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NEXTERA ENERGY CANADA, ULC SUMMERHAVEN WIND ENERGY CENTRE APPLICATION FOR A RENEWABLE ENERGY APPROVAL

Natural Heritage Assessment Report

Submitted to:
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REPORT

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1.0 INTRODUCTION

This Natural Heritage Assessment Report (the Report) has been prepared to provide information to the public, Aboriginal Communities, municipalities, government agencies, and local authorities regarding the proposed Summerhaven Wind Energy Centre (the Project). The Report is a required component of an Application for a Renewable Energy Approval (REA Application) under Ontario Regulation (O. Reg.) 359/09[1] made under the *Environmental Protection Act (EPA)*.

This Report has been prepared in accordance with O. Reg. 359/09 and incorporates additional comments received as the result of consultation with the Public, Aboriginal Communities and Municipality and formal review comments received since the issuance of the Natural Heritage Report, Draft Version 1 (Golder, October 2010). Relative to Version 1, the structure of this Report and content has been rearranged within several sections to address review comments and subsequent communications with the Ontario Ministry of Natural Resources (MNR). Specific components of the natural environment which MNR has deemed to be outside of the O. Reg. 359/09 REA Application process for natural heritage and that is reviewed and approved through other Regulatory processes have also been removed at the request of MNR (OMNR 2010g). These include information pertaining to Endangered and Threatened Species, Mineral Aggregate Resources, Petroleum (Oil Salt and Gas) Resources, Waterbodies containing Fish and Aquatic Habitat, Water and other legislative requirements (and permit approvals). Where deemed prudent, a summary of the modifications between Version 1 and this version of the Report, along with a rationale for modifications, have been provided.

Table 1 summarizes information that is included in the Report based on Sections 25 to 28 of O. Reg. 359/09 and directs readers to the associated section(s) of this document.

Table 1: Natural Heritage Assessment Report Requirements under O. Reg. 359/09

Requirement as per O. Reg. 359/09	Report section where information can be found
Records review conducted in accordance with Section 25	Section 2
Site investigation conducted in accordance with Section 26	Section 3
Evaluation of the significance or provincial significance of each natural feature identified in the course of the records review and site investigation in accordance with Section 27	Section 4
Obtain confirmation from Ministry of Natural Resources in accordance with Section 28	Section 6

Additional information about the Project can be found in the Construction Plan Report (Golder, 2011a), Design and Operations Report (Golder, 2011b), Decommissioning Plan Report (Golder, 2011c), and Project Description Report (Golder, 2011d). A description of the Site Plan design is provided in the Design and Operations Report. As it is broadly applicable to all of the REA Reports, and to avoid redundancy, the Site Plan diagram has been provided as a stand-alone document (the Site Plan Report).

[1] As amended by O. Reg. 521/10 which came into force on January 1, 2011.

Technical studies associated with the REA Application requirements were initiated in 2007 and extended into 2010. Additional information about the Project and the results of technical studies and assessments of negative environmental effects are available in the following reports:

- Wind Turbine Specifications Report (Golder, 2011e);
- Natural Heritage Assessment Report (this Report);
- Stage 1 Archaeological Assessment Report (Golder, 2010a);
- Heritage Assessment Report (Golder, 2011j);
- Noise Study Report (Golder, 2011f);
- Water Assessment Report (Golder, 2011g);
- Site Plan Report (Golder, 2011h); and
- Consultation Report (Golder, 2011i).

Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports are not required as part of the REA Application for this Project (Ministry of Energy and Infrastructure, 2010) and are typically not publically available documents due to the confidential and sensitive nature of the content. Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports will, however, be made available to the Ministry of Tourism and Culture (MTC) for review and their issuance of a comment letter in advance of construction. Hard copies of informational reports will be provided to Aboriginal Communities with an interest in the Project, as identified by the Director and where agreed to by each specific Aboriginal Community.

1.1 Project Summary

The Project consists of the site preparation, construction, operation, and decommissioning of 59 wind turbine generators with a total installed nameplate capacity of 131.04 MW. The Project will be owned and operated by NextEra Energy Canada, ULC (hereafter referred to as NextEra Energy Canada) and will be located in the vicinity of Nanticoke, Haldimand County, Ontario (Figure 1). The Project lifespan commencing from obtaining the REA Approval and extending to the completion of Decommissioning is estimated to be 27 years.

An understanding of this Report requires knowledge of the definition of the Project Location and how this relates to the assessment of natural heritage resources identified n O. Reg. 359/09. The Project Location is defined by O. Reg. 359/09 as:

> *when used in relation to a renewable energy project, 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*;

In practice, the Project Location boundaries used for effects assessments contained in this and other REA Reports are defined based on the greater of:

- The outer extent of the Project infrastructure (e.g., turbines, turbine blades, road edges, cable line routes, etc.); or
- The outer extent of ground disturbance created in constructing or decommissioning the Project.

A summary of the Project vital statistics is presented in Table 2. The maximum extent of disturbance areas associated with the Project Location are provided in Table 3, noting that in some locations the disturbance area has been further reduced as a result of construction space limitations, land access constraints or to protect natural heritage features or other components of the environment. Both Table 2 and Table 3 have been added subsequent to Version 1 of the Natural Heritage Report for the benefit of those readers that are only interested in reading this Report. For a full understanding of the Project and its interactions with the environment it is recommended that this Report be read in conjunction with the other reports forming the collective REA Application.

Turbine towers will be 80 m high to the center of the nacelle and up to 130.5 m high to the extended upright blade tip. The towers will be constructed on a concrete foundation. Underground and overhead cables will interconnect individual turbines and eventually connect to the substation as illustrated in the Site Plan Report. The operation of the wind turbines will be monitored remotely from a Project operations building located near the substation. Once tested and commissioned, the turbines will require scheduled visits for maintenance during the Operations Phase. Maintenance will include complete inspection of the turbine's components and the tower, functionality testing, replacement of worn parts, bolt tightening and lubrication of moving parts. Routine preventative maintenance activities will be completed as per manufacturer requirements.

Within the REA Application reports, including this Report, the terms Project Area and Project Location are not to be used interchangeably. The Project Area (Figure 1) was defined in earlier stages of the Project development and in the absence of a finalized layout, to encompass all parcels which could potentially contain the Project Location (see Figure 1 for Project Area boundary). As a result, the records review and some field studies initiated earlier in Project development (e.g., landscape level Avian Use Surveys) initially used the Project Area to delineate the geographic extent of certain natural heritage study boundaries. Though the term Project Area is no longer relevant to or defined under O. Reg. 359/09, the Project Area boundary was retained for consultation purposes due to substantial changes in optioned Project lands (occurring prior to release of the October 2010 draft reports) which shifted the Project further to the north and east (see Section 1.2 of the Project Description Report for details). The current Project Location, including disturbance area and an up to 120 m distance between the Project Location and identified natural features, remains within the Project Area and natural heritage study boundaries identified in the October 2010 draft reports.

