projects (OMNR, 2011) outlines the criteria to be used for evaluating valleylands. Within this section, criteria for evaluating and identifying valleylands include:

- Surface water functions;
- Degree of naturalness;
- Linkage functions; and
- Restoration: Existing/committed projects.

Information required to complete the evaluation of significance was collected through a combination of site investigation surveys and GIS analysis. The dates of field investigations are shown in Table 3.3, field notes are provided in Appendix B, and the qualifications of field personnel are provided in Appendix C. The evaluation of significance for valleylands was undertaken by a qualified biologist, Jillian deMan.

4.2.4 Significant Wildlife Habitat

The following methods have or will be used to evaluate candidate significant wildlife habitats identified through the records review and site investigation process in order to determine whether these qualify as significant wildlife habitat according to procedures or criteria established or accepted by MNR. Six types of candidate significant wildlife habitat were identified within 120 m of qualifying infrastructure and carried forward to evaluation of significance from the site investigation phase of the NHA as follows:

- Raptor winter feeding and roosting areas (RWA-01);
- Reptile hibernacula (RH-01 and RH-02);
- Bat maternity colonies (BMC-01, BMC-02, BMC-03, BMC-04, BMC-05, BMC-07, BMC-08, BMC-09, BMC-10, BMC-11, BMC-12, BMC-13 and BMC-14);
- Amphibian woodland breeding habitat (AWO-01, AWO-02, AWO-03, AWO-04, AWO-05, AWO-06, AWO-07, AWO-08, AWO-09, AWO-10, AWO-11);
- Amphibian wetland breeding habitat (AWE-01, AWE-02 and AWE-03); and
- Rare vegetation communities (RVC-01).

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 carried forward to the EIS as generalized candidate significant wildlife habitat:

- Waterfowl nesting areas (Natural Area 537);
- Reptile hibernacula (Natural Area 541);
- Bat maternity roosts (Natural Areas 426, 439, 456, 475, 487, 488, 494, 512, 514, 520, 537, 539, 545, 551, 552, 555, 556 and 561);
- Amphibian woodland breeding habitat (Natural Areas 450, 463, 483, 510, 534, 537 and 541);
- Amphibian wetland breeding habitat (Natural Areas 494, 564 and 565);
- Old growth and mature forest stands (Natural Areas 456, 483, 487, 510, 514, 537, 541 and 542);
- Woodland raptor nesting habitat (Woodland Unit N);
- Seeps and springs (Natural Areas 437, 439, 463, 510, 518, 532, 534, 537 and 539);
- Marsh bird breeding habitat (Natural Area 495); and
- Habitats of species of conservation concern (numerous).

As determined through consultation with MNR, the evaluation of candidate significant wildlife habitat must be based on repeatable field protocols, with field work being conducted at the appropriate time of year. The following protocols have or will be used to assess the candidate significant wildlife habitats for which evaluation of significance studies are required. All evaluation of significance field investigations have or will be conducted by qualified biologists. Appendix B contains detailed evaluation of significance field notes. Appendix C contains qualifications (i.e., curriculum vitae) for all investigators.

4.2.4.1 Protocols to Determine Significance of Candidate Significant Wildlife Habitat

Raptor Winter Feeding and Roosting Areas

Only one feature (RWA-01) was identified as candidate significant raptor winter feeding and roosting habitat requiring evaluation of significance because the site contains a large open area (approximately 15 ha in size) of cultural meadow and savannah, connected to a large forest (approximately 25 ha in size), and is within 120 m of a proposed turbine location. The edge of the open feature is approximately 500 m from the nearest road, therefore a road survey is not possible. During evaluation of significance field studies, field personnel will access the feature from Bronson Line, conduct one transect eastward across the north part of the open upland area and to the woodlot edge (approximately 500 m), then walk 200 m south and make a second transect westward across the open upland area (refer to Figure 4.1 for transect locations).

GPS points will be taken at the beginning and end of each transect. Any encountered birds of prey will be recorded at its approximate GPS point, identified, age (adult or immature), behaviour noted, and estimated height above ground recorded for flying birds.

The evaluation of significance surveys will be conducted on up to three occasions at least two weeks apart in January and February 2012 (approximately early January, late January / early February and late February). To the extent possible, surveys will be conducted under calm, clear weather conditions. Weather conditions (wind, cloud cover, temperature, snow depth), start time and end time will be recorded on all survey dates. A field sheet will be prepared to record weather, raptors observed, UTMs of observations as well as time and date.

The number and density of observed raptors will be calculated to determine if the site meets the target for significant wildlife habitat under this criterion (i.e., contains 1 or more Short-eared Owls, or 2 or more Rough-legged Hawk, Red-tailed Hawk, Northern Harrier, American Kestrel or Snowy Owl and 10 or more individuals). If through the first and second survey it is determined that the feature is unlikely to qualify for significance according to these criteria, a third survey will not be conducted.

Reptile Hibernacula

Two features (RH-01 and RH-02) were identified as candidate significant reptile hibernacula requiring evaluation of significance because they contain a large rock or debris pile in the centre of a large area of open habitat that is also near a forest edge and is within 120 m of a proposed turbine location (refer to Figure 3.5). The rock pile and debris pile appear to be potentially suitable hibernacula. If hibernating snakes are present, they may occasionally be seen on the pile or nearby grass in spring or autumn. However snakes are often partially or entirely concealed in the grass or they may be among the loose stones or debris in the pile, so they are difficult to detect even if present. The presence of snakes can be easier to confirm by using cover objects since many species readily take cover under boards or tin sheets, particularly during spring and early autumn.

The vicinity of the rock pile (RH-01) and debris pile (RH-02) will be examined on three occasions between mid-April and mid-May, 2012. To the extent possible, surveys will be conducted under ideal weather conditions, being calm, clear or partly cloudy and with a temperature in the range of 10 to 20 degrees Celsius. On each visit the rock or debris pile will be approached slowly and scanned for the presence of snakes with binoculars from several metres back. An area search will be conducted by slowly walking a circle 5 m out from the edge of the pile while scanning the ground for snakes. Each area will be searched for a minimum of 20 minutes. On the first visit, the dimensions of the rock or debris pile will be recorded as well as immediately surrounding habitat conditions including vegetation, slope, and likelihood that the stones or debris extend below the frostline. If large stones or other cover objects (e.g., boards) are present, these will be overturned carefully since snakes may be hiding under them. Any snakes found will be visually identified, approximate length estimated, and visually sexed by amount of tail tapering (if possible).

This will be done to identify individuals which will help determine the number of snakes present if other snakes are found on subsequent visits. A field sheet will be prepared to record weather, habitat conditions, location of cover objects, UTMs of observations, details of any encountered snakes as well as time and date.

Snake hibernacula used by 5 or more individuals or 2 or more species of snakes, or congregations of 5 or more individuals or 2 or more species of snakes near potential hibernacula are to be considered significant.

Bat Maternity Colonies

Candidate significant bat maternity colonies in the Project Study Area were evaluated by NRSI. NRSI biologists conducted through-the-night acoustic bat monitoring at 12 locations in woodlands within 120 m of proposed wind turbines in 2010 and 2011, according to the 2010 guidance document Bats and Bat Habitats: Guidelines for Wind Power Projects(OMNR 2010). In addition, active visual and acoustic monitoring was undertaken to establish if any snags monitored may contain bat maternity colonies. These surveys occurred at a total of 5 and 6 locations in 2010 and 2011, respectively, and were conducted 91 and 72 times during the 2010 and 2011 monitoring seasons. Details pertaining to the survey methods, dates, locations and field personnel are provided in the Bluewater Wind Energy Centre 2011 Bat Monitoring Report and Environmental Impact Study (NRSI, 2011), appended to this report (Appendix E).

The evaluation of significance was conducted using evaluation criteria outlined in applicable guidance documents, including the Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000), and the Ecoregion Criteria Schedules addendum to the Significant Wildlife Habitat Technical Guide, for Ecoregion 6E (OMNR 2011a). Details regarding the evaluation of significance for bat maternity roosts are provided in Appendix E.

As a result of site investigations which were completed after the end of the 2011 bat monitoring period, an additional five woodlands were identified to contain suitable habitat for a bat maternity colony but could not be evaluated for significance during the appropriate monitoring season. For the purposes of this report, these habitats have been treated as significant with the commitment to conduct pre-construction monitoring within these habitats to confirm whether these features are significant. Pre-construction monitoring will be conducted in accordance with the July 2011 Bat and Bat Habitats provincial guidelines as follows.

Acoustic bat monitoring will occur at 10-30 candidate maternity colony trees in each woodland. Each tree will be surveyed once in June 2012 from one half hour before dusk until one hour after dusk to observe evidence of bats exiting. Monitoring will use high-powered spotlights and acoustic detectors to record species calls. Significant maternity colonies include at least 20 northern long-eared bats (*Myotis septentrionalis*) or little brown bats (*Myotis lucifugus*), 10 big brown bats (*Eptesicus fuscus*), or 5 adult, female, silver-haired bats (*Lasionycteris noctivagans*) (OMNR 2011a). The number of individuals observed exiting or entering candidate trees, combined with species recorded and their representation of total calls recorded at each tree, will be used to determine the number of individuals of each species utilizing a candidate tree. If any of these habitats are identified as being not significant when compared with provincial standards of significance, no specific mitigation measures are required.

Amphibian Breeding Habitat (Woodlands)

Spring 2011 Surveys

AECOM conducted amphibian surveys in order to identify significant wildlife habitat and assess potential impacts of the wind power project on specific natural areas. Amphibian surveys were conducted in late April 2011, late May 2011, and late June 2011. Amphibian survey locations were identified using aerial photo interpretation of natural areas located at or within 120 m of turbine locations for which property access was obtained at the time of the surveys. These surveys were undertaken by qualified biologists (qualifications of field personnel are provided in Appendix C).

Because peak amphibian calling periods are strongly associated with temperature and precipitation as well as date, field visits were scheduled to occur on three separate evenings according to minimum night air temperatures of 5 °C (41 °F), 10 °C, (50 °F), and 17 °C (63 °F), respectively, to the extent possible. Amphibian surveys began one-half hour after sunset and ended by 1:00 am. To the extent possible, visits were conducted during evenings with low wind (i.e., Beaufort Scale 0-2), preferably in moist conditions with one of the above corresponding temperatures. Surveyors recorded the approximate locations of all amphibian species heard calling, as well as the date, start time, finish time, and weather conditions (wind and cloud cover) during the survey. Surveyors listened for calling amphibians over a 3 minute period at each survey location. A call level code was assigned to each species detected, and the number of calling individuals was estimated for call levels 1 and 2, according to the procedures described in the Marsh Monitoring Protocol. Other relevant observations (e.g., frog eggs or tadpoles observed) were also recorded.

Spring 2012 Surveys

Evidence of vernal woodland pools were observed within the 120 m Area of Investigation in a number of natural areas during 2011 site investigations. In many cases these pools were identified late in the growing season (after most amphibian larvae had transformed) when there was no or minimal standing water present while some were found during amphibian calling surveys. Eleven of the natural features (AWO-01, AWO-02, AWO-03, AWO-04, AWO-05, AWO-06, AWO-07, AWO-08, AWO-09, AWO-10 and AWO-11) were located within 120 m of a proposed access road and had vernal pools that appeared to be substantial enough during site investigations to provide breeding habitat. Spring 2011 surveys were conducted at some of these locations as described above. Additional sites will be surveyed in the spring of 2012 as follows.

The general locations of vernal pools were identified by ELC vegetation polygons but a more detailed assessment of habitat conditions will be made as follows. The first step will be to characterize vernal pools within the 120 m Area of Investigation during the day in April 2012, early in the amphibian breeding season. The following characteristics will be documented:

a) UTM;
b) Dimensions (i.e., length x width);
c) Maximum water depth;
d) Presence of emergent and submergent vegetation: type and amount;
e) Presence of fringing shrubs: type and amount;
f) Presence of logs (size, quantity) within or near vernal pools;
g) Apparent water quality (visual observations only);
h) Disturbance nearby;
i) Any amphibian observations; and
j) Search for salamander or frog egg masses if conditions appear suitable.

The location of potential qualifying amphibian corridors will also be identified. Vernal pools that are too shallow, small or degraded to have much potential for amphibian breeding will be identified and removed from further study or consideration. Pools that contain sufficient water depth and habitat conditions will be investigated further.

Surveys to target vocalizing amphibians (i.e., frogs) will be conducted using the following protocol. Each feature will be surveyed three times per year between April 1st and June 30th (preferably April, May and June, but surveys may begin in March in the case of an early spring), with at least 15 days between each survey. Monitoring stations will be established at the edge of vernal pools or ponds that potentially contain breeding amphibians during vernal pool habitat characterization as described above. Surveys will be conducted between one half-hour after sunset and 2:00 am and, to the extent possible, during evenings with little wind 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. An effort will be made to conduct the third survey when the minimum night air temperature is 17°C however it is recognized that this may not be possible in all years. To the extent possible, surveys will be conducted on nights that are clear, cloudy, damp, foggy, or have light rain are suitable. Moderate to heavy rainfall will be avoided. After waiting one minute upon arrival at a station to allow for amphibians to start calling again after being disturbed, a 3-minute listening survey will be completed at each station. Surveys will be conducted using an unlimited distance semi-circular sampling area in which the estimated distance and direction of calling amphibian species will be recorded, indicating whether calls are originating from within or beyond the defined 100 m area surveyed. Call counts will be recorded using the codes established for the Marsh Monitoring Protocol.

Surveys to target non-vocalizing amphibians (i.e., salamanders) will be conducted using one of the following three protocols:

1. Adult Salamander Survey

Nocturnal surveys may be completed for adult salamanders if the amphibian calling surveys can be done either on, or within two days of a relatively warm rainy night in late March to early April. Adult salamanders will remain in the pond for several days following a warm rain. Headlamps will be used to search waters in the pond and a D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be carefully searched for the presence of salamanders. Any salamanders found will be identified, measured and released.

2. Egg Mass Survey

Egg mass surveys for salamanders may be conducted in conjunction with vernal pool habitat characterization as described above. Egg mass searches will be conducted during daylight hours in early spring with the first visit in March after a relatively warm rain. If eggs are not found on the first survey, a second egg mass survey will be conducted in conjunction with the second amphibian call survey in April. Area searches will generally include walking within or along the perimeter of the vernal pool/wetland looking for egg masses, carefully checking any submerged sticks or shrubs standing in the water to which eggs may be attached. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where egg masses may occur, whichever is less. The number of individuals or egg masses of each amphibian species observed will be recorded and the life stage (e.g., egg mass or adult) noted.

3. Larval Survey

Larval surveys may be conducted in May or June to search for presence of larvae of salamanders. A D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be placed into a bucket and carefully searched for the presence of salamander larvae. Any larvae found will be identified, measured and released. Any other encountered amphibians will be recorded and released. Area searches for adult or transformed salamanders will also be conducted by overturning logs and walking along the perimeter of the vernal pool or wetland. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where larvae may occur, whichever is less. Larvae will be identified using a field guide or key (e.g., http://www.umesc.usgs.gov/terrestrial/amphibians/mknutson_5003869_field_guide.html). Water depth and other relevant characteristics of the vernal pools will be recorded. Logs or debris in the vicinity of the pools will be overturned for the presence of salamanders.

Area searches for salamanders will also be conducted in 2012 for features surveyed in 2011 and determined to potentially qualify as significant wildlife habitat. If these protocols cannot be followed (e.g., because access to properties is not granted), MNR will be consulted.

Field sheets will be prepared to record weather, vernal pool conditions, UTMs, and amphibian observations as well as time and date.