The Project area boundary depicted on Figure 1 encompasses approximately 22,583 ha of privately owned land parcels. The area of participating land parcels is 3,990 ha. The area of the Project Location inclusive of construction disturbance, is 282 ha, approximately 1% of the Project Area and may temporarily disturb up to 7% of the participating land parcels with the maximum extent of disturbance occurring during the construction phase. Land use is predominantly cash-crop agriculture (i.e., farmed for corn, soybeans or wheat), although some areas are pasture (predominantly for cattle) and there are pockets of wooded areas. A Provincially Significant Wetland (PSW) is located in the west and southeastern portion of the Project Area, but is well beyond 120 m from the Project Location and therefore is not assessed in this Report. Selkirk Provincial Park and Haldimand Conservation Area are located along the shore of Lake Erie south of the Project Area, but are also beyond 120

m from the Project Location. The Grand River runs northeast of the Project Area and Lake Erie is situated to the south. In accordance with O. Reg. 359/09, the Records Review, Site Investigation, and Evaluation of Significance have been performed only on natural features having boundaries residing within 120 m or less of the Project Location, and the Environmental Impact Study (EIS) has been performed only on those natural features determined to be significant as identified in this Report.

The location of the Project was predicated by interest expressed by local landowners. Haldimand County is also attractive for wind development due to its proximity to Lake Erie, which results in favourable wind conditions for wind power production.

Table 2: Summary of Project Vital Statistics

General		
Project Name	Summerhaven Wind Energy Centre	
Project Ownership and Operation	NextEra Energy Canada, ULC	
Project Lifespan (approval to decommissioning)	27 years	
Project Nameplate Capacity	131.04 MW	
Project Area (as shown in Figure 1)		
Location of Project	Privately-owned land near Nanticoke, Ontario	
Total Project Area	22,583 ha	
Total Area of Project Location	298 ha	
Turbines	**Siemens 101**	**Siemens 93**
Total Number	58	1
Rating	2.221 MW	2.221 MW
Number of Blades	3	3
Blade Length	49 m	45 m
Hub Height	80 m	80 m
Rotor Diameter	101 m	93m
Cut-in Wind Speed	4 m/s	4 m/s
Cut-out Wind Speed	25 m/s	25 m/s
Rated Wind Speed	12 – 13 m/s	12 – 13 m/s
Swept Area	8,000 m^2	6,800 m^2
Foundation Dimensions	Approximately 17 m × 17 m × 3 m	Approximately 17 m × 17 m × 3 m
Access Roads		
Length of 7.3 m-Wide Roads	11 km	
Length of 11 m-Wide Roads	36.8 km	
Electrical Transformers and Cables		
34.5 kV Collector System Cables	132 km (60 km overhead, 54 km underground trenched, 3km underground directional drilled)	
230 kV Transmission Cables	7.7 km (overhead)	
Other Project Structures and Facilities		
Transforming Substation Size	2 ha	
Switchyard Area	2 ha	
Operations Building Size	465 m^2, adjacent 200 m^2 parking area	

Table 3: Maximum Disturbance Areas for the Project that Contribute to Determination of Maximum Extent of Project Location

Component of the Project Location	Infrastructure Footprint Dimensions [1,2]	Maximum Disturbance Dimensions
Turbine	16 m × 16 m	Approximately 1360 m^2 (roughly circular), offset from the centre of the turbine footprint
Access Road	7.3 m or 11 m width including road shoulder and spill-off	7.3m or 11m total disturbance width
Underground Cable Route (1 cable trenched)	Individual trench width <1m	15 m total disturbance width
Underground Cable Route (3 cables trenched)	Individual trench width <1m; 3m total	23 m total disturbance width; trench width ~1m each cable
Underground cable- high pressure directional drill or punch and bore crossing	Underground drill bore diameter <1m including conduit	Drill pad and/or bell hole disturbance and work area maximum 10m x 10m
Access Road and Underground Cable Route combined	7.3 m or 11 m road width; 1 to 3m trench width to receive cable	22.3 m – 34.0 m (additive between all combinations of the two access road and underground cable route widths)
Overhead Collector System Cable	3m	Aerial disturbance only, poles to be placed outside of natural features. Disturbance area <23 m total
Overhead Transmission Line	3m	Aerial disturbance only, poles to be placed outside of natural features. Disturbance area <23 m total
Transforming Substation	Approximately 2 ha	Approximately 5.2 ha (rectangular)
Operations Building	Approximately 465 m^2	
Permanent meteorological towers	Approximately 1.13 ha	Approximately 1.13 ha
Switchyard Area	N/A	Approximately 2 ha (rectangular)
Construction Field Offices and Temporary Storage	N/A	Approximately 4.3 ha (rectangular)

[1]Underground cable route widths may be reduced where adjacent to significant wetlands, significant woodlands, significant valleylands or significant wildlife habitat. Refer to location specific descriptions in EIS.

[2]Permanent met tower footprint includes outer extent of guy wiring. Physical ground footprint is significantly smaller.

2.0 RECORDS REVIEW

Section 24 (1) of O. Reg. 359/09 requires that the proponent of a renewable energy project conducts a Records Review, in accordance with Section 25. The table contained within Section 25 of O. Reg. 359/09 requires that these records are sought from, as applicable:

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.

Of the above sources, only items i) to iv) and item vi) apply based on jurisdictional responsibilities within the Project Area. In addition to the above noted sources, comments regarding natural features were also sought from stakeholders who are broadly grouped by O. Reg. 359/09 as the Public, Municipal Government and Aboriginal Communities. Details of communications with the Public, Municipal Government and Aboriginal Communities are found in the Consultation Report. In conducting the Records Review stakeholders and agencies were contacted by Golder, by NextEra Energy Canada or by Air Energy TCI staff to obtain background natural heritage information. A summary of the information sources contacted and information obtained during the Records Review is presented in Table 4.

The main purposes of the Records Review are to:

- obtain available natural heritage information about the area in which the Project is being proposed;
- determine whether the Project Location is within a provincial park or conservation reserve or within 120 metres of a provincial park or conservation reserve;
- determine whether the Project Location is within 50 metres of an area of natural and scientific interest (earth science); and,
- determine whether the Project Location is within 120 metres of a natural feature that is not an area of natural and scientific interest (earth science).

Throughout this Report, the Project Location boundaries include wind turbines, access roads, substation, laydown areas, transmission lines and underground or overhead cabling, including the full extent of their construction disturbance areas. The distance between the Project Location boundaries are measured from the

outer extent of the Project Location disturbance areas to the outer boundary of the natural feature measured on a horizontal plain.

Map data obtained during the records review was mapped using geographic information systems software (GIS) to determine the proximity between known natural features and the Project Location. All natural features identified within 120 m of the Project Location identified in the Records Review were subsequently assessed during Site Investigations, in addition to any new natural features observed. Information pertaining to known significant natural features was examined during the Records Review to establish if significance had been determined using evaluation criteria or procedures established or accepted by the MNR, as amended from time to time. Other natural features identified using maps and orthophotography were discussed in the Records Review section of Draft Version 1 of this Report, but, based on direction received from MNR (OMNR, 2011c) natural features within 120 m that are not already of known significance have been moved to the Site Investigation section as directed by MNR. Information pertaining to the office based process of delineating preliminary vegetation community boundaries and vegetation community types and providing them with a distinct identifier has also been moved to the Site Investigation section at the request of MNR, as MNR has interpreted this step as being the initial stage of the Site Investigation process. Regardless of the stage in the Natural Heritage Assessment process at which the features are initially identified, O. Reg. 359/09 requires that all natural features within 120 m of the Project Location are assessed and that new features or boundary modifications to natural features identified prior to conducting field studies.

Information sources and a summary of data obtained during the Records Review are provided in Table 4. Relative to Table 2 in Natural Heritage Report Version 1, Table 4 has been modified at the request of MNR to exclude records of consultation with, and direction obtained from MNR (OMNR 2010g) and to exclude records obtained that were associated with aspects that MNR has deemed to be outside of the O. Reg. 359/09 REA Application process and are reviewed and approved through other Regulatory processes. As requested by MNR, this Report now excludes records pertaining to Endangered and Threatened Species, Oil Salt and Gas Resources, Fish and Fish Habitat, Water and Natural Hazards as this information is provided within separate reports and permit applications and is reviewed and approved by MNR or the Conservation Authority independent of the NHA.

Table 4: Information Sources and Summary of Data Obtained during Natural Heritage Assessment Records Review

Agency	Information Source / Method of Consultation[1]	Data or Information Obtained
Ministry of Natural Resources	■ MNR (OMNR, 2009b) emailed Golder on December 3, 2009 stating the Aylmer District office could provide shapefiles but most would be available through LIO; ■ MNR (OMNR, 2009c) emailed Golder on December 15, 2009 and provided fisheries information; ■ MNR (OMNR, 2010h) emailed Golder on September 20, 2010 with the requested SAR list; ■ MNR (OMNR, 2010i) emailed Golder on October 1, 2010 and provided additional fisheries information.	■ MNR provided list of LIO layers for Golder to request; ■ MNR provided fisheries coordinates and historical sampling records for several drainages; ■ MNR provided SAR screening list; did not provide element occurrence numbers for these or DFO drainage mapping; ■ MNR provided additional fisheries information for Gates Creek.
Ministry of Natural Resources – Information Access Section	■ Golder emailed MNR (OMNR, 2009d) on December 11, 2009 to purchase natural feature shapefiles.	■ MNR had only one of the requested data layers available and deferred to NHIC.
Ministry of Natural Resources – Natural Heritage Information Centre (NHIC)	■ Golder obtained information from the NHIC website on December 14, 2009.	■ Shapefiles obtained.
Canadian Wildlife Service	■ An email was sent on November 25, 2010 and voice messages were left on November, 25, 29, 30, December 8 and December 14, 2010 with Rob Dobos to inquire about the role of CWS in the review process of wind power proposals in the REA. Efforts continue to be made to initiate discussion.	■ No response was received from either the emails or voice messages.
Long Point Region Conservation Authority (LPRCA)	■ Further to July request by Golder, LPRCA (Ej Lai, LPRCA GIS/IT Specialist), emailed data on August 4, 2010; ■ Further to November 2010 meeting (Ben Hodi, LPRCA) LPRCA emailed Golder floodline data and further guidance	■ LPRCA provided shapefiles of LPRCA regulation limit boundaries; ■ LPRCA provided additional floodline data to assist in detailed design for specific watercourse

Agency	Information Source / Method of Consultation[1]	Data or Information Obtained
	on LPRCA permitting expectations for watercourse crossings, work within the Regulation Limit and Permit costs.	crossings and to complete LPRCA permits.
Haldimand County	■ Selected Haldimand County Official Plan (OP) schedules were obtained from the County website in Fall 2008; ■ Golder emailed the Planning and Environmental Services Departments of Haldimand County on July 8, 2009, requesting shapefiles of specified data depicted on their OP schedules. ■ Haldimand County (Audrey Stewart, County Mapping and Graphics Technologist), emailed Golder on July 15, 2009 and stated the County has not designated and mapped most of the requested natural features; they are only addressed through wording in the OP; ■ Haldimand County (Audrey Stewart, County Mapping and Graphics Technologist) emailed Golder on July 20, 2009, and sent shapefiles for available natural feature layers.	■ Official Plan and Schedules downloaded, printed and reviewed; ■ Haldimand County provided mapping (not shapefiles) for some natural features; ■ Haldimand County confirmed no designated feature mapping available. ■ Haldimand County provided shapefiles of some natural features.

[1] Only a summary of information requested and obtained has been provided in this table, based on comments received from MNR on Report Version 1 (October 2010 draft). Individual correspondence associated with each request have been archived by Golder.

2.1 Results of Records Review

2.1.1 Natural Features

A “natural feature” is defined in O. Reg. 359/09 as all of, or part of the following:

- An area of natural and scientific interest (ANSI, earth science);
- An ANSI (life science);
- A coastal wetland;
- A northern wetland;
- A southern wetland;
- A valleyland;
- A woodland; or
- Wildlife habitat.

Within this Report Golder, on behalf on NextEra Energy Resources Canada, has elected to follow the woodland definition based on the amended O. Reg. 359/09, 2011 version consistent with Section 63.(2) transition provision. This option was further explained in Natural Heritage Assessment Guide training sessions held by MNR and attended by Golder in January 2011.

In addition to a determination of whether the Project Location is in or within 120 m of any of these natural features (within 50m for earth sciences ANSI’s), O. Reg. 359/09 also requires proponents to determine during the records review whether the Project Location is in a provincial park or conservation reserve or within 120 metres of a provincial park or conservation reserve, or is within the Niagara Escarpment Plan Area, the Greenbelt Plan, or the Oak Ridges Moraine Conservation Plan Area. Should the Project location be within 120 m of any of these specific areas, then other sections of O. Reg. 359/09 apply.

The Records Review included natural features with and without a specific designation status and without regard for significance, however at the direction of MNR (OMNR, 2011c) only known significant features are summarized in the Records Review of this Report. Table 5 provides a description of known occurrences of natural features and protected areas, limited only to those specifically defined in O. Reg. 359/09. Table 6 provides a description of known occurrences of other features, based on the Records Review. Other features are those which are not defined in O. Reg. 359/09, but that are designated by Federal, Provincial or Municipal agencies or planning authorities. Table 6 also includes those features that are defined differently by the agency having jurisdiction but that differ from the O. Reg. 359/09 definition (example O. Reg. 359/09 definition of Southern Wetland versus different wetland definitions defined by the MNR using the Ontario Wetland Evaluation System). These other features are identified in this Report as they were considered by Golder in this Report where they had potential relevance in evaluating the significance of the natural features identified, or where their proximity may have suggested that the natural feature and the other feature should ecologically be treated as one unit (i.e. if for example the natural feature and other feature functioned as one significant wildlife habitat).