Features containing breeding population of 1 or more of the following species with at least 20 individuals are to be considered significant: Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Chorus Frog, Wood Frog. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be significant.

Where Significant Wildlife Habitat for woodland breeding amphibians is identified, the landscape context will be evaluated to identify potential or likely movement corridors based on configuration of woodlots, hedgerows and breeding sites. The location of probable corridors will need to be examined to determine if they occur within 120 m of a project component.

Amphibian Breeding Habitat (Wetlands)

Spring 2011 Surveys

AECOM conducted amphibian surveys in order to identify Significant Wildlife Habitat and assess potential impacts of the wind power project on specific natural areas. Amphibian surveys were conducted in late April 2011, late May 2011, and late June 2011. Amphibian survey locations were identified using aerial photo interpretation of natural areas located at or within 120 m of turbine locations for which property access was obtained at the time of the surveys. These surveys were undertaken by qualified biologists (qualifications of field personnel are provided in Appendix C).

Because peak amphibian calling periods are strongly associated with temperature and precipitation as well as date, field visits were scheduled to occur on three separate evenings according to minimum night air temperatures of 5°C (41°F), 10°C, (50°F), and 17°C (63°F), respectively, to the extent possible. Amphibian surveys began one-half hour after sunset and ended by 1:00 am. To the extent possible, visits were conducted during evenings with low wind (i.e., Beaufort Scale 0-2), preferably in moist conditions with one of the above corresponding temperatures. Surveyors recorded the approximate locations of all amphibian species heard calling, as well as the date, start time, finish time, and weather conditions (wind and cloud cover) during the survey. Surveyors listened for calling amphibians over a 3 minute period at each survey location. A call level code was assigned to each species detected, and the number of calling individuals was estimated for call levels 1 and 2, according to the procedures described in the Marsh Monitoring Protocol. Other relevant observations (e.g., frog eggs or tadpoles observed) were also recorded.

Spring 2012 Surveys

Evidence of potentially suitable amphibian breeding in open wetlands was observed within the 120 m Area of Investigation during 2011 site investigations. Three of the natural features (AWE-01, AWE-02 and AWE-03) were located within 120 m of a proposed access road and appeared to be substantial enough to provide wetland breeding habitat. Spring 2011 surveys were conducted at some of these locations as described above. Additional sites will be surveyed in the spring of 2012 as follows. Additional features will be evaluated for significance in the spring of 2012 as follows.

The first step will be to characterize the conditions in open wetlands within the 120 m Area of Investigation during the daytime in April 2012, early in the breeding season to determine the extent of potentially suitable standing water. The following characteristics will be documented:

a) UTM;
b) Dimensions (i.e., length x width);
c) Maximum water depth;

d) Presence of emergent and submergent vegetation: type and amount;
e) Presence of fringing shrubs: type and amount;
f) Presence of logs (size, quantity) within or near vernal pools;
g) Apparent water quality (visual observations only);
h) Disturbance nearby; and
i) Any amphibian observations.

The location of potential qualifying amphibian corridors will also be identified. Ponded areas that are too shallow, small or degraded to be considered to have potential for significant amphibian breeding will be identified and removed from further study or consideration. Pools that contain sufficient water depth and habitat conditions will be investigated further.

Surveys to target vocalizing amphibians (i.e., frogs) will be conducted using the following protocol. Each feature will be surveyed three times per year between April 1st and June 30th (preferably April, May and June, but surveys may begin in March in the case of an early spring), with at least 15 days between each survey. Monitoring stations will be established at the edge of vernal pools or ponds that potentially contain breeding amphibians during vernal pool habitat characterization as described above. Surveys will be conducted between one half-hour after sunset and 2:00 am and, to the extent possible, during evenings with little wind 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. An effort will be made to conduct the third survey when the minimum night air temperature is 17°C however it is recognized that this may not be possible in all years. To the extent possible, surveys will be conducted on nights that are clear, cloudy, damp, foggy, or have light rain are suitable. Moderate to heavy rainfall will be avoided. After waiting one minute upon arrival at a station to allow for amphibians to start calling again after being disturbed, a 3-minute listening survey will be completed at each station. Surveys will be conducted using an unlimited distance semi-circular sampling area in which the estimated distance and direction of calling amphibian species will be recorded, indicating whether calls are originating from within or beyond the defined 100 m area surveyed. Call counts will be recorded using the codes established for the Marsh Monitoring Protocol.

Surveys to target non-vocalizing amphibians (i.e., salamanders) will be conducted using one of the following three protocols:

1. Adult Salamander Survey

Nocturnal surveys may be completed for adult salamanders if the amphibian calling surveys can be done either on, or within two days of a relatively warm rainy night in late March to early April. Adult salamanders will remain in the pond for several days following a warm rain. Headlamps will be used to search waters in the pond and a D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be carefully searched for the presence of salamanders. Any salamanders found will be identified, measured and released.

2. Egg Mass Survey

Egg mass surveys for salamanders may be conducted in conjunction with vernal pool habitat characterization as described above. Egg mass searches will be conducted during daylight hours in early spring with the first visit in March after a relatively warm rain. If eggs are not found on the first survey, a second egg mass survey will be conducted in conjunction with the second amphibian call survey in April. Area searches will generally include walking within or along the perimeter of the vernal pool/wetland looking for egg masses, carefully checking any submerged sticks or shrubs standing in the water to which eggs may be attached. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where egg masses may occur, whichever is less. The number of individuals or egg masses of each amphibian species observed will be recorded and the life stage (e.g., egg mass or adult) noted.

3. Larval Survey

Larval surveys may be conducted in May or June to search for presence of larvae of salamanders. A D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be placed into a bucket and carefully searched for the presence of salamander larvae. Any larvae found will be identified, measured and released. Any other encountered amphibians will be recorded and released. Area searches for adult or transformed salamanders will also be conducted by overturning logs and walking along the perimeter of the vernal pool or wetland. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where larvae may occur, whichever is less. Larvae will be identified using a field guide or key (e.g., http://www.umesc.usgs.gov/terrestrial/amphibians/mknutson_5003869_field_guide.html). Water depth and other relevant characteristics of the ponds will be recorded.

Area searches for salamanders will also be conducted in 2012 for features surveyed in 2011 and determined to potentially qualify as significant wildlife habitat. If these protocols cannot be followed (e.g., because access to properties is not granted), MNR will be consulted.

Field sheets will be prepared to record weather, standing water conditions, UTMs, and amphibian observations as well as time and date.

Features containing breeding population of 2 or more of the following species with at least 20 individuals are to be considered significant: Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog or Mink Frog. Any wetland with confirmed breeding by American Bullfrog is to be considered significant.

Where Significant Wildlife Habitat for woodland breeding amphibians is identified, the landscape context will be evaluated to identify potential or likely movement corridors based on configuration of woodlots, hedgerows and breeding sites. The location of probable corridors will need to be examined to determine if they occur within 120 m of a project component. Both aerial photographs and ground surveys will be used to locate probable corridors.

Rare Vegetation Communities

Only one provincially rare vegetation community (RVC-01) was identified within the 120 m Area of Investigation. This community, Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4), is a rare forest type with a provincial ranking of S2S3. This community occurs in Natural Area 539 and is located within 120 m of a proposed access road. No additional field studies are required to evaluate the significance of this community. It was carried forward to the EIS phase of the NHA.

4.3 Results of Evaluation of Significance

The following sections summarize the evaluation of significance for all natural features carried forward from the Records Review and site investigation.

4.3.1 Wetlands

Provincially significant wetlands (PSWs) are those areas identified by the MNR as being the most valuable within the landscape based on the OWES. Unevaluated wetlands within 120 m of Project components were treated as significant without undertaking the OWES if they were not directly affected by the proposed project, and an EIS was completed as described in Section 5. A total of ten wetland complexes occurring within the 120 m Area of

Investigation were identified during site investigations. All of these were treated as significant and their characteristics are described in the following table (Table 4.2), as described in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2010). The locations of these wetlands (WET-01, WET-03, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10, WET-12 and WET-13) are shown on Figure 3.3.

All wetlands assessed are considered riverine, palustrine or isolated in nature and are made up mostly of swamp with some associated marsh communities. The marsh communities are typically found along stream systems whereas the swamp communities are found both along stream systems and isolated amongst agricultural fields as well.

These ten wetland complexes are considered to be significant and were therefore carried forward to the EIS.

4.3.2 Woodlands

An assessment of each woodland within the 120 m Area of Investigation was undertaken based on the criteria and standards described in the Natural Heritage Assessment Guide (MNR 2011). As described therein, woodlands meeting any one of the evaluation criteria are to be considered significant provided they meet minimum width requirements (e.g., average minimum width of 40 m measured to crown edges where the size criterion threshold is 0.5 to 4 ha).The results of the woodlands evaluation are documented in Table 4.3.

In order to complete and apply criterion 2.e (woodland diversity representation) to our woodland units, inferences into the composition of the larger forest units were made when only a portion of the feature was studied during site investigations. Criterion 2.b (proximity to other significant woodlands or habitats), and criterion 2.c (linkages) could not be completed because the final determination of significant wildlife habitats will be made following field studies to be conducted in 2012. Therefore, these sections of the woodland evaluation will be revisited once data have been collected. Nonetheless, with the exception of woodland unit AF, none of the results of woodland evaluations will change with respect to status (i.e., significant or not significant) following completion of the evaluation of significance for wildlife habitats. For the purposes of this NHA submission, woodland AF was treated as significant and carried forward to the EIS; however the mitigation measures proposed for this significant woodland may not be required depending on the results of additional field studies.

A total of 39 woodlands occurring within the 120 m Area of Investigation were identified and evaluated following the criteria described within Section 4.2.2 above (refer to Figure 3.4 for the locations of woodland units). Of these, the following 31 woodlands are considered significant based on meeting at least one of the criteria used in the evaluation process: D, E, F, G, H, K, L, M, N, O, P, Q, R, S, T, U, V, X, Y, AA, AE, AH, AJ, AK, AL, AM, AO, AP, AQ, AR and AS. These woodlands were therefore carried forward to the EIS. Details regarding the specific criteria/criterion met by each woodland unit are provided in Table 4.3.

Table 4.2 Wetland Characteristics and Ecological Functions Assessment

Wetland # *(refer to Figure 3.3)*	Distance from Project Location	Wetland Size	Wetland Type	Site Type	Vegetation Communities (ELC)	Proximity to Other Wetlands	Interspersion	Open Water Types	Flood Attenuation	Water Quality Improvement	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitats	Fish Habitat	Determination of Significance
WET-01	>0.1 (collection line)	188.37 ha	Marsh and Swamp	Riverine	• **M1 (MAM 2-10)** ne, *Carex comosa, Equisetum pratense*; gc*, *Impatiens capensis, Symphyotrichum sp., Eupatorium maculatum, Euthamia graminifolia, Solidago gigantean; ts, Cornus sericea, Salix bebbiana, Rhamnus cathartica, Salix eriocephala; h- Fraxinus pennsylvanica, Fraxinus americana, Ulmus Americana* • **M2 (MAS 2-9)** h-*Salix alba; ts – Salix bebbiana, Salix eriocephala, Sambucus nigra; gc*-Eupatorium maculatum, Epilobiumpalustree, Impatiens capensis; re-Typha latifolia* • **M3 (MAS 2-1)** re*-*Typha latifolia* • **M4 (MAM 2-2** ne*-*Phalaris arundica, Daucus carota* • **S1 (SWT 2-2)** ts*-*Salix eriocephala, Salix discolour, Cornus sericea, Salix bebbiana; gc-Impatiens capensis, Symphyotrichum puniceum, Eupatorium maculatum; Solidago altissima; h-Ulmus americana* • **S2 (SWD 2-2)** h*-*Fraxinus pennsylvanica, Populous tremuloides, Fraxinus americana, Acer saccharinum; ts- Prunus virginiana, Cornus alternifolia, Lindera benzoin* • **S3 (SWT 2-5)** h-*Acer negundo, Tilia americana; ts*-Cornus sericea, Crataegus sp, Salix bebbiana; gc-Taraxacum officincale, Galium asprellum* • **S4 (SWT 2-2)** h-*Salix amygdoloides, Salix fragilis; ts*-Salix eriocephala, Cornus sericea; ne-Leersia oryzoides; gc-Impatiens capensis, Eupatorium maculatum; re-Typha latifolia, Equisetum pratense* • **S5 (FOD 7-2)** h* *Fraxinus pennsylvanica, Ulmus americana, Prunus virginiana; ts-Cornus altemifolia, Lindera benzoin, Ribes sp; gc-Solidago flexicaulis, Asarum canadense,*	Between 800 and 1000 m	89	0	Low	High	n/a	Low	0	n/a	Yes	Treated as Significant
WET-03	19 (collection line)	8.6 ha	Swamp	Palustrine, Isolated and Riverine	• **S1 (SWT2a)** ts*- *Lindera benzoin; h-Fraxinus nigra, Ulmus Americana; gc-Solidago altissima, Fragaria virginiana, Anemone Canadensis* • **S2 (FOD7-***2) h* - Fraxinus pennsylvanica; ts-Rhamnus cathartica, Fraxinus pennsylvanica; gc-Solidago altissima, Symphyotrichum lanceolatum, Fragaria virginiana* • Wetland communities 120 m beyond the proposed project were designated through aerial photograph interpretation. The following ELC units were designated: SWD, SWD3	Approximately 600 m to a wetland community less than 0.5 ha in size. Over 1000 m away from any other type of wetland	20	0	Moderate	Moderate	n/a	Low	0	n/a	Yes	Treated as Significant
WET-04	>0.1 (collection line)	15.35 ha	Swamp and Marsh	Isolated	• **M1 (MAM 2-5)** ne*-*Carex bebbiana, Carex vulpinodea; ts-Salix x rubens, Cornus sericea* • **S1 (SWD3-3)** h*-*Acer freemani, Salix sp., Ulmus Americana* • Wetland communities 120 m beyond the proposed project were designated through aerial photograph interpretation. The following ELC units were designated: SWT, SWD, SWD3	Over 1000 m	26	0	High	Low	n/a	Low	0	n/a	No	Treated as Significant
WET-05	>0.1 (collection line)	30.30 ha	Swamp and Marsh	Riverine	• **M1 (MAM 2)** ts-*Rhamnus cathartica; gc*-Arisaema triphyllum, Tiarella cordifolia, Caulophyllumthalictroides* • **S1 (SWD)** h*-*Fraxinus pennsylvanica, Acer nigra, Acer saccharinum, Tilia Americana; gc-Imapatiens capensis, Aster lanceolatus; ne-Carex crinite* • **S2 (SWD 2-2)** h*-*Fraxinus pennsylvanica Acer nigrum; ne-Carex carosa; gc-Impatiens capensis, Aster sp* • **S3 (SWD 3-3)** h*-*Acer freemani, Fraxinus pennsylvia, Ulmus americana; gc-Aster lanceolatus, Glyceria striata, Rhus radicans, Impatiens capensis* • **S4 (FOD7-***2) h*-Fraxinus pennsylvanica, Acer freeman, Acer saccharum; ts – Ulmus americana, Fraxinus pennsylvanica; gc-Alliaria petiolata, Symphyotrichum lanceolatus, Geum canadensis*	Over 1000 m	31	0	Low	High	n/a	Low	0	n/a	Yes	Treated as Significant
WET-06	>0.1(transmission line)	47.5 ha	Swamp and Marsh	Riverine	• **M1 (MAM 2-2)** ne*-*Phalaris arundica* • **S1 (SWD 3)** h*-*Acer saccharinum, Fraxinus sp, Ulmus Americana* • **S2 (SWD 3)** h*-*Acer freeman, Ulmus americana, Tilia americana; ts-Salix sp* • **S3 (SWD 2)** h*-*Fraxinus pennsylvanica, Thuja occidentalis*	Over 1000 m	44	0	Low	High	n/a	Low	0	n/a	Yes	Treated as Significant
WET-07	43 (collection line)	181.62 ha	Swamp and Marsh	Isolated and Riverine	• **S1 (SWD)** h*-*Acer saccharinum, Populous tremuloides* • **S2 (SWD 3-1)** h*-*Acer rubrum, Tilia Americana; gc-Impatiens capensis, Onoclea sensibilis, Viola sp* • **S3 (SWD 3-3)** h*-*Acer freeman, Fraxinus pennsylvanica Ulmus americana; ne-Carex comosa, Carex crinita; gc-Aster lanceolatus* • **S4 (FOD7)** h*-*Salix, Acer negundo, Tilia Americana, Ulmus americana, Fraxinus pennsylvanica* • **S5 (SWM1-1)** h*-*Thuja occidentalis, Populous deltoides, Salix sp, Fraxinus nigra* • Wetland communities 120 m beyond the proposed project were designated through aerial photograph interpretation. The following ELC units were designated: MAS, SWD, SWM, SWT, SWC, OAO	Over 1000 m	99	0	Moderate	Moderate	n/a	Low	0	n/a	Yes	Treated as Significant
WET-08	35 (turbine)	61.55 ha	Swamp	Isolated	• **S1 (SWD3-3)** h*-*Acer freemani, Fraxinus pennsylvanica, Ulmus americana; ne-Carex crinata; gc-Aster sp.* • **S2 (SWD 2-2)** h*-*Fraxinus pennsylvanica, Acer freeman; ts-Rhamnus cathartica; gc-Aster lanceolatus; ne-Carex arayi* • **S3 (FOD7-2)** h*-*Fraxinus pennsylvanica, Ulmus Americana; ts-Rhamnus cathartica, Ulmus americana; gc- Geum Canadensis, Rhus radicans ssp., Parthenocissus inserta* • Wetland communities 120 m beyond the proposed project were designated through aerial photograph interpretation. The following ELC units were designated: FOD7, SWD	Over 1000 m	52	0	High	Low	n/a	Low	0	n/a	No	Treated as Significant
WET-10	26 (access road)	213.82 ha	Swamp	Isolated and Riverine	• This wetland contains communities that have been evaluated as part of the Hay Provincially Significant Wetland. For the purposes of this assessment, wetland communities that have been investigated/interpreted from aerial photography were complexed. Additional communities within 120 m of proposed project are: • **S1 (FOD7-2)** h*-*Fraxinus pennsylvanica, Ulmus americana; ne-Leersia oryzoidess, Glyceria striata; gc-Aster lanceolatus, Rhus radicans, Parthenocissus inserta* • **S2 (SWD 3-3)** h*-*Acer freeman, Ulmus Americana, Fraxinus pennsylvanica; gc-Solidago canadensis, Apocynum cannabinum; ts-Rubus idaeus, ne- Phalaris arundica*	Over 1000 m	n/a – evaluated wetland	0	Moderate	Moderate	n/a	High	0	Hay Provincially Significant Wetland	Yes	Treated as Significant
WET-12	>0.1 (transmission line)	55.03 ha	Swamp and Marsh	Riverine	• Wetland communities for this unit were determined through aerial photograph interpretation. The following ELC units were designated: MAM, MAM2, MAS, SWD, SWT	Over 1000 m	74	0	Low	High	n/a	Low	0	n/a	Yes	Treated as Significant
WET-13	>0.1(transmission line)	8.37 ha	Swamp	Isolated	• Wetland communities for this unit were determined through aerial photograph interpretation and field work. The following ELC units were designated: • S1 (SWD3-3) h* *Acer freemani, Fraxinus pennsylvanica, Populous tremuloides* • Wetland communities for this unit were determined through aerial photograph interpretation. The following ELC units were designated: SWD	Over 1000 m	58	0	Low	Low	n/a	Low	0	n/a	No	Treated as Significant

Notes: 1. * denotes dominant form
2. Main forms; h-deciduous trees, ts-tall shrubs, re-robust emergents, ne-narrow-leaved emergents, gc-groundcover

Table 4.3 Determination of Significance for Woodlands

Woodland Feature ID	Natural Area #	County	Evaluation Criteria and Standards (Based on 16.5% woodland cover within the Municipality of Bluewater and 10.8% cover within the Municipality of Huron East)														# of Criteria Met to date	Determination of Significance
			1. Woodland Size		2.a) Woodland Interior		2.b) Proximity to Other Significant Woodlands/Habitats		2.c) Linkages		2.d) Water Protection		2.e) Woodland Diversity Representation (composition)		3. Uncommon Characteristics			
			Must be at least		Must have woodland interior at least[1]		Must be within 30 m of a significant natural feature or fish habitat[2] and be at least		Must be located between 2 other significant features each of which are 120 m apart and be at least		Must be located within 50 m of a sensitive groundwater discharge[3], recharge, headwater, watercourse or fish habitat and be at least		Must be dominated singly or in combination by native naturally occurring Ms, Mb, Msi, Mr, By, H, Ba, Ab, Wb, Ta, Sp, Pi, Oa, Ba, He, and be at least		Must have rare vegetation community (S1, S2, S3) and be more than 0.5 ha in size.OR Habitat of a rare, uncommon, or restricted woodland plant species with 10 individual stems or 100 m of leaf coverage and be more than 0.5 ha in size.OR Characteristics of older woodlands with larger tree size structure in native species and be more than			
			Municipality of Bluewater: **20 ha** in size		Municipality of Bluewater: **2 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater**: 2 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater: **2 ha** in size			
			Municipality of Huron East: **4 ha** in size		Municipality of Huron East: Any size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **0.5 ha** in size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **1 ha** in size			
			Criteria Met		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**			
			Y/N	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**		
A	427	Municipality of Bluewater	**N**	0.3 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	none	Not Significant
B	426	Municipality of Bluewater	**N**	0.41 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	none	Not Significant
D	442	Municipality of Bluewater	**N**	4.4 ha	**N**	No interior forest	**Y**	Within 30 m of fish habitat (C46, C83)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**N**	Not dominated by listed species	**N**	Doesn't meet specified requirements	2 criteria met	Significant
E	450	Municipality of Bluewater	**N**	2.8 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**Y**	Within a groundwater recharge area	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet specified requirements	1 criterion met	Significant
F	463	Municipality of Bluewater	**Y**	31.5 ha	**Y**	3.9 ha of interior forest	**TBD**	Not fish habitat (C6, C7)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	4 criteria met	Significant
G	459, 462	Municipality of Bluewater	**N**	9.7 ha	**N**	0.4 ha of interior forest	**TBD**	Not fish habitat (C79) Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse	**N**	Not dominated by listed species	N	Doesn't meet specified requirements	1 criterion met	Significant
H	480	Municipality of Bluewater	**Y**	29.6 ha	**Y**	7.1 ha of interior forest	**TBD**	No fish data Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	4 criteria met	Significant
I	480	Municipality of Bluewater	**N**	1.31 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	none	Not significant
K	481, 487	Municipality of Bluewater	**N**	15.3 ha	**N**	0.5 ha of interior forest	**Y**	Within 30 m of Fish habitat (C10)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	3 criteria met	Significant
L	504	Municipality of Bluewater	**Y**	78 ha	**Y**	33.9 ha of interior forest	**Y**	Within 30 m of fish habitat (C41)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species, within area of investigation (larger portion of study area unknown)	**N**	Doesn't meet specified requirements	5 criteria met	Significant
M	498	Municipality of Bluewater	**N**	2.7 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**Y**	Within groundwater recharge area	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet specified requirements	1 criterion met	Significant
N	508, 509, 515, 517, 518	Municipality of Bluewater	**Y**	87 ha	**Y**	28.2 ha of interior forest within natural area #518	**Y**	Within 30 m of fish habitat (C33, C35, C18)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, within sensitive headwater area, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	5 criteria met	Significant
O	525	Municipality of Bluewater	**N**	1.9 ha	**N**	No interior forest	**Y**	Within 30 m of fish habitat (C18)	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet specified requirements	One criteria met	Significant
P	532	Municipality of Bluewater	**N**	7.7 ha	**N**	<0.1 ha of interior forest	**Y**	Within 30 m of fish habitat (C19)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	3 criteria met	Significant
Q	541	Municipality of Bluewater	**Y**	31.8 ha	**N**	0.3 ha of interior forest	**Y**	Within 30 m of fish habitat (C20, C21)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	4 criteria met	Significant
R	535, 539	Municipality of Bluewater	**Y**	41.9 ha	**Y**	3.13 ha of interior forest	**Y**	Within 30 m of fish habitat (48)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse and groundwater discharge area	**N**	Not dominated by native species	**Y**	Fresh-Moist Black Walnut Lowland Deciduous Forest Type (S2S3)	5 criteria met	Significant
S	545	Municipality of Bluewater	**N**	10.9 ha	**N**	0.4 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	2 criteria met	Significant
T	544	Municipality of Bluewater	**N**	3.9 ha	**N**	No interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within groundwater recharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	2 criteria met	Significant
U	542	Municipality of Bluewater	**N**	13.8 ha	**N**	0.2 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species	**Y**	meets Characteristic of Older woodlands within the FOD5-2 community	3 criteria met	Significant
V	537	Municipality of Bluewater	**N**	15.1 ha	**N**	0.1 ha of interior forest	**TBD**	Not fish habitat (C55) Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	2 criteria met	Significant
X	524	Municipality of Bluewater	**N**	2.7 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**Y**	Within groundwater recharge area	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet specified requirements	1 criterion met	Significant
Y	510	Municipality of Bluewater	**Y**	41.3 ha	**Y**	4.1 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within groundwater recharge/discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	4 criteria met	Significant

Table 4.3 Determination of Significance for Woodlands

Woodland Feature ID	Natural Area #	County	Evaluation Criteria and Standards (Based on 16.5% woodland cover within the Municipality of Bluewater and 10.8% cover within the Municipality of Huron East)														# of Criteria Met to date	Determination of Significance
			1. Woodland Size		2.a) Woodland Interior		2.b) Proximity to Other Significant Woodlands/Habitats		2.c) Linkages		2.d) Water Protection		2.e) Woodland Diversity Representation (composition)		3. Uncommon Characteristics			
			Must be at least		Must have woodland interior at least[1]		Must be within 30 m of a significant natural feature or fish habitat[2] and be at least		Must be located between 2 other significant features each of which are 120 m apart and be at least		Must be located within 50 m of a sensitive groundwater discharge[3], recharge, headwater, watercourse or fish habitat and be at least		Must be dominated singly or in combination by native naturally occurring Ms, Mb, Msi, Mr, By, H, Ba, Ab, Wb, Ta, Sp, Pi, Oa, Ba, He, and be at least		Must have rare vegetation community (S1, S2, S3) and be more than 0.5 ha in size.OR Habitat of a rare, uncommon, or restricted woodland plant species with 10 individual stems or 100 m of leaf coverage and be more than 0.5 ha in size.OR Characteristics of older woodlands with larger tree size structure in native species and be more than			
			Municipality of Bluewater: **20 ha** in size		Municipality of Bluewater: **2 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater: **2 ha** in size		Municipality of Bluewater: **4 ha** in size		Municipality of Bluewater: **2 ha** in size			
			Municipality of Huron East: **4 ha** in size		Municipality of Huron East: Any size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **0.5 ha** in size		Municipality of Huron East: **1 ha** in size		Municipality of Huron East: **1 ha** in size			
			Criteria Met		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**		**Criteria Met**			
			Y/N	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**	**Y/N**	**Description**		
Z	492	Municipality of Bluewater	**N**	1.3 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	none	Not significant
AA	483	Municipality of Bluewater	**N**	6.2 ha	**N**	No interior forest	**Y**	Within 30 m of fish habitat (C25, C26)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse and within groundwater discharge area	**Y**	Dominated by native species	**Y**	meets Characteristic of Older woodlands within the SWD3-2 community	4 criteria met	Significant
AB	475	Municipality of Bluewater	**N**	1.6 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	None	Not significant
AC	470	Municipality of Bluewater	**N**	1 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	None	Not significant
AD	456	Municipality of Bluewater	**N**	1.1 ha	**N**	No interior forest	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	**N**	Doesn't meet threshold size requirement	None	Not significant
AE	452, 460	Municipality of Bluewater	**N**	12.6 ha	**N**	No interior forest	**Y**	Within 30 m of fish habitat (C30)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species, do not know composition of larger forest unit	**N**	Doesn't meet specified requirements	3 criteria met	Significant
AF	437	Municipality of Bluewater	**N**	5.2 ha	**N**	0.1 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**N**	Groundwater indicator species were observed during field investigations however due to the area of the woodland within the Area of Investigation extent of indicator species is unknown	**N**	Not dominated by listed species	**N**	Doesn't meet specified requirements	TBD	TBD
AH	439	Municipality of Bluewater	**N**	4.7 ha	**N**	No interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within groundwater recharge/discharge area	**N**	Not dominated by listed species	**N**	Doesn't meet specified requirements	1 criterion met	Significant
AJ	488, 514	Municipality of Bluewater	**Y**	44.5	**Y**	9.1 ha of interior forest within natural area #514	**Y**	Within 30 m of fish habitat (C27, C51, C99, C71)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/discharge area	**N**	Not dominated by listed species	**N**	Doesn't meet specified requirements	4 criteria met	Significant
AK	514, 534	Municipality of Bluewater	**Y**	64.2 ha	**Y**	3.7 ha of interior forest within natural area #534	**Y**	Within 30 m of fish habitat (C22)	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge/ discharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	5 criteria met	Significant
AL	494, 512, 520, 522, 528	Municipality of Bluewater	**Y**	264.7 ha	**Y**	46.1 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species	**N**	Doesn't meet specified requirements	4 criteria met	Significant
AM	484	Municipality of Huron East	**Y**	50 ha	**Y**	9.8 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within groundwater recharge area	**N**	Not dominated by listed species, do not know the composition of the larger forest unit	**Y**	*Carex grayi* (CC8) was dominant plant within community	4 criteria met	Significant
AO	551, 552	Municipality of Huron East	**Y**	27 ha	**Y**	2.1 ha of interior forest within natural area #552	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species (roadside investigation)	**N**	Doesn't meet specified requirements	4 criteria met	Significant
AP	555, 556	Municipality of Huron East	**Y**	45.8 ha	**Y**	5.0 ha of interior forest within natural area #556	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**Y**	Dominated by native species (roadside investigation)	**N**	Doesn't meet specified requirements	4 criteria met	Significant
AQ	561	Municipality of Huron East	**Y**	22.1 ha	**Y**	17.5 ha of interior forest	**TBD**	Commitment to complete	**N**	Unknown if considered fish habitat	**Y**	Within 50 m of a watercourse and groundwater recharge area	**N**	Not dominated by listed species (roadside investigation)	**N**	Doesn't meet specified requirements	3 criteria met	Significant
AR	562	Municipality of Huron East	**Y**	13 ha	**Y**	1.8 ha of interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**N**	Not dominated by listed species (roadside investigation)	**N**	Doesn't meet specified requirements	3 criteria met	Significant
AS	564	Municipality of Huron East	**N**	1.3 ha	**N**	No interior forest	**TBD**	Commitment to complete	**TBD**	Commitment to complete	**Y**	Within 50 m of a watercourse, and groundwater recharge area	**N**	Not dominated by listed species (roadside investigation)	**N**	Doesn't meet specified requirements	1 criterion met	Significant

Notes:
1. *Area of Interior Forest for each woodland unit is not necessarily contiguous. I.e. pockets of interior forest within a single woodland may be isolated from one another. Therefore for the purposes of this criterion interior woodland sizes were calculated by natural area.*
2. *The numbers in parentheses indicate watercourse numbers referred to in the Water Assessment and Water Body Report.*
3. *Groundwater indicator species observed during field investigations were used to determine presence/absence of groundwater discharge areas.*

4.3.3 Valleylands

A total of one valleyland feature was identified through the site investigation and records review. The location of this valleyland is shown on Figure 3.5. Following the evaluation criteria as outlined within the Natural Heritage Assessment Guide for Renewable Energy Projects (OMNR, 2011), this valleyland was evaluated as significant considering its ability to satisfy the following criteria; landform prominence, surface water, high degree of naturalness, community and species diversity and linkage. This valleyland was therefore carried forward to the EIS.