Table 5: O. Reg. 359/09 Natural Feature Designations, Definitions and Occurrences within 120 m or Project location

Natural Feature Designation	O. Reg. 359/09 Definition	Occurrences Within 120 m of Project Location Based on Records Review (Reference)
ANSI – Earth Science (ANSI-ES)	An area that has earth science values related to protection, scientific study or education	No known features of this classification are in or within 50m of the Project Location
ANSI – Life Science (ANSI-LS)	An area that has life science values related to protection, scientific study or education.	No known features of this classification are in or within 120 m of the Project Location
Southern Wetland	A wetland located south of the northern limit of Ecoregions 5E, 6E and 7E as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005;	SAC10 Wetland- An "Other Wetland" (Evaluated to be not Provincially significant) within a wetland complex, made up of four individual wetlands, composed of one wetland type (100% swamp) (Haggeman, 1989)
Provincial Park (historical, natural environment, nature reserve, recreational, waterway, wilderness)	A Provincial Park within the meaning of the Provincial Parks and Conservation Reserves Act, 2006;	No known features of this classification are in or within 120 m of the Project Location.
Conservation Reserves	A conservation reserve as defined within the meaning of the Provincial Parks and Conservation Reserves Act, 2006;	No known features of this classification are in or within 120 m of the Project Location
Valleyland	A natural area, (a) that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005, and	No known valleylands in or within 120 m of the Project Location; Valleylands within the Project area are not designated or mapped by Haldimand County or other planning authorities.

Natural Feature Designation	O. Reg. 359/09 Definition	Occurrences Within 120 m of Project Location Based on Records Review (Reference)
	(b) that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year;	
Woodland[1]	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 as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005;	No known significant woodlands in or within 120 m of the Project location; Woodlands are not designated or mapped by Haldimand County or other planning authorities.
Wildlife habitat	An area where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species;	No known wildlife habitat in or within 120 m of the Project location; wildlife habitat is not designated or mapped by Haldimand County or other planning authorities.

[1] Proponent has elected to follow the woodland definition based on O. Reg. 359/09, 2011 version consistent with Section 63.(2) transition provision. This option was granted by the MNR as per an update to O. Reg. 359/09 stating that where possible it can be used.

Table 6: Other Feature Designations and Definitions

Feature Designation	Definition	Occurrences Within 120 m of Project Location Based on Records Review (Reference)
Carolinian Canada Site (CC)	A natural feature tracked by the MNR NHIC that was originally recognized by the Carolinian Canada program as having important natural heritage values representing the Carolinian life zone.	No known features of this classification are in or within 120 m of the Project Location.
Environmentally Sensitive Area (ESA)	The Haldimand County OP (2006) includes these areas that were originally designated for protection by the Region of Haldimand-Norfolk. ESAs contain unusual or special features as well as features which are representative of certain biological or landform phenomena. The designation was based on the feature meeting at least two of the criteria outlined in the Natural Areas and Wetlands Background Paper (Regional Municipality of Haldimand-Norfolk, 1993).	Sandusk Creek Floodplain Woods: This is one of the best developed floodplain communities in the region with an exceptionally rich spring flora (Gartshore *et al.*, 1987) (Haldimand County). ESA <120 m from turbines 59, 16 and 21 and turbine 16 and turbine 21 collector.
Environmentally Significant Site (ESS)	The Haldimand County OP (2006) includes these areas that were originally designated for protection by the Region of Haldimand-Norfolk. As with ESAs, Environmentally Significant Sites also contain unusual feature(s) as well as feature(s) which are representative of certain biological or landform phenomena; however, the designation is based on the feature meeting only one of the criteria outlined in the Natural Areas and Wetlands Background Paper (Regional Municipality of Haldimand-Norfolk, 1993).	Sandusk Creek Floodplain Woods: This is one of the best developed floodplain communities in the region with an exceptionally rich spring flora (Gartshore *et al.*, 1987) (Haldimand County). ESS <120 m from turbines 59, 16 and 21 and turbine 16 and turbine 21 collector.
Earth Science Site (ES Site)	An area recognized by the MNR as having geological features, but has not been officially designated as a provincial earth science ANSI.	Sandusk Creek Floodplain Woods: This is one of the best developed floodplain communities in the region with an exceptionally rich spring flora (Gartshore *et al.*, 1987) (Haldimand County). ES <120 m from turbines 59, 16 and 21 and

Feature Designation	Definition	Occurrences Within 120 m of Project Location Based on Records Review (Reference)
		turbine 16 and turbine 21 collector.
International Biological Program Site (IBP)	A site that is tracked by the MNR that was inventoried in the late 1960s and early 1970s under the International Biological Program.	No known features of this classification are in or within 120 m of the Project Location.
Life Science Site (LSS)	Sites that are initially identified by municipalities as Environmentally Sensitive Areas that contain ecologically important natural features. The MNR NHIC refers to these areas as Life Science Sites and tracks them (often referred to as candidate ANSIs by MNR).	Sandusk Creek Floodplain Woods: This is one of the best developed floodplain communities in the region with an exceptionally rich spring flora (Gartshore *et al.*, 1987) (Haldimand County). ESA <120 m from turbines 59, 16 and 21 and turbine 16 and turbine 21 collector.
Provincially Significant Wetland (PSW)	A wetland that has been evaluated by the MNR using OWES and is recognized as having ecological significance at a Provincial level.	No known features of this classification are present in or within 120 m of the Project Location.
Locally Significant Wetland	A wetland that has been evaluated by Municipalities as locally significant in municipal planning, and has been evaluated by the MNR using OWES, considering groundwater discharge, social value and Aboriginal value/cultural heritage.	No known features of this classification are in or within 120 m of the Project Location.
Unevaluated Wetland	A wetland that has not been evaluated by the MNR using OWES criteria.	No known features of this classification are in or within 120 m of the Project location.
Other Wetland (non-PSW)	A wetland that has been evaluated by the MNR using OWES criteria and did not score as a PSW.	SAC10 Wetland- An “Other Wetland” within a wetland complex, made up of four individual wetlands, composed of one wetland type (100% swamp) (Haggeman, 1989)

2.1.2 Records Obtained from Public, Aboriginal Communities and Municipal Consultation

Three open houses were held for the Project on December 21, 2009, December 7, 2010 and January 10, 2011 to seek input from the public. Aboriginal Communities were contacted, but did not attend these open house events. Comments received from Aboriginal Communities are provided in the Consultation Report.

During the Project open houses and through ongoing public consultation and Aboriginal engagement processes, the following questions were formally received from both aboriginal people and the public regarding how the Project could negatively affect particular habitats and species:

1) What are the potential impacts to terrestrial species, with deer, squirrels and chipmunks, raccoons, rabbit mentioned specifically.

2) What are the potential impacts to avian species, with wild turkey, great blue heron rookery, tundra swans, bald eagles and winter raptors mentioned specifically?

3) What are the potential impacts to watercourses that may support harvestable aquatic species?