Table 4.4 Determination of Significance for Valleylands

Valleyland Feature #	Distance from Project Location	Landform-Related Functions	Ecological Features		Restored Ecological Functions	Determination of Significance
			Degree of Naturalness	Linkage Function		
VAL-01	Within 120 m of project component	The total catchment area of the surface water feature through the valleyland is 380.79 ha. Associated wetlands are identified within the boundaries of the valleyland.	Areas of contiguous woodland are present and consist of FOM 3-2, FOD 5-2 and FOD7 ELC communities. The area contains greater than 25% natural cover. The area contains wetland communities.	Through aerial photograph interpretation, contiguous natural vegetation with a minimum of 100 m in width occur for most of the length to Lake Huron.	No restoration projects are already underway or planned and awaiting implementation.	Significant considering degree of naturalness

4.3.4 Significant Wildlife Habitat

4.3.4.1 Raptor Winter Feeding and Roosting Habitat

None of the target species were observed in feature RWA-01 during the first and second field surveys therefore it was determined that a third visit is not required. Two Red-tailed Hawks and one Rough-legged Hawk were observed outside the feature during the second survey-. Detailed field notes for these surveys are provided in Appendix B. This feature was not carried forward to the EIS.

4.3.4.2 Reptile Hibernacula

Candidate significant reptile hibernacula RH-01 and RH-02 will be evaluated following completion of the evaluation of significance field studies described in Section 4.2.4.1. For the purposes of this submission, these candidate significant wildlife habitats were treated as significant and carried forward to the EIS, with the commitment to complete pre-construction evaluation of significance surveys as described in Section 4.2.4.1. The locations of these features are shown on Figure 4.1.

4.3.4.3 Bat Maternity Colonies

Of the 13 candidate significant bat maternity colonies identified within 120 m of proposed turbine locations, a total of four were determined to be significant through the evaluation of significance (BMC-01, BMC-07, BMC-08 and BMC-13) (NRSI, 2011). A commitment is made herein to evaluate a total of five additional candidate significant bat maternity roosts (BMC-02, BMC-03, BMC-10, BMC-12 and BMC-14) that were introduced to the project area as a result of project changes after 2011 monitoring had completed, and therefore could not be surveyed during the appropriate monitoring season prior to this submission (NRSI, 2011). Refer to Appendix E for the complete bat monitoring report. For the purposes of this submission, these candidate significant wildlife habitats were treated as significant and carried forward to the EIS, with the commitment to complete pre-construction evaluation of significance surveys as described in Section 4.2.4.1. The locations of these features are shown on Figure 4.1.

4.3.4.4 Amphibian Woodland Breeding Habitat

The first round of amphibian surveys was conducted in April 2011 at the time when Spring Peepers and Wood Frogs were at their peaks and woodland pools were at their deepest levels. These are the two most vociferous and widespread of the woodland breeding amphibians. Pools that support Spotted or Blue-spotted Salamanders nearly always also contain breeding Wood Frogs or Spring Peepers. If no calling amphibians were recorded on the first visit when water was deepest, it was believed that the woodland pools did not provide good habitat, and probably did not have a sufficient hydroperiod or sufficient food for larvae. Consequently, pools which had no frogs on the first visit were not resurveyed and are not considered to be significant wildlife habitat in this category. While it is possible that some of these pools contain some breeding amphibians, it is unlikely that they would have met the trigger for significance (*i.e.,* 20 breeding individuals). Similarly, if there were only very few calling amphibians on the first visit, they were not treated as significant. In some cases, the first amphibian survey did not occur until the 2nd (May) or 3rd (June) rounds. If pools were present but no frogs were heard, sites were treated as significant and carried forward to the EIS with additional pre-construction survey commitments if the first round of surveys had not been conducted.

A summary of the results of 2011 amphibian call surveys is provided in Table 4.5. A total of six features were carried forward to the EIS. These include one confirmed significant features and five features treated as significant and carried forward to the EIS, with commitments for additional pre-construction evaluation of significance surveys as described in Section 4.2.4.1.

Table 4.5 Amphibian Breeding Habitat (Woodland)

Natural Area No.	ELC Unit	Feature ID	2011 Amphibian Call Survey Results	Commitments for Additional Monitoring	Carried Forward to EIS
463	FOD5-1	AWO-01	No calls heard on April survey.	None required.	No – not significant wildlife habitat
480	FOD6-5	AWO-02	Spr. Peeper (1) at one of four locations on April survey, well outside 120 m AOI. No calls heard on June survey. Well below threshold of 20 calling and lack of amphibians on later count indicates that it is not likely significant.	None required.	No – not significant wildlife habitat
481	FOD5-1	AWO-03	Grey Tree Frog (2) on June survey, inside 120 m AOI.	Area search for egg masses and larvae will be conducted in May or early June 2012 as described in Section 4.2.4.1	Yes – treated as significant
484	SWD2-2	AWO-04	Not surveyed	Spring 2012 surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
	SWD3-3	AWO-05	Not surveyed	Spring 2012 surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
487	FOD5-2	AWO-06	No calls heard on June survey at four locations.	Spring 2012 surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
498	FOD5-2	AWO-07	Am. Toad (2) and Spr. Peeper (2) on April Survey. No calls on May or June surveys. Well below threshold of 20 calling and lack of amphibians on 2 later counts indicates that it is not likely significant	None required.	No – not significant wildlife habitat
504	FOD5-1	AWO-08	Not surveyed	Spring 2012 surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
510	FOD6-5	AWO-09	Chorus Frog (1) and Spr. Peeper (1) on April survey. Spr. Peeper (1) on May survey. No calls heard on June survey. Well below threshold of 20 calling indicates that it is not likely significant	None required.	No – not significant wildlife habitat
534	FOD5-1	AWO-10	No calls heard on April, May or June surveys.	None required.	No – not significant wildlife habitat
	FOD7-2	AWO-11	Large chorus of Spr. Peepers on April survey. No calls heard on May or June surveys.	Area search for egg masses and larvae will be conducted in May or early June 2012 as described in Section 4.2.4.1	Yes – confirmed significant wildlife habitat

4.3.4.5 Amphibian Wetland Breeding Habitat

The first round of amphibian surveys was conducted in April 2011 at the time when Spring Peepers and Chorus Frogs were at their peaks and standing water in wetlands was at their deepest levels. Spring Peeper is most vociferous and widespread of the breeding amphibians in ephemeral pools. If no calling amphibians were recorded on the first visit when water was deepest, it was believed that the wetlands did not provide good habitat, probably did not have a sufficient hydroperiod or sufficient food for larvae. Consequently, pools that had no frogs on the first visit were not resurveyed and are not considered to be significant wildlife habitat. While it is possible that some of these pools contain some breeding amphibians it is highly unlikely that they would have met the target for significance (i.e., 20 breeding individuals). Similarly, if there were only very few calling amphibians on the first visit, they were not treated as significant. In some cases the first amphibian survey did not occur until the 2nd (May) or 3rd (June) rounds. If pools were present but no frogs were heard, sites were treated as significant and carried forward to the EIS with additional pre-construction survey commitments if the first round of surveys had not been conducted.

A summary of the results of 2011 amphibian call surveys is provided in Table 4.6. One feature was treated as significant and carried forward to the EIS, with commitments for additional pre-construction evaluation of significance surveys as described in Section 4.2.4.1.

Table 4.6 Amphibian Breeding Habitat (Wetland)

Natural Area No.	ELC Unit	Feature ID	2011 Amphibian Call Survey Results	Commitments for Additional Monitoring	Carried forward to EIS
495	SWT2-2	AWE-01	Grey Tree Frog (3) and Green Frog (2) in June survey.	Spring 2012 surveys will be conducted as described in Section 4.2.4.1	Yes – treated as significant
532	MAM2-10	AWE-02	Spring Peeper (3) and Chorus Frog (1) in April survey. No calls heard on May or June surveys. Well below threshold of 20 calling and lack of amphibians on 2 later counts indicates that it is not likely significant	None required.	No – not significant wildlife habitat
541	MAM2-10	AWE-03	No calls heard on April survey.	None required.	No – not significant wildlife habitat

4.3.4.6 Rare Vegetation Communities

No additional field studies are required to evaluate the significance of the provincially rare vegetation community (RVA-01), Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4), identified in Natural Area 539. It was carried forward to the EIS phase of the NHA.

4.3.4.7 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 for Renewable Energy Projects (MNR, 2011). 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:

- Waterfowl nesting areas (Natural Area 537);
- Reptile hibernacula (Natural Area 541);
- Bat maternity roosts (Natural Areas 426, 439, 456, 475, 487, 488, 494, 512, 514, 520, 537, 539, 545, 551, 552, 555, 556 and 561);

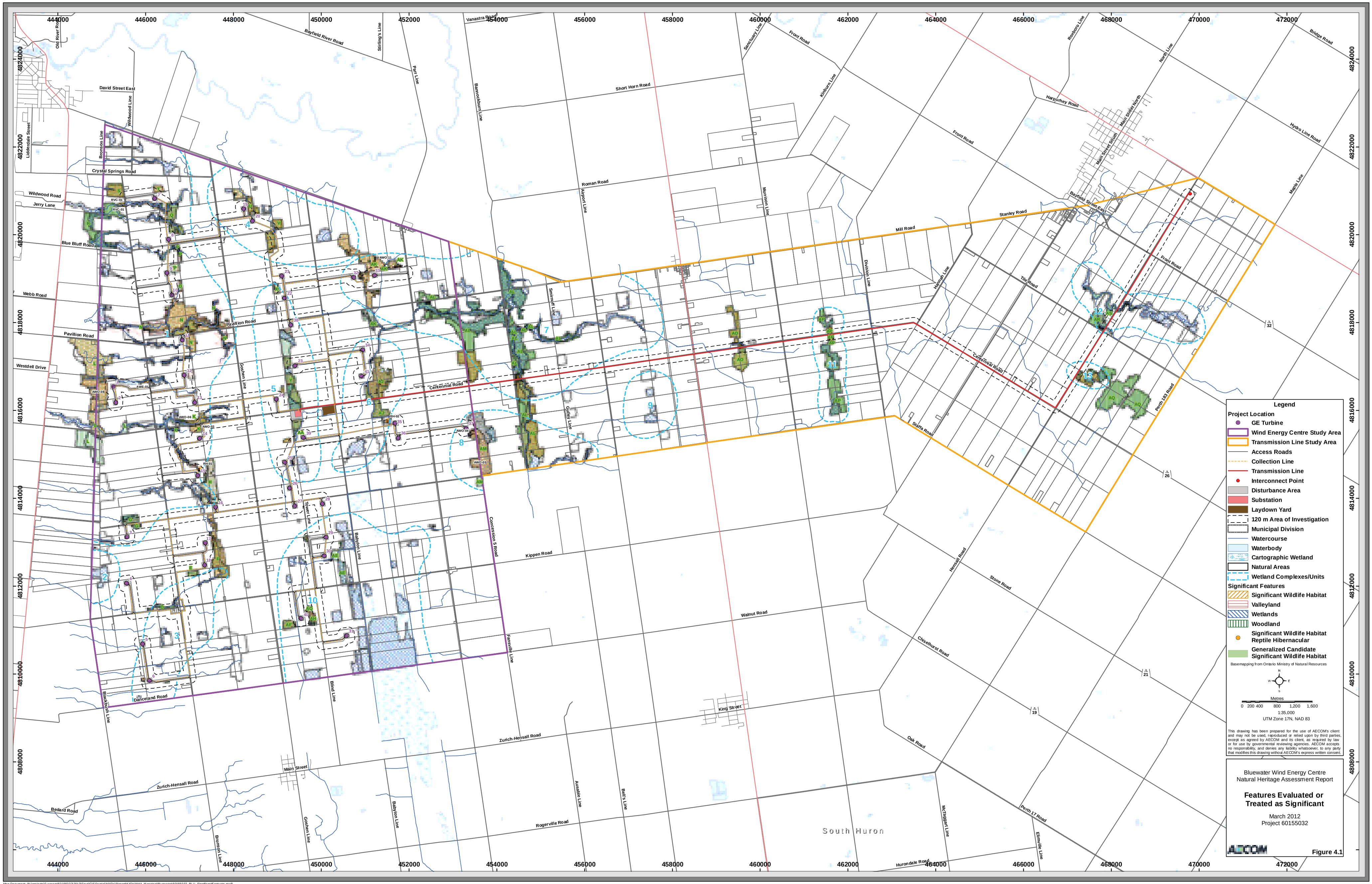
- Amphibian woodland breeding habitat (Natural Areas 450, 463, 483, 510, 534, 537 and 541);
- Amphibian wetland breeding habitat (Natural Areas 494, 564 and 565);
- Old growth and mature forest stands (Natural Areas 456, 483, 487, 510, 514, 537, 541 and 542);
- Woodland raptor nesting habitat (Woodland Unit N);
- Seeps and springs (Natural Areas 437, 439, 463, 510, 518, 532, 534, 537 and 539);
- Marsh bird breeding habitat (Natural Area 495); and
- Habitats of species of conservation concern (numerous).

4.4 Summary of Features Carried Forward to the Environmental Impact Study

Table 4.5 provides a summary of the natural features treated as significant or confirmed to be significant or provincially significant (or assumed to be significant) in the Project Location or within the 120 m Area of Investigation. The locations of these features are shown on Figure 4.1.

Table 4.7 Summary of Natural Features Carried Forward to the Environmental Impact Study

Feature	Natural Features Carried Forward to the EIS
Wetlands	The following ten wetland units or wetland complexes were treated as significant and carried forward to the EIS: WET-01, WET-03, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10, WET-12 and WET-13.
Woodlands	The following 32 woodlands were determined to be significant or treated as significant and therefore carried forward to the EIS: • D, E, F, G, H, K, L, M, N, O, P, Q, R, S, T, U, V, X, Y, AA, AE, AF, AH, AJ, AK, AL, AM, AO, AP, AQ, AR and AS.
Valleylands	The following valleyland feature was determined to be significant and therefore carried forward to the EIS: • VAL-01
Significant Wildlife Habitat	The following candidate significant wildlife habitats were confirmed within the 120 m Area of Investigation and within 120 m of qualifying project infrastructure, and were therefore carried forward to the EIS. Features evaluated and determined to be significant: • Bat maternity colonies (BMC-01, BMC-07, BMC-08 and BMC-13); • Amphibian woodland breeding habitat (AWO-11); and • Rare vegetation communities (RVC-01). Features treated as significant for the purpose of this submission (a determination as to whether the mitigation measures described in the EIS will be applied will be made based on the outcome of evaluation of significance studies to be completed prior to construction): • Reptile hibernacula (RH-01 and RH-02); • Bat maternity colonies (BMC-02, BMC-03, BMC-10, BMC-12 and BMC-14); • Amphibian woodland breeding habitat (AWO-03, AWO-04, AWO-05, AWO-06 and AWO-08); and • Amphibian wetland breeding habitat (AWE-01).
	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*: • Waterfowl nesting areas (Natural Area 537); • Reptile hibernacula (Natural Area 541); • Bat maternity roosts (Natural Areas 426, 439, 456, 475, 487, 488, 494, 512, 514, 520, 537, 539, 545, 551, 552, 555, 556 and 561); • Amphibian woodland breeding habitat (Natural Areas 450, 463, 483, 510, 534, 537 and 541); • Amphibian wetland breeding habitat (Natural Areas 494, 564 and 565); • Old growth and mature forest stands (Natural Areas 456, 483, 487, 510, 514, 537, 541 and 542); • Woodland raptor nesting habitat (Woodland Unit N); • Seeps and springs (Natural Areas 437, 439, 463, 510, 518, 532, 534, 537 and 539); • Marsh bird breeding habitat (Natural Area 495); and • Habitats of species of conservation concern (numerous).