4) What are the potential impacts to habitat that may support harvestable plant species or to the plants themselves?

Responses to these questions are addressed through the evaluation of significant wildlife habitat within this Report. Additional information from the Open Houses and broader consultation process is available in the Consultation Report.

2.1.3 Wetlands

At the records review level, wetlands were identified using the NHIC Natural Areas described in Table 5 and the Natural Resource and Values Information Systems (NRVIS) map layer obtained from Land Information Ontario (LIO). The wetlands identified during the records review are further discussed in the Site Investigations section.

Only one known and MNR evaluated Southern Wetland, the SAC10 – wetland, was identified in the records review process. The SAC10 wetland is defined by MNR as an “Other Wetland” which is a complex of four individual wetlands, composed of one wetland type (100% swamp). The SAC-10 wetland is within 120 m of the Project Location at two points.

2.1.4 Valleylands

Valleylands have been discussed in the Haldimand County Official Plan text, but the County confirmed they have not designated and mapped significant valleylands to date, nor are they included in the OP Schedules (Stewart 2009, pers. comm.). Golder understands that the County will identify valleylands in the Haldimand County Natural Environment / Greenlands Study though the County confirmed that this Report has not yet been finalized. The MNR also confirmed that they have not mapped valleylands (OMNR 2008).

In the absence of existing valleyland mapping, Golder identified potential valleyland boundaries in the Records Review based on the Riverine Hazard Lands Boundary, as was recommended by MNR in a discussion with

MNR (OMNR, 2008). MNR felt that the Riverine Hazard Lands were a useful surrogate for mapping of valleylands, as he felt the Hazard Land area is likely to closely approximate significant valleylands using criteria provided in the PPS 2005 (OMNR, 2008).

Instances of a Project Location occurring in, or within 120 m of potential valleyland features, using the Riverine Hazard boundaries, were determined using GIS. A total of 14 instances of the Project Location within 120 m of Riverine Hazardlands were identified using GIS. Of these 14 occurrences, there were 13 cases of the Project Location occurring within the valleyland boundary, and one case of the Project Location occurring adjacent to a valleyland boundary (Figures 2a through 2g). The 14 valleylands are depicted on Figures 2a through 2g.

The valleylands within this Report are often closely associated with watercourses that overlap with the area within 120 m of the Project Location. Watercourses are now discussed in the Water Assessment Report only. The Natural Heritage Report Version 1 included a total of 38 instances of the Project location intersecting with the Riverine Hazardlands setback limits using GIS. Of these 38 occurrences, there were 22 cases of the Project location occurring within the valleyland boundary, and 16 cases of the Project location occurring adjacent to a valleyland boundary. The discrepancy in the numbers of valleylands between Version 1 and this Report are associated with the removal of cases where the Riverine hazards only intersect water features but no natural features are present, and as a result of changes to the Project Location such that the valleyland at specific locations are no longer within 120 m of the Project Location boundaries as identified in this Report.

2.1.5 Woodlands

Significant Woodlands (as defined by the County) are discussed in the Haldimand County Official Plan and will ultimately be identified in Haldimand County's Natural Environment Study/Greenlands Study, which has not yet been finalized or published. In response to a request to the Haldimand County GIS department, the County indicated; *"As follow up to your request for GIS Layers (shape files) of the County's natural areas (significant woodlands, significant valley lands, significant natural corridors and linkages, and significant wildlife habitat), the County has not designated and mapped any of these types of significant features yet. These features are only addressed through Official Plan policy wording." (Stewart 2009, pers. comm.).*

Therefore there are no known woodlands in the Project area that have been evaluated following MNR accepted criteria under O. Reg. 359/09. There are, however, several wooded features that were identified using 2006 orthophotography acquired from LPRCA and the LIO Natural Resources Value Information System (NRVIS) data.

In the Natural Heritage Report Version 1, the process for delineating woodlands was provided in the Records Review section. At the request of MNR (OMNR 2011a) this information is now provided in the Site Investigation.

2.1.6 Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000a) identifies four types of wildlife habitat, namely seasonal concentration areas, rare vegetation communities and specialized habitats, significant habitat of species of conservation concern, animal movement corridors. These wildlife types are further divided into 14 subtypes of seasonal concentration areas, 8 rare vegetation communities, 11 specialised habitats for wildlife with

3 additional area types, specific habitats for individual species of concern, and individual animal movement corridors. Due to the large number of possible wildlife habitat subtypes at the Records Review stage of the Natural Heritage Assessment (NHA), it is difficult to group the search for available records using these subtypes. The NHIC provides records of tracked species and rare vegetation communities, but these are typically obtained from databases that are specific to a family of animals (i.e., mammals, herpetiles, birds, etc) not by the MNR SWH types, which was the rationale for arranging Natural Heritage Report Version 1 in this manner. In consideration of comments received from MNR and further consultation with them, this section is now organized by SWH types and subtypes with the available resources used in the records review outlined where relevant. It is further noted that although background information is available for many different types of wildlife habitat, very few sources have specifically evaluated significance following MNR accepted protocols outlined in the SWHTG, which is required under O. Reg. 359/09.

Due to the absence of certain species or their habitats in this region some SWH types in this Region were precluded from being considered in the Records Review and subsequent sections of this Report, namely:

- Moose Late Winter habitat:
  - The present range of moose does not extend into the Project Location and there are no records of moose populations or habitat to support moose.
- Otter Feeding/Denning Sites; Marten and Fisher Denning Sites:
  - The present Otter range is limited to major rivers and lakeshores and there are no suitable habitats for or populations of marten and fisher, that extend into the Project Location.
- Foraging Areas Producing Fruit, Hard Mast (Acorns, Beechnuts):
  - Although certain tree species in the Project Location were identified as producing mast, consultation with MNR (OMNR, 2011c) indicated this category of SWH is not applicable to the Project Area.

Most of the criteria and rationale described herein was obtained from Appendix Q of SWHTG (MNR, 2000). The SWH categories and defining criteria contained in the Draft 7E Schedules have not been used at the direction of MNR (OMNR, 2011c) since they are currently being revised, with the following minor exceptions as follows:

- Songbird Migratory Stopover Areas outlined in Draft 7E Schedules were considered in evaluating SWH landbird migratory stopover category within this Report;
- Open Country Bird Breeding Habitat outlined in Draft 7E Schedules were considered in evaluating the SWH Sites Supporting Area Sensitive Species category within this Report;
- Shrub/Early Successional Bird Breeding Habitat outlined in Draft 7E Schedules were considered in evaluating the SWH Sites Supporting Area Sensitive Species category within this Report; and
- Terrestrial Crayfish: Because these are rare and limited to Southern Ontario, were considered in evaluating SWH species of conservation concern category within this Report.

2.1.6.1 Seasonal Concentration Habitats

2.1.6.1.1 Winter Deer Yards

The MNR and LIO maintain a data layer which describes known winter deer yards in Ontario. No deer wintering yards were identified on this layer within 120 m of the Project Location. Therefore, winter deer yards will not be carried forward to the Site Investigations.