Legend
Project Location
GE Turbine
Wind Energy Centre Study Area
Transmission Line Study Area
Access Roads
Collection Line
Transmission Line
Interconnect Point
Disturbance Area
Substation
Laydown Yard
120 m Area of Investigation
Municipal Division
Watercourse
Waterbody
Cartographic Wetland
Natural Areas
Wetland Complexes/Units
Significant Features
Significant Wildlife Habitat
Valleyland
Wetlands
Woodland
Significant Wildlife Habitat Reptile Hibernacular
Generalized Candidate Significant Wildlife Habitat
Basemapping from Ontario Ministry of Natural Resources
Metres
0 200 400 800 1,200 1,600
1:35,000
UTM Zone 17N, NAD 83
This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.
Bluewater Wind Energy Centre
Natural Heritage Assessment Report
Features Evaluated or Treated as Significant
March 2012
Project 60155032
Figure 4.1
South Huron
Centennial Road
Mill Road
Stanley Road
Division Line
Concession 5 Road
Kippen Road
Walnut Road
Zurich-Hensall Road
Babylon Line
Blind Line
Goshen Line
Pavilion Road
Blue Bluff Road
Crystal Springs Road
Front Road
Hensall Road
Perth 183 Road

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 of all significant natural features 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 a significant natural feature 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 Construction Plan Report (AECOM, 2011) and the draft Design and Operation Report (AECOM, 2011), the latter including the Environmental Effects Monitoring Plan.

Table 4.5 summarizes the natural features that have been carried forward to the EIS during the Natural Heritage Assessment process for the proposed Project. The locations of these features are shown on Figure 4.1.

No part of the proposed Project is located within a significant wetland (all wetlands treated as significant), significant woodland, significant valleyland or significant wildlife habitat; however various portions of the Project are proposed within 120 m of these features. The following section (Section 5.2) provides an overview of the proposed Project, as described in the Construction Plan Report (AECOM, 2011). Sections 5.3 to 5.7 describe 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.

5.2 Project Description

The proposed Project will consist of 37 1.6MW GE model wind turbine generators with a nameplate capacity of 60MW and pad mounted step-up transformers (41 turbines are shown for permitting purposes). The turbine layout contains more turbines than will ultimately be constructed to allow for greater flexibility post-permitting (e.g., if issues arise prior to construction). The electricity generated from the wind turbines will be collected through a network of collection lines to an on-site transformer substation located on leased private land on Centennial Road (west of Babylon Line). A115kV transmission line will connect the transformer substation to the Hydro One transmission system and will be installed along Centennial Road easterly to Hensall Road and northerly to the Village of Seaforth. Turbine access roads along with laydown and storage areas (including temporary staging areas) are planned for the site. A permanent meteorological (weather monitoring) tower and maintenance and operations building will be constructed on site.

The sections below, adapted from the draft Construction Plan Report (AECOM, 2011), summarize the construction phase activities.

5.2.1 Overview of Materials and Equipment Brought on Site

In general, the raw materials for construction include standard building materials, concrete, wood, and aggregate. Excavation and fill requirements for the Project are minimal. Any excavated materials that cannot be reused on the construction site will be offered to the landowner for reuse. Where reuse is not possible, these materials will be disposed of at a licensed disposal facility.

All work crews will generally drive light trucks to reach the Project site. Provincial and local roads will be used for the transportation of components and equipment to and from the construction sites. Clearing of land for the temporary storage and equipment laydown areas will require tracked bulldozers and excavators to strip topsoil and subsoil. Compactors and graders will be used to create an even travel surface where gravel is laid down for access roads. Flat-bed trucks will be used to transport tracked bulldozers, excavators, loaders, dump trucks, compactors and graders to the Project site for site preparation activities. Construction equipment and vehicles, including those that transport materials, will access the site via existing or constructed roads. It is expected that dump trucks and flat-bed transport trucks will transport all materials and equipment to the site. All construction activities that result in noise will be conducted in accordance with the municipality's noise by-law.

Hazardous materials used during construction are limited to fuels, lubricants and coolants that are associated with machinery, vehicles and equipment. Only fuel will be stored on-site for use by construction equipment. These materials will be managed according to the EEMP as outlined in the draft Design and Operations Report (AECOM, 2011).

5.2.2 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 will be conducted in compliance with the mitigation measures outlined below in Sections 5.3 to 5.7.

5.2.3 Land Clearing and Construction of Access Roads

Access roads will be constructed to transport equipment to the construction sites. 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 afterwards reduced to 6 m wide during the operating phase. The road length will be different for each turbine according to its location.

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 steel 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 and the potential effects are described in detail below in Section 3. 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) as part of their permitting process; however, the culverts are proposed to be open bottom and are proposed to be left in place following the operation phase, in consultation with the landowner.

Temporary crane paths will also be constructed. These will be 11 m wide and constructed in a manner similar to the other roads described above. Once the construction activities have been completed, the granular base 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 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 in Sections 5.3 to 5.7.

5.2.4 Construction Laydown Area

A 4 ha (10 acre) site will be constructed for the temporary storage of construction material (i.e., no turbine components). Following clearing and grubbing of any vegetation, the topsoil at the Construction 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. Construction activities are expected to last approximately one week and will require 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 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 in Sections 5.3 to 5.7.

5.2.5 Turbine Site and Crane Pad Construction

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

material 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 described below in Section 3.

Crane pads will be constructed at the same time as the road and will be located adjacent to the turbine locations. The crane pads will typically 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 use. 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 in Sections 5.3 to 5.7.

5.2.6 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.

5.2.7 Turbine Foundations

A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m^2, will be constructed of a wooden frame, 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. Spent welding roads will be disposed of as hazardous waste by a licensed contractor.

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

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

The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment. Fuel-handling will be conducted in compliance with the mitigation measures outlined below in Sections 5.3 to 5.7.

5.2.8 Wind Turbine Assembly and Installation

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

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

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

Equipment will include, at a minimum, trucks, two cranes, graders, and bulldozers. The trucks and graders will be driven to the site and the bulldozers will be transported via trailers. The larger track mounted crane can move from turbine site to turbine site; however, it will need to be disassembled to move it along roadways and from the Project site. 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 in Sections 5.3 to 5.7.

5.2.9 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 and municipal road right-of-ways. These components are described below.

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

The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment, and the polymer used for directional drilling. Fuel-handling will be conducted in compliance with the mitigation measures outlined below in Sections 5.3 to 5.7.

5.2.10 Transmission Line

The 115 kV electrical transmission line that will be built from the transformer substation to the connection point at the Seaforth Transformer Station is proposed to be located within the existing road right-of-ways along Centennial Road and Hensall Road in the Municipalities of Bluewater and Huron East. It is anticipated that the transmission line will be mounted on existing hydro poles or on new hydro poles. The local utility company may require NextEra to erect additional poles, or replace undersized poles, in order to accommodate the transmission line. The poles are proposed to be constructed of wood, concrete or steel and will be between 18 and 30 m tall.

Holes for new hydro 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. 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. 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 licence facility.

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.

Equipment will include, at a minimum, a truck mounted crane, 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 in Sections 5.3 to 5.7.

5.2.11 Transformer Substation

Approximately 5 m in length, by 7 m in width, by 4 m in height, the transformer substation for the wind energy centre will include an isolation switch, a circuit breaker, a step-up power transformer, transmission switch gear, instrument transformers, grounding and metering equipment. Substation grounding will meet the Ontario Electrical Safety Code.

The substation area will be gravelled with clean material imported to the site on an as needed basis and sloped to facilitate drainage. A secondary containment system will be installed around the transformer in the event of an oil leak to prevent any soil contamination.

During construction of the substation, 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. The construction crew will consist of approximately 25-40 people and 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 licence facility.

Construction equipment will include small trenchers, a small crane, 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 in Sections 5.3 to 5.7.

5.2.12 Operations 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 in Sections 5.3 to 5.7.

5.2.13 Permanent Meteorological Tower

A permanent meteorological tower will be installed at the Project. These are typically up to 80 m in height and use either a monopole or lattice structure installed using a drill truck. The towers will be erected using winches and secured with three guy wires tied off to anchors or a small monopole foundation. No significant soil or vegetation disturbance is anticipated. Construction of the meteorological tower will take approximately two days and require a crew of six people.

5.2.14 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.

5.2.15 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 are required for approximately one day per turbine. The generators are supplied with a Certificate of Approval to the owners. Following the commissioning phase, the portable generators will be removed from the site and returned to the owners.

Equipment will include support trucks which will be driven to the construction site. The only chemicals required for this phase are oils, gasoline, and grease used to operate construction equipment and portable generators, gearbox oil, and lubricants. Fuel-handling will be conducted in compliance with the mitigation measures outlined below in Sections 5.3 to 5.7.

5.3 Effects Associated with 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 Bluewater 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.

Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of potential negative effects including, but not limited to, increased erosion, sedimentation and turbidity in watercourses or wetlands, windblown dust, reduced stability of sensitive landforms, and/or minor changes in natural drainage patterns and flow volume. Consequently, significant habitat features and functions may be affected through changes in hydrology, disturbance to reproductive processes of wildlife through noise or physical intrusion, fragmentation of linkages, or increased vulnerability of invasion by non-native species. The general landscape is quite flat and therefore not highly susceptible to erosion except where small valley features are present.

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. As such, these are not presented here.

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 very limited literature on the effects of wind turbine disturbance (i.e., sound and/or vibration) on wildlife. Potential effects include the masking of

auditory signals such as amphibian 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). The setback distances from significant wildlife habitats for proposed turbine locations are considered to be sufficient to mitigate noise and vibration effects to wildlife.

5.3.1 Potential Effects of Turbines

Potential effects from the construction, operation and decommissioning of turbines on significant natural features are presented in tabular format in Table 5.1. A summary of those potential effects is provided below.

5.3.1.1 Potential Effects of Turbine Construction / Decommissioning

- Increased erosion, sedimentation and turbidity from clearing and grubbing, resulting in increased inputs of nutrients and contaminants to waterbodies, wetlands, woodlands and other significant natural features.
- Removal/disturbance of topsoil within turbine staging area and increased soil compaction from excavation and backfilling of turbine foundation.
- Disturbance and/or mortality to wildlife (e.g., birds, bats, etc.), and disturbance to or loss of wildlife habitat from construction of turbines, access roads and laydown area.
- Damage to vegetation while operating construction equipment.
- Soil / water contamination by oils, gasoline, grease and other materials from construction equipment.
- Increased erosion, sedimentation and turbidity due to discharge from dewatering activities (if required) for excavation of foundation area.
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation.

5.3.1.2 Potential Effects of Turbine Operation

- Disturbance to wildlife (e.g., birds, bats, etc.) from operation of turbines.
- Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance personnel).
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation.

5.3.2 Mitigation Measures

5.3.2.1 Generalized Significant Wildlife Habitat (SWH) Mitigation Measures

A summary of the generalized SWH mitigation measures recommended for all proposed Project infrastructure is provided below. Additional mitigation measures to address potential effects of the construction, operation and decommissioning of turbines on specific significant natural features are presented in tabular format in Table 5.1.

1. Construction Timing

- Avoid intersecting likely wildlife movement corridors wherever possible.
- Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours, wherever possible.

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.
- Damaged trees should be pruned through implementation of proper arboricultural techniques.

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, 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.
- 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.

5. Grading and Excavation

- Minimize changes in land contours and natural drainage; maintain timing and quantity of flows.

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'.
- 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 and 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.

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/behaviour 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.

10. Impervious Surfaces

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

Table 5.1 describes the potential effects, mitigation measures, monitoring commitments and residual effects associated with turbines as they relate to significant wildlife habitat, significant woodlands, significant valleylands and significant wetlands located within 120 m of proposed turbine locations.

Table 5.1 Potential Effects and Mitigation Measures Associated with Turbines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments [5]	Residual Effects	Significance of Residual Effects
Significant Wildlife Habitat					
Reptile hibernaculum (RH-01* and RH-02*)	**Construction/ Decommissioning** • Accidental intrusion into natural features resulting in habitat damage. • Possible mortality from equipment.	• Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. • 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.	• Weekly inspection of drift fence while construction is occurring during specified timing windows.	• 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).
	Operation • No effect on hibernaculum, as it is located approximately 120 m from base of turbine.	• None required	• Conduct reptile hibernacula survey according to protocol described for pre-construction survey (refer to Evaluation of Significance).	• No effects on hibernaculum.	• Negligible
Bat maternity colonies (BMC-01, BMC-07, BMC-08, BMC-13, BMC-02*, BMC-03*, BMC-10*, BMC-12* and BMC-14*)	**Construction/ Decommissioning** • Accidental intrusion into natural features resulting in habitat damage. • Bats may be disturbed by noise from construction.	• Clearly delineate habitat boundaries using protective fencing to ensure that construction activities occur outside the habitat boundaries. • Focus construction activities within 30 m of significant bat habitats to daylight hours during the period of May 1st to July 31st.	• None required	• Habitat loss will be prevented through clear delineation of habitat boundaries. • Disturbance to bats from construction noise will be minimized by timing construction activity accordingly.	• Construction effects temporary and minor if mitigation measures are implemented.
	Operation • Bats may be disturbed by noise from operation.	• Propose a lighting scheme that will minimize potential risk to bat collisions, while fulfilling Transport Canada requirements.	• Conduct 3 years of post-construction acoustic monitoring for significant bat maternity colony habitats located within 120 m of a turbine according to protocol described for pre-construction survey(refer to Evaluation of Significance).	• Bats may be disturbed by noise from operation.	• Significance of residual effects to be determined based on results of post-construction monitoring.
Significant Woodlands					

5. Additional details are provided in the environmental effects monitoring plan within the draft Design and Operation Report (AECOM, 2011).