2.1.6.1.2 Colonial Bird Nesting Sites

Colonial Bird Nesting Sites are identified by the NHIC on the biodiversity explorer. None of these features were identified within the Project Area. Consultation with the public, however, indicated that a great-blue heron rookery is located near natural feature ID #63c (will be described in the Site Investigations). This feature will be carried forward to the Site Investigation.

2.1.6.1.3 Waterfowl Stopover and Staging Areas

The Project Area is within two international migratory bird flyways (Atlantic and Mississippi) and proximal to two nationally designated Important Bird Areas (IBAs). The Long Point Peninsula and Marshes IBA being situated approximately 28 km to the southwest, and the Norfolk Forest Complex IBA being situated approximately 25 km to the southwest. Long Point Peninsula and Marshes IBA (Long Point) is considered both globally and nationally significant. This is due, in part, to the importance of Long Point as a migratory staging area for many species of waterfowl which regularly occur in large numbers. The Norfolk Forest Complex IBA is designated as a nationally significant IBA. The relative proximity of the Project to these features suggested that avifauna and their migratory routes were an important wildlife component to be assessed under the former requirements of O. Reg. 116/01 and as such, multi-season avian surveys were initiated in 2009, consistent with the guidelines of the Canadian Wildlife Service (CWS) which were also being followed by MNR at the time.

These IBA's are not within 120 m of the Project Location. According to the SWHTG, agricultural lands are not to be considered SWH unless a large concentration of tundra swans (i.e., greater than 100) use the area during migration. Waterfowl stopover areas are mapped by the NHIC and provided on the BioDiversity Explorer. No natural features were identified on the BioDiversity Explorer during the Records Review, and therefore, no Waterfowl Stopover and Staging Areas will be carried forward to the Site Investigation.

2.1.6.1.4 Waterfowl Nesting Areas

Among other areas, waterfowl nest in specific wetland habitat such as large marshes, swamps and open water. The SWHTG specifically mentions nesting of black ducks, gadwall, green-winged teal, northern pintail, northern shoveller, American wigeon and wood duck.

There is no data resource which specifically depicts waterfowl nesting areas though individual nesting records are available for some species. Of the species listed above, the Atlas of the Breeding Birds of Ontario (ABBO, 2007) has nesting season records for gadwall (probable), green-winged teal (confirmed), northern pintail (observed), northern shoveller (probable) and wood duck (probable). Because no geographic locations for these nests were identified, no waterfowl nesting areas will be carried forward to the Site Investigations.

2.1.6.1.5 Shorebird Migratory Stopover Areas

As noted in the waterfowl stopover and staging areas section the Project Area is within two international migratory bird flyways (Atlantic and Mississippi) and proximal to two nationally designated Important Bird Areas (IBAs). The proximity of the Project to these features suggested that avifauna and their migratory routes were an important wildlife component to be assessed and as such, multi-season avian surveys were initiated in 2009, consistent with the guidelines of the Canadian Wildlife Service (CWS).

Seasonal concentration areas, including shorebird migratory stopover areas are mapped by the NHIC and are provided on the BioDiversity Explorer. No known shorebird migratory stopover areas were identified in the Records Review, and therefore none will be carried forward to the Site Investigation.

2.1.6.1.6 Landbird Migratory Stopover Areas

As noted in the waterfowl stopover and staging areas section the Project Area is within two international migratory bird flyways (Atlantic and Mississippi) and proximal to two nationally designated Important Bird Areas (IBAs). The proximity of the Project to these features suggested that avifauna and their migratory routes were an important wildlife component to be assessed and as such, multi-season avian surveys were initiated in 2009, consistent with the guidelines of the Canadian Wildlife Service (CWS).

Landbirds use large woodlands and habitat complexes to stopover while migrating, but no record was available which assigns a geographic location to these stopover locations. Therefore, no natural features of this type were identified in the Records Review to be carried forward to the Site Investigation.

2.1.6.1.7 Raptor Winter Feeding and Roosting Areas

The Haldimand County Winter Raptor Inventory (Badzinski, 2003) was reviewed to determine what, if any, concentrations of raptors could be using Haldimand County, particularly the Project Area, during the winter. The Inventory identified 10 species of diurnal raptors that winter either regularly or occasionally within this part of southwestern Ontario. No natural features of this type will be carried forward to the Site Investigation.

2.1.6.1.8 Bald Eagle Winter Feeding and Roosting Areas

The Southern Ontario Bald Eagle Monitoring Program (Laning, 2006) was reviewed to determine if there are any recorded bald eagles within the Project Area and to better understand the activities of bald eagles in the region. This Report was conducted by a cooperation of several partners, lead by Bird Studies Canada (BSC). Bald eagles use the shores of major bodies of water for breeding and overwintering. This document described the steady increase of southern Ontario bald eagle productivity over the past 25 years. This Report also suggests that bald eagles will remain in the area to overwinter, but does not identify specific locations of bald eagle winter feeding and roosting areas. Therefore, no natural features of this type were identified which could be carried forward to the Site Investigation.

2.1.6.1.9 Wild Turkey Winter Range

At an open house held on January 10, 2011, a landowner who did not leave his name stated that a flock of wild turkey can often be seen in close proximity to natural features 37 and 38. In consultation with MNR (OMNR, 2011c), it was discussed that wild turkey populations have increased substantially since the development of the SWHTG. They are now common throughout ecoregion 7E and are considered to utilize a variety of habitat types with low fidelity to each. Therefore, based on direction received from MNR (OMNR 2011c) wild turkey winter range does not need to be considered in the assessment of seasonal concentration areas. Therefore, no natural features of this type were carried forward to the Site Investigations.

2.1.6.1.10 Turkey Vulture Summer Roosting Areas

Turkey Vultures congregate in areas for roosting in the summer. No records were available to review to determine any known concentrations of Turkey Vultures. Therefore, no known turkey vulture summer roosting areas were carried forward to the Site Investigations.

2.1.6.1.11 Reptile Hibernacula

Reptiles may hibernate in areas where rock piles, old foundations, talus, cliff, crevice or caves extend below the frost line into the ground. Although the Ontario Herpetofaunal Atlas (Oldham, 2000) lists species use of an area, it does not indicate specific known reptile hibernacula locations. No records were available from the MNR of known reptile hibernacula within 120 m of the Project Location. No talus, cliff, cave or crevice communities were identified within 120 m of the Project Location using base map information. No natural features of this type were identified to carry forward to the Site Investigations.

2.1.6.1.12 Migratory Butterfly Stopover Areas

The Ontario Butterfly Atlas (Holmes, 1991) provides point locations of various species of butterfly. However, this reference does not indicate any geographic locations specifically classified as stopover areas. No other reference was available which provides this information for the Project Area, and therefore, no natural features were carried forward to the Site Investigations.

2.1.6.1.13 Bullfrog Habitat

The known historic locations of herpetofaunal species was queried in the Ontario Herpetofaunal Atlas (Oldham, 2000). This resource, however does not provide geographic locations where bullfrog habitat is present. Therefore, no bullfrog habitats were identified to carry forward to the Site Investigation.

2.1.6.1.14 Bat Maternity Roosting Habitat and Hibernacula

Golder determined which bat species could be present from online range maps provided by Bat Conservation International (BCI, 2010). All eight species of bats known to occur in Ontario are potentially present in the Project

Area. None of these species are classified as endangered, threatened or special concern in Ontario or in Canada.

The Ontario Wind Atlas also provides a data layer depicting areas where significant bat hibernacula have been recorded. There were no occurrences of known bat hibernacula identified within 120 m of the Project Location or anywhere else in the Project area. Candidate significant bat habitat was further examined during the Site Investigation for natural features, such as woodlands, located within 120 m of the Project Location.

In addition, the Karst of Ontario (Brunton, 2008) was queried to determine if there were any known karstic features that could potentially provide hibernacula or roosting locations for bats. The Project Area contains "inferred" karst and "potential" karst but no "known" karstic areas within 120 m of the Project Location were identified.

No known hibernacula or maternity roosts were identified in the records review to be carried forward to the Site Investigation.

2.1.6.2 Significant Habitats of Species of Conservation Concern

Table 7 lists the Species of Conservation Concern based on Species at Risk listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2010) and Committee on the Status of Species at Risk in Ontario (COSSARO) (COSSARO 2010) including those designated in the Endangered Species Act (ESA) as Special Concern, and that have ranges overlapping the Project Area based on the Royal Ontario Museum range maps (ROM, 2010), the NHIC, and through inquiries to LPRCA (Lai, pers. comm., 2009) and the MNR (Gould, 2008). Table 7 includes all species of Special Concern or S1-S3 rank with occurrence records within the Project Area based on site specific inquiries to the MNR Aylmer District and the NHIC. Based on review comments and subsequent communication with and direction from MNR, threatened and endangered species listed in regulations under the Endangered Species Act, and their habitat are discussed within an Endangered Species section of the Approval and Permitting Requirements Document (APRD) Reports (in progress) which will be reviewed by MNR outside of the O. Reg. 359/09 process.

During surveys conducted in by Badzinski (2003), several short-eared owls were observed within the Project Area, just northwest of the town of Fisherville. An owl preserve, designated by the MNR, is situated approximately 300m northwest of turbine 18, and 800m south of turbine 10. (Figure 2d). This natural feature, however is not within 120 m of the Project Location, and therefore will not be carried forward to the Site Investigation.

None of the species of conservation concern identified in Table 7 are known to occur in or within 120 m of the project location. Therefore, no Significant Habitats of Species of Conservation Concern were carried forward to the Site Investigation. However, species of conservation concern were recorded and evaluated within this report if observed during Site Investigations or the Evaluation of Significance field surveys.

Table 7: Species of Conservation Concern Reported in the Project Area based on records review

Common Name	Scientific Name	COSSARO Status (COSSARO 2010)	COSEWIC Status (COSEWIC 2010)	S-Rank	Habitat Criteria
Virginia Mallow	Sida hermaphrodita			S1	Open shores and thickets, woodland edges
Narrow-leaved Wild Leek	Allium tricoccum var. burdickii			S1?	Rich woods, rock outcroppings, woodlands
Carey's Sedge	Carex careyana			S2	Mesic to dry mesic hardwood forests, floodplains, riparian, woodlands
Weak Stellate Sedge	Carex seorsa			S2	Peaty edges of woodland pools, wetlands, woodlands, woodland edges
Yellow Corydalis	Corydalis flavula			S2	Sandy or rocky woods and lakeshores, shorelines, woodlands
Lowland Brittle Fern	Cystopteris protrusa			S2	Open deciduous woodlands on sandy laom; alluvial river terraces and hillsides that border streams or rivers, riparian, woodlands
Prostrate Tick-trefoil	Desmodium rotundifolium			S2	Sandy woods, prairie grasslands, savannas, woodlands, woodland edges
Green Dragon	Arisaema dracontium	SC	SC	S3	Wet bottomlands along rivers and creeks, riparian, wetlands, woodlands
Cooper's Milk-vetch	Astragalus neglectus			S3	Open woods, frequently on limestone plains, alvars, riparian, woodlands, woodland edges
Hairy Green Sedge	Carex hirsutella			S3	Dry-mesic to wet-mesic hardwood forests, edges and old fields, woodlands
Northern Map Turtle	Graptemys geographica	SC	SC	S3	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas;

Common Name	Scientific Name	COSSARO Status (COSSARO 2010)	COSEWIC Status (COSEWIC 2010)	S-Rank	Habitat Criteria
					aquatic corridors (e.g. stream) are required for movement; not readily observed
Sharp-fruited Rush	Juncus acuminatus			S3	Sandy and gravelly shorelines, ditches and gravel pits, prairies/grasslands/shorelines, wetlands
Milksnake	Lampropeltis triangulum	SC	SC	S3	Farmlands, meadows, hardwood or aspen stands; pine forest with brush or woody cover; river bottoms or bog woods...
Sundial Lupine	Lupinus perennis			S3	Dry, sandy oak savannahs and prairies; open forests and forest edges, prairies/grasslands, savannahs, woodlands, woodland edges
Greater Redhorse	Moxostoma valenciennesi			S3	Fast flowing, clear rivers
Halberd-leaved Tearthumb	Persicaria arifolia			S3	Wet mucky soil under alders at margin of peat bogs; along wet shaded ground of streams, ponds, swamps and lakes, rich thickets and marshy borders; wet depressions and seepage areas. In mature hardwood forests. Riparian, seeps, wetlands, woodlands
Broad Beech Fern	Phegopteris hexagonoptera	SC	SC	S3	Rich , moist soil in mature deciduous forests, woodlands
Eastern Ribbonsnake	Thamnophis sauritus	SC	SC	S3	Sunny grassy areas with low dense vegetation

Common Name	Scientific Name	COSSARO Status (COSSARO 2010)	COSEWIC Status (COSEWIC 2010)	S-Rank	Habitat Criteria
Woodland Vole	Microtus pinetorum	SC	SC	S3?	Mature deciduous forest in the Carolinian forest zone, with loose sandy soil and deep humus; grasslands, meadows and orchards with groundcover of grass, grasslands, thickets, second growth, old growth, mature stands, forest edges, downed woody debris,
Eastern Pipistrelle	Pipistrellus subflavus			S3?	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices; wetlands, open water, riparian, old growth, mature stands, forest edges, cliffs, talus slopes, ravines
Black Tern	Chlidonias niger	SC	NAR	S3B	Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs., wetlands, open water, riparian, grasslands, colonial, area sensitive

Common Name	Scientific Name	COSSARO Status (COSSARO 2010)	COSEWIC Status (COSEWIC 2010)	S-Rank	Habitat Criteria
Cerulean Warbler	Dendroica cerulea	SC	SC	S3B	Mature deciduous woodland of Great Lakes-St. Lawrence and Carolinian forests, sometimes coniferous; swamps or bottomlands with large trees; area sensitive species needing extensive areas of forest (>100 ha), old growth, mature stands, area sensitive

2.1.6.3 Animal Movement Corridors

The Significant Wildlife Habitat Technical Guide (MNR, 2000a) was used to assist in identifying animal movement corridors. The SWHTG recommends identifying linkages and corridors only after other natural features, including significant wildlife habitats have been located and mapped. The approach to identifying known linkages and corridors taken by Golder during the records review was consistent with the SWHTG and included:

- Determining if natural systems, linkages and corridors had been previously identified by others
- Contacting MNR and other agencies for their suggestions on the locations of corridors and restorable corridors.
- Consulting with local residents via the Project consultation process
- Using knowledge of habitat requirements and behaviour of key species
- Using high resolution photographs and map layers (topographical, FRI, wetland, ANSI, land use) to help to identify potentially significant corridors.