** 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 5.1 Potential Effects and Mitigation Measures Associated with Turbines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments [5]	Residual Effects	Significance of Residual Effects
Woodland Units: E, F, H, K, L, M, N, O, P, Q, T, U, X, Y, AA, AE, AF*, AH, AJ, AK, AM	**Construction/ Decommissioning** • Accidental intrusion into significant woodlands resulting in damage to trees. • Disturbance of local wildlife. • No expected loss or fragmentation of woodland habitat or habitat function. • Refer to Section 5.3.1 for potential effects.	• Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for standard mitigation measures. • Maintain 30 m setback from significant woodlands. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Construction activities within 30 m of significant woodlands should occur during daylight hours to avoid excessive noise and/or light at night. • No additional site specific mitigation measures required.	• Periodic monitoring during active construction to ensure compliance.	• No loss or fragmentation of woodland habitat or habitat function.	• Negligible
	Operation • No effects on significant woodlands during operation.	• None required	• None required	• No effects on significant woodlands during operation.	• Negligible
Significant Wetlands					
Wetlands Complexes: WET-01, WET-04, WET-05, WET-06, WET-07 and WET-08	**Construction/ Decommissioning** • Accidental intrusion into significant wetlands resulting in damage to wetland form or function. •	• Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for standard mitigation measures. • Maintain 30 m setback from significant wetlands. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features.	• Periodic monitoring during active construction to ensure compliance.	• Risk of sedimentation and spills will be avoided through mitigation.	• Negligible
	Operation • No effects on significant wetlands during operation.	• None required	• None required	• No effects on significant wetlands during operation.	• Negligible

* *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 5.1 Potential Effects and Mitigation Measures Associated with Turbines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments [5]	Residual Effects	Significance of Residual Effects
Significant Valleylands					
VAL-01	**Construction/ Decommissioning** • Some risk of sedimentation and erosion due to proximity to construction (approximately 40 m) • Changes to surface water hydrology	• 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 features to prevent substances from inadvertently entering feature. • Limit changes in land contours. • Maintain streams and timing and quantity of flow.	• Periodic monitoring during active construction to ensure compliance.	• Erosion or sedimentation into valleyland feature will be avoided through mitigation.	• Negligible
	Operation • No effects on significant valleylands during operation.	• None required	• None required	• No effects on significant valleylands during operation.	• Negligible

The significance of some Candidate Significant Wildlife Habitats (e.g., wintering raptor areas, reptile hibernacula, bat maternity colonies) has yet to be determined, as additional field studies are required to evaluate the significance of these features. This process also has the potential to remove one woodland (Unit AF) from the group of significant woodlands. For the purposes of this submission, these Candidate Significant Wildlife Habitats and Woodland Unit AF have been treated as significant, and mitigation measures and monitoring related to these features are 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 wildlife habitat, woodlands, wetlands), refer also to other sections of the report for relevant discussion of potential effects and mitigation measures.

5.4 Effects Associated with Access Roads

The effects associated with access roads and the associated temporary crane paths are related primarily to the 10-14 m wide footprint during the construction phase and 6 m wide footprint during the operational phase. Access roads and temporary crane paths will be constructed in existing agricultural fields a minimum of 30 m from significant natural features. Therefore, no direct loss or fragmentation of significant natural features is expected as a result of access road and temporary crane path construction. The roads do not require removal of natural vegetation except for portions of some hedgerows.

Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of negative effects including, but not limited to, increased erosion, sedimentation and turbidity, mobilization of dust, reduced stability of sensitive landforms, and/or changes in natural drainage patterns and flow volume. Consequently, significant habitat 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.

Since the proposed roads are outside of any natural features, there is not expected to be direct impacts to the vernal breeding pools. The risks to amphibian woodland or wetland breeding are primarily the sensitivity of road mortality associated with migrating between breeding pond 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.

5.4.1 Potential Effects of Access Roads

Potential effects from the construction, operation and decommissioning of access roads on significant natural features are presented in tabular format in Table 5.2. A summary of those potential effects is provided below.

5.4.1.1 Potential Effects of Access Road Construction / Decommissioning

- Increased erosion, sedimentation and turbidity from clearing and grubbing for construction of access roads, temporary crane paths and pads/turnaround areas, resulting in increased inputs of nutrients and contaminants to waterbodies, wetlands and other significant natural features.
- Increased soil compaction from manoeuvring of heavy machinery.

- Disturbance and/or mortality to terrestrial wildlife (e.g., nesting turtles and other wildlife attracted to roads near wetlands and water features), including barriers to wildlife movement, and disturbance to or loss of wildlife habitat from construction of access roads.
- Damage to vegetation while operating construction equipment.
- Soil / water contamination by oils, gasoline, grease and other materials from construction equipment.
- Increase in impervious surfaces from construction of access roads, crane paths/pads and turnaround areas, resulting in increased water temperatures, increased surface runoff and stream peak flows, and reduced infiltration, baseflows and upwelling.
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation.
- Obstruction of lateral flows in surface water to wetlands and water bodies.

5.4.1.2 Potential Effects of Access Road Operation

- Disturbance and/or mortality to terrestrial wildlife due to traffic along permanent access roads.
- Soil / water contamination by oils, gasoline, grease and other materials from maintenance activities.
- Increase in impervious surfaces from permanent access roads, resulting in increased water temperatures, increased surface runoff and stream peak flows, and reduced infiltration, baseflows and upwelling.
- Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation.

5.4.2 Mitigation Measures

A summary of the generalized SWH mitigation measures recommended for all proposed Project infrastructure is provided in Section 5.3.2.1. Additional mitigation measures to address potential effects of the construction, operation and decommissioning of access roads on significant natural features are presented in tabular format in Table 5.2. This table describes the potential effects, mitigation measures, monitoring commitments and residual effects associated with access roads and temporary crane paths as they relate to significant wildlife habitat, significant woodlands, significant valleylands, and significant wetlands located within 120 m of proposed access roads.

The significance of some Candidate Significant Wildlife Habitats (e.g., amphibian woodland breeding habitat, amphibian wetland breeding habitat, reptile hibernacula) 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 the report for relevant discussion of potential effects and mitigation measures.

Table 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Wildlife Habitat					
Amphibian woodland breeding habitat: (AWO-03*, AWO-04*, AWO-05*, AWO-06*, AWO-08*and AWO-11)	**Construction/ Decommissioning** • Accidental intrusion into natural features resulting in habitat damage. • Disruption of amphibians moving to breeding pools and home range. • Possible indirect effects on breeding pool condition through changes to surface water drainage patterns.	• Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. • 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. • Ensure no grade changes within 30 m of vernal pools during construction. • Post speed limits along construction access roads.	• Periodic monitoring of sediment and erosion controls during active construction to ensure compliance. • Examine condition of vernal pools within 30 m of road following completion of construction. • Inspect locations following completion of access roads to ensure no grade changes.	• Disruption to amphibians avoided and indirect impacts to habitat minimized with the application of mitigation measures.	• Construction effects temporary and minor.
	Operation • Risk of mortality to amphibians moving between breeding pools and home range.	• Advise operations staff to avoid driving roads in proximity to these features at night 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, wherever possible. • Enforce slow vehicle speeds. Post and maintain speed limit signs.	• Conduct post-construction amphibian call surveys and area searches to assess any potential changes in amphibian breeding populations according to protocol described for pre-construction survey (refer to Evaluation of Significance). • 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.	• Risk of amphibian mortality reduced through mitigation measures.	• Operation effects minor (i.e., no or limited mortality expected).

* *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 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Amphibian wetland breeding habitat (AWE-01)*	**Construction/ Decommissioning** • Accidental intrusion into natural features resulting in habitat damage. • Disruption of amphibians moving to breeding pools and home range. • Possible indirect effects on breeding pool condition through changes to surface water drainage patterns.	• Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. • Avoid construction of roads from April to June in areas identified as amphibian corridors. • Install sediment and erosion control fences if pools are downgradient and within 30 m of a road.	• Periodic monitoring of sediment and erosion controls during active construction to ensure compliance. • Examine condition of breeding pools within 30 m of road following completion of construction. •	• Disruption to amphibians avoided and indirect impacts to habitat minimized with the application of mitigation measures.	• Construction effects temporary and minor.
		• Construction activities within 30 m of significant amphibian habitats should occur during daylight hours to avoid excessive noise vehicle caused mortality • Ensure no grade changes within 30 m of breeding ponds during construction. • Post speed limits along construction access roads.	• Inspect locations following completion of access roads to ensure no grade changes		
	Operation • Risk of mortality to amphibians moving between breeding pools and home range.	• Advise operations staff to avoid driving access roads in proximity to these features at night between April 1st and June 30th and any rainy nights from spring to early autumn. • Enforce slow vehicle speeds. Post and maintain speed limit signs.	• Conduct post-construction amphibian call surveys and area searches to assess any potential changes in amphibian breeding populations according to protocol described for pre-construction survey (refer to Evaluation of Significance). • 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.	• Risk of amphibian mortality reduced through mitigation measures.	• Operation effects minor (i.e., no or limited mortality expected).

* *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 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Amphibian movement corridors*	**Construction/ Decommissioning** • Risk of mortality to amphibians moving between breeding pools and home range.	• Advise operations staff to avoid driving roads in proximity to these features at night between April 1st and June 30th (for frog movement corridors) or between March 15th and April 30th (for salamander movement corridors), and any rainy nights from spring to early autumn, wherever possible. • Enforce slow vehicle speeds. Post and maintain speed limit signs.	• If construction occurs after dark in or near identified movement corridors between April 1st and June 30th (for frog movement corridors) or between March 15th and April 30th (for salamander movement corridors), and rainy nights from spring to early autumn amphibian mortality surveys will be conducted the following day. • Consider installing larger culvert for amphibians with drift fencing if culvert already needed for drainage purposes and road crosses a high potential amphibian movement corridor. • Site specifics will be examined to determine appropriate mitigation (e.g., corridor width, vegetation type).	• Risk of amphibian mortality reduced through mitigation measures.	• Operation effects minor (i.e., no or limited mortality expected).
	Operation • Risk of mortality to amphibians moving between breeding pools and home range.	• Advise operations staff to avoid driving roads in proximity to these features at night between April 1st and June 30th(for frog movement corridors) or between March 15th and April 30th (for salamander movement corridors), and any rainy nights from spring to early autumn, wherever possible. • Enforce slow vehicle speeds. Post and maintain speed limit signs.	• No additional monitoring required.	• Risk of amphibian mortality reduced through mitigation measures.	• Operation effects minor (i.e., no or minimal mortality expected).

* *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 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Reptile hibernacula (RH-01* and RH-02*)	**Construction/ Decommissioning** • Accidental intrusion into natural features resulting in habitat damage. • Possible mortality from equipment.	• Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. • 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.	• Weekly inspection of drift fence while construction is occurring during specified timing windows.	• 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).
	Operation • Possible mortality from vehicles using roads.	• Erect long term drift fence between edge of habitat and road if hibernaculum determined to be large (>25 snakes).	• Conduct reptile hibernacula survey for 2 years post-construction according to protocol described for pre-construction survey (refer to Evaluation of Significance).	• Mortality minimized through the application of mitigation measures.	• Operation effects minor (i.e., no or limited mortality expected).
Rare vegetation communities (RVA-01)	**Construction/ Decommissioning** • No effects to feature due to distance (opposite side of Bronson Line and >50 m away from proposed access road).	• None required	• None required	• No effects to feature	• Negligible
	Operation • No effects to feature	• None required	• None required	• No effects to feature	• Negligible

* *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 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Woodlands					
Woodland Units: G, K, P, U	**Construction/ Decommissioning** • Accidental intrusion into significant woodlands resulting in damage to trees. • No expected loss or fragmentation of woodland habitat or habitat function. • Refer to Section 5.4.1 for potential effects.	• Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for standard mitigation measures. • Maintain 30 m setback from significant woodlands, where possible. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Construction activities within 30 m of significant woodlands should occur during daylight hours to avoid excessive noise and/or light at night. • No additional site specific mitigation measures required.	• Periodic monitoring during active construction to ensure compliance.	• No loss or fragmentation of woodland habitat or habitat function.	• Negligible
	Operation • Changes in soil moisture regime and vegetation species composition.	• Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for mitigation measures. • Implement infiltration techniques to the maximum extent possible. • Minimize paved surfaces and design roads to promote infiltration. • No additional site specific mitigation measures required.	• None required	• No effects on significant woodlands during operation.	• Negligible
Significant Wetlands					
Wetland Complexes: WET-01, WET-04, WET-05, WET-06, WET-07 and WET-08	**Construction/ Decommissioning** • Accidental intrusion into significant wetlands resulting in damage to wetland form or function. • Risk of sedimentation from excavation or accidental spills of fuel, etc.	• Maintain 30 m setback from significant wetlands. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Install sediment and erosion control fencing along edge of wetland if within 30 m. • Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent wetland features.	• Periodic monitoring during active construction to ensure compliance.	• Risk of sedimentation and spills will be avoided through mitigation.	• Negligible

Table 5.2 Effects Associated with Access Roads and Temporary Crane Paths

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
	Operation • Changes in soil moisture regime and vegetation species composition.	• Implement infiltration techniques to the maximum extent possible. • Minimize paved surfaces and design roads to promote infiltration.	• None required	• No effects on significant wetlands during operation.	• Negligible
Significant Valleylands					
VAL-01	**Construction/ Decommissioning** • No effects to valleyland feature due to distance from construction (on opposite side of Pavillion Road).	• No additional site specific mitigation measures required.	• None required	• No effects to valleyland feature.	• Negligible
	Operation • Changes in soil moisture regime and vegetation species composition.	• Implement infiltration techniques to the maximum extent possible. • Minimize paved surfaces and design roads to promote infiltration.	• None required	• Negligible	• Negligible

5.5 Effects Associated with 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 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 six 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:

- Feature 541 (Wetland Complex 1; Woodland Q) significant wetland and significant woodland, natural area width at two locations 125 m and 100 m;
- Feature 537 (Woodland V) significant woodland, width 70 m;
- Feature 534 (Woodland AK) significant woodland, width 110 m;
- Feature 510 (Wetland Complex 5, Woodland Y) significant wetland and significant woodland, width 270 m;
- Feature 532 (Wetland Complex 1) significant wetland, width 75 m; and
- Feature 480 (Wetland Complex 1) significant wetland, width 65 m.

Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of potential negative effects including, but not limited to, increased erosion, sedimentation and turbidity, reduced stability of sensitive landforms, and/or changes in natural drainage patterns and flow volume. Consequently, significant habitat features and functions may be affected through changes in hydrology, disturbance to reproductive processes through noise or physical intrusion, fragmentation of linkages, or increased vulnerability of invasion by non-native species.

5.5.1 Potential Effects of Underground Collection Lines

Potential effects from the construction, operation and decommissioning of underground collection lines on significant natural features are presented in tabular format in Table 5.3. A summary of those potential effects is provided below.

5.5.1.1 Potential Effects of Collection Line Construction / Decommissioning

- Increased erosion, sedimentation and turbidity from directional drilling, resulting in increased inputs of nutrients and contaminants to waterbodies and wetlands.
- Disturbance and/or mortality to terrestrial wildlife and disturbance to or loss of wildlife habitat from clearing for directional drilling.
- Damage to vegetation while operating construction equipment.
- Soil / water contamination by oils, gasoline, grease and other materials (e.g., bentonite or polymer used during directional drilling), including the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as “frac-out”.

5.5.1.2 Potential Effects of Collection Line Operation

No negative impacts are anticipated to result from the operation of underground collection lines.

5.5.2 Mitigation Measures

A summary of the generalized SWH mitigation measures recommended for all proposed Project infrastructure is provided in Section 5.3.2.1. Additional mitigation measures to address potential effects of the construction, operation and decommissioning of underground collection lines on significant natural features are presented in tabular format in Table 5.3. This table describes the potential effects, mitigation measures, monitoring commitments and residual effects associated with underground collection lines as they relate to significant wildlife habitat, significant woodlands, significant valleylands, and significant wetlands located within 120 m of proposed underground collection lines.

Table 5.3 Effects Associated with Collection Lines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Woodlands					
Woodland Units: Q, V, Y, AK	**Construction/ Decommissioning** • Accidental intrusion into significant woodlands resulting in damage to trees. • Potential for unplanned intrusion into woodlands in event of equipment malfunction due to directional drilling under Units Q (two locations), V, Y and AK.	• Locate entrance and exit pits at least 30 m from woodland edge. • Install protective fencing around vegetation to prevent accidental damage. • Ensure drill depth is at an appropriate depth below woodland to reduce the risk of a 'frac-out'.	• Monitor during active drilling / construction.	• Unplanned intrusion into woodland due to directional drilling will be avoided through the implementation of mitigation measures.	• Negligible
	Operation • No effects on significant woodlands during operation.	• None required	• None required	• No effects on significant woodlands during operation.	• Negligible
Significant Wetlands					
Wetland Complexes: WET-01, WET-04 and WET-05	**Construction/ Decommissioning** • Potential for unplanned intrusion into wetlands in event of equipment malfunction due to directional drilling. • Risk of sedimentation or erosion into significant wetlands when directionally drilling. • Risk of soil / water contamination from spills during directional drilling.	• Where feasible, wetlands 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.	• Monitor during active drilling / construction.	• Risk of unplanned intrusion into wetland due to directional drilling will be minimized through the use 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.

Table 5.3 Effects Associated with Collection Lines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
	Operation • No effects on significant wetlands during operation.	• None required	• None Required	• No effects on significant wetlands during operation.	• Negligible
Significant Valleylands					
VAL-01	**Construction/ Decommissioning** • No effects to feature due to distance from construction (>50 m).	• None required	• None Required	• No effects to feature	• Negligible
	Operation • No effects to feature during operation.	• None required	• None Required	• No effects to feature during operation.	• Negligible

5.6 Effects Associated with Transmission Lines

One transmission line is proposed for the Bluewater Wind Energy Centre. The transmission line will be installed along Centennial Road from west of Babylon Line easterly to Hensall Road and northerly to the Village of Seaforth. Discussion of the effects arising from the transmission line assumes that, where feasible, the transmission line will be installed on existing above-ground wooden hydro poles and will be installed within the existing road right-of-way. No direct loss or fragmentation of significant natural features is expected as a result of transmission line construction.

Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of potential negative effects including, but not limited to, increased erosion, sedimentation and turbidity, reduced stability of sensitive landforms, and/or changes in natural drainage patterns and flow volume. Consequently, significant habitat features and functions may be affected through changes in hydrology, disturbance to reproductive processes through noise or physical intrusion, fragmentation of linkages, or increased vulnerability of invasion by non-native species.

5.6.1 Potential Effects of the Overhead Transmission Line

Potential effects from the construction, operation and decommissioning of the overhead transmission line on significant natural features are presented in tabular format in Table 5.4. A summary of those potential effects is provided below.

5.6.1.1 Potential Effects of Overhead Transmission Line Construction / Decommissioning

- Increased erosion, sedimentation and turbidity from clearing and grubbing, resulting in increased inputs of nutrients and contaminants to waterbodies, wetlands, and other significant natural features.
- Increased soil compaction from manoeuvring of heavy machinery.
- Potential loss of riparian habitat adjacent to watercourses
- Disturbance and/or mortality to terrestrial wildlife and disturbance to or loss of wildlife habitat from clearing for transmission lines.
- Damage to vegetation while operating construction equipment.
- Soil / water contamination by oils, gasoline, grease and other materials from construction equipment.

5.6.1.2 Potential Effects of Overhead Transmission Line Operation

- Disturbance and/or mortality to terrestrial wildlife from spraying pesticides along transmission lines.
- Soil / water contamination by oils, gasoline, grease and other materials from maintenance activities.

5.6.2 Mitigation Measures

A summary of the generalized SWH mitigation measures recommended for all proposed Project infrastructure is provided in Section 5.3.2.1. Additional mitigation measures to address potential effects of the construction, operation and decommissioning of the overhead transmission line on significant natural features are presented in tabular format in Table 5.4. This table describes the potential effects, mitigation measures, monitoring commitments and residual effects associated with the overhead transmission line as they relate to significant wildlife habitat, significant woodlands, significant valleylands, and significant wetlands located within 120 m of the proposed transmission line.

Table 5.4 Potential Effects and Mitigation Measures Associated with Transmission Lines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Woodlands					
Woodland Units: AL, AO, AP, AQ, AR, AS	**Construction/ Decommissioning** • Increased potential for unintended damage to adjacent woody vegetation, (i.e., damage to roots or branches) due to proximity of transmission line to significant woodlands, small size of the right-of-way and constrained work area.	• Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for standard mitigation measures. • Establish 30 m setback from significant woodland where possible. • Limit vegetation removal within significant woodlands to the existing right-of-way. • Complete a detailed inventory of species and abundance to be removed. Re-plant following an area ratio of 1:1 of similar species association (native species) if area to be removed is greater than 1% of the woodland cover. Removal of vegetation will be limited to the road right-of-way. • Construction activities within 30 m of significant woodlands should occur during daylight hours to avoid excessive noise and/or light at night. • No additional site specific mitigation measures required.	• Monitor during construction	• Damage to woody vegetation within significant woodlands will be minimized through the application of mitigation measures.	• Construction effects due to vegetation removal minor (i.e., no fragmentation of woodland habitat or loss of habitat function).
	Operation • No effects on significant woodlands during operation	• None required	• None required	• No effects on significant woodlands during operation.	• Negligible

Table 5.4 Potential Effects and Mitigation Measures Associated with Transmission Lines

Feature	Potential Effects	Mitigation Measures	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Wetlands					
Wetland Complexes: WET-05, WET-06, WET-12 and WET-13	**Construction/ Decommissioning** • 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. • Risk of sedimentation or erosion into significant wetlands from excavation. • Risk of soil / water contamination from spills during directional drilling.	• 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 sediment and erosion control fencing along edge of wetland within 30 m of transmission line footprint. • Develop and implement an emergency spills plan outlining steps to contain any spills to avoid contamination of adjacent wetland features.	• Periodic monitoring during active construction to ensure compliance.	• Damage to vegetation, risk of sedimentation and risk of contamination resulting from spills 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.
	Operation • No effects on significant wetlands during operation.	• None required	• None required	• No effects on significant wetlands during operation.	• Negligible

5.7 Effects Associated with the Operations Building and Substation

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 and Substation assumes that a building measuring approximately 30 m by 15 m in size will be constructed in the location shown on Figure 4.1. 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. Both will be constructed in accordance with applicable municipal and provincial standards.

Since the proposed operations building and substation are located outside of any natural features, there is not expected to be direct impacts to these features provided that no intrusion occurs into adjacent natural vegetation. Site preparation, grading and construction activities within 120 m of significant natural features may result in a variety of potential negative effects including, but not limited to, increased erosion, sedimentation and turbidity, reduced stability of sensitive landforms, and/or changes in natural drainage patterns and flow volume. Consequently, significant habitat features and functions may be affected through changes in hydrology, disturbance to reproductive processes through noise or physical intrusion, fragmentation of linkages, or increased vulnerability of invasion by non-native species.

5.7.1 Potential Effects of Operations Building and Substation

Potential effects from the construction, operation and decommissioning of the operations building and substation on significant natural features are presented in tabular format in Table 5.5. A summary of those potential effects is provided below.

5.7.1.1 Potential Effects of Operations Building and Substation during Construction / Decommissioning

- Increased erosion, sedimentation and turbidity from clearing and grubbing, resulting in increased inputs of nutrients and contaminants to waterbodies, wetlands and other significant natural areas.
- Removal/disturbance of topsoil and increased soil compaction from excavation and backfilling of building/transformer station foundation.
- Disturbance and/or mortality to wildlife (e.g., birds/bats, etc.), and disturbance to or loss of wildlife habitat from construction of operation building and transformer station.
- Damage to vegetation while operating construction equipment.
- Soil / water contamination by oils, gasoline, grease and other materials from construction equipment.

5.7.1.2 Potential Effects of Operations Building and Substation Operation

- Soil / water contamination by oils, gasoline, grease and other materials required in the operation building and transformer station.

5.7.2 Mitigation Measures

A summary of the generalized SWH mitigation measures recommended for all proposed Project infrastructure is provided in Section 5.3.2.1. Additional mitigation measures to address potential effects of the construction, operation and decommissioning of the operations building and substation on significant natural features are presented in tabular format in Table 5.5. This table describes the potential effects, mitigation measures, monitoring commitments and residual effects associated with the operations building and substation as they relate to significant wildlife habitat, significant woodlands and significant wetlands located within 120 m of these proposed Project components.

Table 5.5 Potential Effects and Mitigation Measures Associated with Operations Building and Substation

Feature	Potential Effects	Mitigation Measures/ Construction Plan Report Commitments	Monitoring Methodology and Commitments	Residual Effects	Significance of Residual Effects
Significant Woodlands					
Woodland Units: Y, AA	**Construction/ Decommissioning** • Accidental intrusion into significant woodlands resulting in damage to trees. • No expected loss or fragmentation of woodland habitat or habitat function due to distance from operations building and substation (>30 m from significant woodlands). • Refer to Section 5.7.1 for potential effects.	• Maintain 30 m setback from significant woodlands. Install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. • Refer to Generalized SWH Mitigation Measures (Section 5.3.2.1) for standard mitigation measures. • Construction activities within 30 m of significant woodlands should occur during daylight hours to avoid excessive noise and/or light at night. • No additional site specific mitigation measures required.	• Monitor during construction.	• No loss or fragmentation of woodland habitat or habitat function.	• Negligible
	Operation • No effects on significant woodlands during operation.	• None required	• None required	• No effects on significant woodlands during operation.	• Negligible
Significant Wetlands					
Wetland Complexes: WET-05	**Construction/ Decommissioning** • Risk of accidental intrusion by construction vehicles entering site, which is minimized due to location of building and substation in relation the wetland (on the opposite side of Centennial Road).	• Install temporary construction fencing along edge of feature.	• Site inspection during construction.	• Accidental intrusion by construction vehicles will be avoided through use of mitigation.	• Negligible
	Operation • No effects on significant wetlands during operation.	• None required	• None required	• No effects on significant wetlands during operation.	• Negligible

5.8 Environmental Effects Monitoring Plan

The following sections describe how the environmental effects monitoring plan and construction plan report address negative environmental effects to significant natural feature identified in the EIS.

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

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

- Bats may be disturbed by noise from operations (Features BMA-01, BMA-07, BMA-08, BMA-13, BMA-02, BMA-03, BMA-10, BMA-12 and BMA-14);
- Barrier effect caused by access roads to amphibian movement between breeding pools and home range if a significant amphibian movement corridor is identified during pre-construction surveys
- No anticipated operational effects by physical disturbance or introduction of invasive species into rare vegetation community (RVC-01) as a result of proximity to access road. RVC-01 is located along an existing road and the proposed access road is located on the opposite side of the existing road. Therefore the existing road is a more likely source of disturbance than the proposed access road.
- No anticipated operational effects to reptile hibernacula habitat (Features RH-01 and RH-02); potential for mortality along access road.
- No anticipated operational effects to amphibian woodland breeding habitat (Features AWO-03, AWO-04, AWO-05, AWO-06, AWO-08, AWO-11; potential for mortality along access roads
- No anticipated operational effects to amphibian wetland breeding habitat (AWE-01); potential for mortality along access roads
- No anticipated operational effects to significant woodlands
- No anticipated operation effects to significant valleylands
- No anticipated operational effects to provincially significant wetlands

The performance objectives, mitigation measures, residual effects, and the monitoring plan associated with potential effects to natural heritage features are described in Table 5.6 below.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Significant Wildlife Habitat				
Bats may be disturbed by noise from operation (BMA-01, BMA-07, BMA-08, BMA-13 BMA-02, BMA-03, BMA-10, BMA-12 and BMA-14**).**	No displacement of bats from habitat	• Implement mitigation when disturbance effects are detected through post-construction monitoring	• Bats may be displaced from their habitat because of operational noise • Significance of residual effects will be determined based on the results of post-construction monitoring	• Conduct 3 years of post-construction acoustic monitoring for Features BMC-01, BMC-06, BMC-07, BMC-08 and BMC-13 where located within 30 m of construction activities according to protocol described for pre-construction survey(as described in March 2010 version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including: ▪ Conduct through-the-night acoustic bat monitoring in June, beginning at dusk and continuing for 5 hours. ▪ Conduct active visual and acoustic monitoring between sunset and midnight in June, consisting of ten minute surveys at each point count location. • Conduct 3 years of post-construction acoustic monitoring for Features BMC-03, BMC-02, BMC-10, BMC-12, BMC 15 where located within 30 m of construction activities according to protocol described for pre-construction survey(as described in July 2011 version of *Bats and Bat Habitats: Guidelines for Wind Power Projects*) including: ▪ 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, consisting of ten minute surveys at each point count location. • The findings of the acoustic monitoring will be reported back to MNR on an annual basis for the first 3 years of operation. • Contingency Measures ▪ Institute changes to turbine operation if necessary (see mitigation strategy in this table). ▪ Consultation with MNR to determine additional contingency measures if necessary

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Risk of mortality to amphibians moving between breeding pools and home range on access roads. *Note: only applies if significant amphibian movement corridor identified during pre-construction surveys*	No amphibian mortality	• Advise operations staff to while driving roads in proximity to these features at nights between April 1 and June 30 and any rainy nights from spring to early autumn, where possible. • Maintain wildlife crossing signs and limit speed of vehicles near crossings.	• Risk of amphibian mortality reduced through mitigation measures. • Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles.	• Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) to assess any potential changes in amphibian breeding populations or species distribution
Risk of amphibian mortality on access roads.	No amphibian mortality along access road			
Possible snake mortality from vehicles using access road near Features RH-01 and RH-02**.**	No snake mortality along access road	• Erect long term drift fence between edge of habitat and road if hibernaculum determined to be large (>25 snakes).	• Risk of snake mortality minimized through the application of mitigation measures. • Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles.	• Conduct reptile hibernacula survey for 2 years post-construction according to assess any potential changes in snake populations or species composition. Protocol described for pre-construction survey, which includes: ▪ Examination of rock piles and vicinity between mid-April and mid-May. ▪ Identifying species and counting individuals, ▪ Preparing a field sheet to record weather, habitat conditions, location of cover objects, UTMs and details of snakes encountered. • 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. • Contingency Measures ▪ Advise operations staff to take extra care while driving near Features RH-01 and RH-02.
Degradation of Rare Vegetation (RVC-01) by physical intrusion or increase of invasive plant species	• No increase in disturbance or invasive plant species as a result of access road`	• Make construction crew aware of RVC-01 and that it should be avoided • Following construction of access road, determine if any physical disturbance to RVC-01	• Accidental disturbance prevented	• Generally no plant monitoring required because existing road lies between RVC-01 and access road and is more a likely source of invasives • Corrective restoration and plant species monitoring required only if accidental physical intrusion occurs during construction or operations.

Table 5.6 Mitigation Measures, Residual Effects and Monitoring Plan: Natural Heritage Resources

Potential Effect	Performance Objective	Mitigation Strategy	Residual Effects	Monitoring Plan and Contingency Measures
Soil / water contamination by oils, gasoline, grease and other materials (e.g., turbine lubricant and maintenance personnel)	• No off-site contamination of soil or no contamination of groundwater or surface water	• Control soil / water contamination through best management practices. • Ensure machinery arrives on site in a clean, washed condition and is to be 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 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. • 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).	• 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.	• Conduct regular site inspections and monitoring of turbines by a designated on-site Environmental Monitor(s). • Contingency Measures ▪ 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.
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	• Adhere to all setback requirements from watercourses. • Implement infiltration techniques to the maximum extent possible. • Minimize paved surfaces and design roads to promote infiltration.	• Effects to soil moisture and species composition of vegetation minimized due to setback requirements. • Low likelihood and limited magnitude of effects as a result.	• No monitoring or contingency measures required.

5.8.2 Potential Negative Environmental Effects Resulting From Construction

5.8.2.1 Generalized Candidate Significant Wildlife Habitat

The potential effects from construction and installation activities on generalized candidate significant wildlife habitat are as follows:

- increased erosion, sedimentation and turbidity 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, temporary crane paths and 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, temporary crane paths and 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, temporary crane paths and pads/turnaround areas, collection lines, transmission line, operations building and substation;
- disturbance to or loss of wildlife habitat from construction of turbines, access roads, temporary crane paths and pads/turnaround areas, collection lines, transmission line, operations building and substation;
- damage to vegetation while operating equipment used in construction of turbines, access roads, temporary crane paths and 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, temporary crane paths and 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”.
- changes in surface water drainage patterns (e.g., obstruction of lateral flows in surface water to wetlands) from construction of turbines, access roads, temporary crane paths and pads/turnaround areas, resulting in effects to soil moisture and species composition of vegetation.

Table 5.7 provides mitigation measures, residual effects and the monitoring plan for Generalized Candidate Significant Wildlife Habitat potential effects identified above.

Table 5.7 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, sedimentation and turbidity resulting from clearing and grubbing, excavation, backfilling and stockpiling.	• Minimize erosion, sedimentation and turbidity from clearing, grubbing, excavation, backfilling and stockpiling.	• Develop and implement an erosion and sediment control plan before commencement of construction. • Utilize erosion blankets, erosion control fencing, straw bales, 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.	• Increased erosion, sedimentation and turbidity avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis: ▪ 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. • 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). • 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: ▪ Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place. ▪ Water samples will be analyzed 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).
Removal/disturbance of topsoil and increased soil compaction from manoeuvring of heavy machinery, excavation and backfilling.	• Minimize removal/disturbance of topsoil and increased soil compaction.	• 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.	• Increased erosion, sedimentation and turbidity avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• See erosion and sedimentation above.

Table 5.7 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, sedimentation and turbidity resulting from directional drilling.	• Minimize erosion, sedimentation and turbidity.	• 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.	• Increased erosion, sedimentation and turbidity avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• See erosion and sedimentation above.
Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement.	• Minimize disturbance and/or mortality to terrestrial wildlife.	• Time vegetation removal to avoid periods of habitat use to the extent possible, particularly to avoid sensitive life stages (e.g., breeding season for migratory birds, May 1 to July 30). Undertake active nest surveys 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, wherever possible. • Clearly post construction speed limits. Install and maintain wildlife crossing and speed limit signs on access roads.	• Disturbance and/or mortality to terrestrial wildlife, including barriers to wildlife movement avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Undertake monthly site inspections to ensure that only specified trees are removed and that there is no damage caused to the remaining trees during construction. • Contingency Measures: ▪ Suspend construction during breeding periods.
Disturbance to or loss of wildlife habitat, including active bird nests. **Damage to vegetation while operating equipment.**	• Minimize disturbance to/loss of wildlife habitat and vegetation.	• Keep vegetation removal to a minimum and limited to non-significant habitats (e.g., hedgerows). • 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. • Damaged trees should be pruned through implementation of proper arboricultural techniques.	• 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.	• 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: ▪ Suspend construction during breeding periods.

Table 5.7 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
Minor vegetation removal in right of way and possible destruction of bird nests during construction of transmission line.	• Minimize vegetation removal and destruction of bird nests.	• Schedule vegetation removal outside of breeding season (May 1 to July 30) where possible. • Conduct nest surveys if any substantial vegetation to be removed in breeding season. • Construction and decommissioning activities within 30 m of woodlands or wetlands should occur during daylight hours, wherever possible. • Complete a detailed inventory of species and abundance to be removed. Re-plant following an area ratio of 1:1 of similar species association (native species) if area to be removed is greater than 1% of the woodland cover.	• 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.	• 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: ▪ Suspend construction during breeding periods.
Soil / water contamination by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.	• Minimize soil/water contamination.	• Ensure machinery is maintained free of fluid leaks. • 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.	• Soil and water contamination avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Conduct daily inspections of construction equipment for leaks / spills. • Contingency Measures ▪ 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; ▪ 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).

Table 5.7 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
Soil / water contamination by oils, gasoline, grease and other materials from spills during directional drilling.	• Minimize soil/water contamination.	• Conduct all drilling by licensed drillers in accordance with Regulation 903 under Ontario Water Resources Act, R.S.O. 1990. • 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. • 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.	• Risk of soil / water contamination avoided or minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Monitor directional drilling for the duration of such activities to ensure that "frac-out" does not occur, and if it does, to ensure that there are no effects on surface or groundwater. • Contingency Measures: ▪ 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. ▪ Document post-cleanup conditions with photographs and prepare frac-out incident report describing time, place, actions taken to remediate frac-out and measures implemented to prevent recurrence. Provide incident report to MNR and MOE forthwith.
Changes in surface water drainage patterns. **Obstruction of lateral flows in surface water to wetlands.**	• Minimize changes in surface water drainage patterns and obstruction of lateral flows in surface water to wetlands.	• Minimize changes in land contours and natural drainage; maintain timing and quantity of flows.	• 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.	• No monitoring or contingency measures required.

5.8.2.2 Significant Wetlands, Woodlands, Valleylands and Wildlife Habitat

The potential effects from construction and installation 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:
  - habitat damage at Reptile Hibernacula Features RH-01 and RH-02 and Bat Maternity Colony Features BMC-01, BMC-07, BMC-08, BMC-13, BMC-02, BMC-03, BMC-10, BMC-12 and BMC-14 from turbine construction;
  - habitat damage at Reptile Hibernacula Features RH-01 and RH-02 from access road construction;
  - damage to trees at Significant Woodland Units E, F, H, K, L, M, N, O, P, Q, T, U, X, Y, AA, AE, AF, AH, AJ, AK, AM from turbine construction and Units G, K, P, U from access road construction, and Units Q,V,Y and AK from collection line construction;
  - damage to wetland form and function at Significant Wetland Unit Features WET-01, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10 resulting from turbine construction and Features WET-01, WET-04, WET-05, WET-06, WET-07, WET-08, WET-10 from access road construction.
  - habitat damage at Amphibian Woodland Breeding Habitat Features AWO-03, AWO-04, AWO-05, AWO-06, AWO-08 and AWO-11 and Amphibian Wetland Breeding Habitat Feature AWE-01 from access road construction;
- Noise disturbance to bats during turbine construction at Bat Maternity Colony Features BMC-01, BMC-07, BMC-08, BMC-13, BMC-02, BMC-03, BMC-10, BMC-12 and BMC-14
- Sedimentation or erosion from:
  - turbine and access road construction at Significant Wetland Feature WET-01;
  - from turbine foundation excavation at Significant Valleylands Feature VAL-01;
  - directional drilling at Wetland Complexes WET-01, WET-04 and WET-05; and,
  - transmission line construction at Wetland Complexes WET-05, WET-06, WET-12, and WET-13;
- Accidental spills of fuel at Significant Wetland Feature WET-01 from turbine and access road construction due to proximity to construction (< 30 m);
- Soil/water contamination from spills during directional drilling at Wetland Complexes WET-01, WET-04 and WET-05;
- Disruption of amphibians moving to breeding pools and home range and possible indirect threats by changes to surface water drainage patterns resulting from access road construction at Amphibian Woodland Breeding Habitat Features AWO-03, AWO-04, AWO-05, AWO-06, AWO-08 and AWO-11, and Amphibian Wetland Breeding Habitat Feature AWE-01;
- Mortality to reptiles from construction equipment for turbines and access roads at Reptile Hibernacula Features RH-01 and RH-02; and,
- Unplanned intrusion into woodlands/wetlands in event of equipment malfunction due to directional drilling under Significant Woodlands (Units Q (two locations), V, and AK), Wetland Complexes WET-01, WET-04 and WET-05 due to directional drilling; and
- Unintended damage to adjacent vegetation due to proximity of transmission line to significant woodlands and wetlands, small size of the right-of-way and constrained work area at Woodland Units: AL, AO, AP, AQ, AR, AS; and Wetland Complexes WET-05, WET-06, WET-12, and WET-13.

Table 5.8 provides Feature/Unit specific mitigation measures, residual effects and the monitoring plan for each potential effect identified 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 be applied.

Table 5.8 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
Disturbance to or loss of wildlife habitat and damage to vegetation while operating equipment within significant wetlands and / or woodlands.	• Minimize disturbance to/loss of wildlife habitat and damage to vegetation.	• Clearly delineate habitat boundaries to ensure that construction activities occur outside the habitat boundaries. • Maintain 30 m setback from significant woodlands and wetlands where possible. Install and maintain protective fencing to clearly define the construction area and prevent accidental intrusion. • Construction activities within 30 m of significant woodlands should occur during daylight hours to avoid excessive noise and/or light at night.	• Accidental intrusion into natural features avoided through application of mitigation measures. • No likelihood of effects.	• Undertake monthly site inspections to ensure that protective fencing is intact and that there is no damage caused during construction. • No contingency measures required.
Noise disturbance to bats during turbine construction.	• Minimize noise disturbance to bats.	• Focus construction activities within 30 m of significant bat habitat to daylight hours during the period of May 1st to July 31st.	• Disturbance to bats from construction noise will be minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• No monitoring or contingency measures required.
Sedimentation and erosion affecting function of significant wetland (WET-01).	• Minimize effect of sedimentation and erosion on function of significant wetland.	• Install sediment and erosion control fencing along edge of wetland within 30 m of turbine footprint (WET-01).	• Sedimentation and erosion minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) where construction occurs within 30 m of a feature on the following basis: ▪ 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: ▪ Suspend work if excessive flows of sediment discharges occur until mitigation measures are in place. ▪ Water samples will be analyzed 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).

Table 5.8 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
Sedimentation and erosion affecting function of significant valleyland (VAL-01).	• Minimize effect of sedimentation and erosion on function of significant valleyland.	• 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 features to prevent substances from inadvertently entering feature. • Immediately re-vegetate any inadvertently disturbed soils within 30 m of the top of bank using native plant species	• Sedimentation and erosion minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• See erosion and sedimentation above.
Sedimentation and erosion associated with directional drilling affecting function of significant Wetland Complexes WET-01, WET-04 and WET-05.	• Minimize effect of sedimentation and erosion on function of significant Wetland Complexes.	• Locate entrance and exit pits at least 30 m from wetland edge.	• Risk of unplanned intrusion into wetland due to directional drilling will be minimized through application of mitigation measures. • Low likelihood; however, if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions.	• See erosion and sedimentation above.
Sedimentation and erosion associated with transmission line construction affecting function of significant Wetland Complexes WET-05, WET-06, WET-12, and WET-13.	• Minimize effect of sedimentation and erosion on function of Wetland Complexes.	• Establish 30 m setback to significant wetlands from new pole locations where possible. • Install sediment and erosion control fencing along edge of wetland within 30 m of transmission line footprint.	• Risk of sedimentation will be minimized through the application of mitigation measures. • Low likelihood; however, if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions.	• See erosion and sedimentation above.
Disruption of amphibians moving to breeding pools and home range from Amphibian Woodland Breeding Habitat Features and Amphibian Wetland Breeding Habitat Features and possible indirect threats by changes to surface water drainage patterns.	• Minimize disruption to amphibian movements and changes to surface water drainage patterns.	• Limit construction of roads within 30 m of significant amphibian habitats to daylight hours between April 1st and June 30th to avoid excessive noise and/or vehicle caused mortality, wherever possible. • Ensure no grade changes within 30 m of vernal pools during construction. • Post speed limits along construction access roads.	• Disruption to amphibians avoided and indirect impacts to habitat minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• See sedimentation and erosion control above. • Examine condition of vernal pools within 30 m of road following completion of construction. • Inspect locations following completion of access roads to ensure no grade changes. • No contingency measures required.

Table 5.8 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 into Features RH-01 and RH-02 resulting in habitat damage, or possible mortality to reptiles within feature from construction equipment.	• Minimize potential for accidental intrusion into this feature.	• Erect temporary drift fence between edge of habitat and road if hibernaculum is within 60 m of road.	• Habitat damage avoided and mortality minimized through application of mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• Weekly inspection of drift fence while construction is occurring during specified timing windows. • Conduct reptile hibernacula survey during construction according to protocol described for pre-construction survey, which includes: ▪ Examination of rock piles and vicinity between mid-April and mid-May. ▪ Identifying, measuring, visually sexing and searching for identifiable markings any snakes found prior to release. ▪ Preparing a field sheet to record weather, habitat conditions, location of cover objects, UTMs and details of snakes encountered. • The findings of the reptile hibernacula survey monitoring program will be reported back to MNR after the end of the monitoring period. • Contingency Measures: ▪ Avoid construction activities within 60 m of feature within timing windows during which snakes emerge (April 15 - May 31) and return (September 1 – October 15) to hibernaculum.
Unplanned intrusion into significant woodlands in event of equipment malfunction due to directional drilling.	• Minimize potential for accidental intrusion into 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'.	• Unplanned intrusion into woodland due to directional drilling avoided through mitigation measures. • Low likelihood and limited magnitude of effect as a result.	• See directional drilling above.
Unplanned intrusion into significant wetlands in event of equipment malfunction due to directional drilling.	• Minimize potential for accidental intrusion into significant wetlands.	• Where feasible, wetlands 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. • 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.	• Risk of unplanned intrusion into wetland due to directional drilling minimized through application of mitigation measures. • Low likelihood; however, if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions.	• See directional drilling above.

Table 5.8 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 within significant wetlands and woodlands due to transmission line construction.	• Minimize potential for unintended damage to significant wetlands and woodlands.	• Limit vegetation removal within significant wetlands and woodlands to the existing right-of-way.	• Damage to vegetation will be minimized through the application of mitigation measures. • Low likelihood; however, if accidental damage occurred, negative effects may be measurable but would represent a small change relative to existing conditions.	• Undertake monthly site inspections to ensure that only specified trees are removed and that there is no damage caused to the remaining trees during construction. • Contingency Measures: ▪ Suspend construction during breeding periods.

5.9 Summary and Conclusions

None of the above-ground project infrastructure (turbines, access roads, collection lines, transmission line, operations building and substation) is proposed to be located within significant natural features (*i.e.*, significant woodlands, significant wetlands, significant valleylands or significant wildlife habitat) and no vegetation clearing will be required in significant natural features to accommodate project infrastructures. As a result, there will be no direct loss or fragmentation of significant natural features resulting from the proposed Project. The landscape is nearly level and quite intensively cultivated with natural features mostly in the form of isolated woodlots. This landscape configuration has made it possible to derive a layout of turbines and associated infrastructure that avoids the natural features.

Where turbines, access roads and/or underground collection lines are proposed in agricultural fields adjacent to significant features (i.e., significant wetlands, significant woodlands, significant wildlife habitat or significant valleylands), a minimum 30 m buffer from the edge of the feature will be applied in which no physical disturbance will be permitted. This buffer will avoid and mitigate potential negative environmental effects associated with construction and operation of access roads and collection lines. 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 six 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.

Operation 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 accordance with provincial guidelines and requirements, as described in Birds and Bird Habitats: Guidelines for Wind Power Projects (MNR, 2011) and Bats and Bat Habitats: Guidelines for Wind Power Projects (MNR, 2011). 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 project, the significance of anticipated residual effects is predicted to be low 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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