The Haldimand County Official Plan (2006) identifies natural areas and natural environment areas in Schedule A and Schedule E of the OP, respectively. Natural habitat, in general, is fragmented across the area by roads, infrastructure, settlement areas and agriculture, so the dispersal of flora and fauna is generally limited to species and communities adapted to the anthropogenic landscape.

No records were obtained which specifically indicate animal movement corridor locations. Therefore, consistent with the approach identified in the SWHTG and consultation with the MNR, this type of natural feature was assessed once other SWH have been assessed in the Site Investigation and Evaluation of Significance.

2.1.6.4 Rare Vegetation Communities and Specialized Wildlife Habitat

2.1.6.4.1 Rare Vegetation Communities

Rare vegetation communities are tracked by the NHIC. A query of this database resulted in no records of known rare vegetation community types within 120 m of the Project Location. The document Alvars of Ontario (Bronwell and Riley, 2000) was also reviewed and identified only one alvar community within Haldimand Region, which was not within 120 m of the Project Location. Therefore, no rare vegetation communities were carried forward to the Site Investigations.

2.1.6.4.2 Sites Supporting Area Sensitive Species

Existing bird species lists obtained from the Atlas of the Breeding Birds of Ontario (Bird Studies Canada, 2007) for squares 17NH74, 17NH84 and 17NH94 included 116 bird species. Results of endangered and threatened bird species are provided in the Endangered Species section of the APRD Reports (in progress) with consideration given as to whether additional approvals outside of the REA are required. Avian Species of Conservation Concern, as described by the NHIC, are discussed separately in Section 2.1.6.2. Avian species that are area sensitive are also listed on the ABBO (2005), but they can only be related to natural features at the

Site Investigations stage. None of these records provided geographic locations within 120 m of the Project Location which could be carried forward to the Site Investigation.

2.1.6.4.3 Woodlands Supporting Amphibian Breeding

Herpetofauna Species of Conservation Concern are discussed separately in Section 2.1.6.2 as described by the NHIC. The known historic locations of endangered and threatened species was queried in the Ontario Herptofaunal Atlas (Oldham, 2000). Results of endangered and threatened species are provided in the Endangered Species section of the APRD Reports (in progress) with consideration given as to whether an ESA permit application is required. These resources did not provide any geographic locations within 120 m of the Project Location which could be classified as natural features and carried forward to the Site Investigations.

2.1.6.4.4 Old Growth or Mature Forest Stands

No record could be found which indicated the presence of a natural feature which contained a stand of trees greater than 100 years old. All natural features will be assessed for woodland age in the Site Investigation, but no specific natural features were carried forward to the Site Investigation.

2.1.6.4.5 Osprey and Eagle Nesting Habitat

Existing bird species lists from the Atlas of the Breeding Birds of Ontario (Bird Studies Canada, 2007) for squares 17NH74, 17NH84 and 17NH94 included 116 bird species. Results of endangered and threatened species are provided in the Endangered Species section of the APRD Reports (in progress) with consideration given as to whether additional approvals outside of the REA are required. Avian Species of Conservation Concern, as described by the NHIC, are discussed separately in Section 2.1.6.2.

The Southern Ontario Bald Eagle Monitoring Program (Laning, 2006) was reviewed to determine if there are any tracked bald eagles within the Project Area and to better understand the activities of bald eagles in the region. This Report was conducted by a cooperation of several partners, including Bird Studies Canada (BSC). Bald eagles use the shores of major bodies of water for breeding and overwintering. This document described the steady increase of southern Ontario bald eagle productivity over the past 25 years. Due to the sensitivity of eagle nest locations, exact coordinates were omitted from Lanning (2006). Although several nests occur within Haldimand-Norfolk Region, there was no specific indication of documented nest s within 120 m of the Project Location. This Report also suggests that bald eagles will remain in the area to overwinter, but does not provide specific locations of nesting habitat. No locations of osprey nests were available for the Project Area. Therefore, no natural features of this type will be carried forward to the Site Investigation though eagle and osprey nests were searched for during all Site Investigations.

2.1.6.4.6 Turtle Nesting Habitat

The known locations of endangered and threatened species was queried in the Ontario Herptofaunal Atlas (Oldham, 2000). Herpetofauna Species of Conservation Concern are discussed separately in Section 2.1.6.2 as

described by the NHIC. Results of endangered and threatened species are provided in the Endangered Species section of the APRD Reports (in progress) with consideration given as to whether additional approvals outside of the REA are required. This record did not provide any geographic features which could be documented as natural features within 120 m of the Project Location. Therefore, no natural features will be carried forward to the Site Investigation.

2.1.6.4.7 Areas of High Diversity

No resource was available identifying known areas of high diversity. This wildlife habitat type is similar and will be treated concurrently with "Forest Areas Providing a Diversity of Habitat Types." This type of SWH must be assessed in the field, while considering community and species composition and complexity. These natural features typically contain a variety of community types, a multi-layered canopy and a richness of vegetation species. Areas of high diversity were searched for at all natural features during the Site Investigations, but no specific natural feature was identified, and therefore none could be carried forward.

2.1.6.4.8 Seeps and Springs

No records could be found which list specific natural areas that contain seeps and/or springs. No natural features are carried forward to the Site Investigations, but all field surveys will include a search for seeps and springs.

2.1.6.4.9 Cliffs and Caves

Cliffs can be discerned from the contours of topographic maps of an appropriate scale. Contours were reviewed and determined that no cliffs were present within 120 m of the Project Location. Caves are not always definable on such maps. However, the Karst of Ontario (Brunton, 2008) provides known karstic locations including caves. The Project Area contains "inferred" karst and "potential" karst but no "known" karstic areas within 120 m of the Project Location were identified. A cave was discovered on the Sandusk Creek, east of Sandusk Road (point coordinate provided to MNR). This is called the "Left Door Cave" on the Caves of Ontario website (www.ontariocaves.com). It is not within 120 m of the Project Location. Therefore, no natural features will be carried forward to the Evaluation of Significance.

2.2 Summary of Records Review

Only one known wetland , the SAC-10 wetland was identified within 120 m of the Project Location. Riverine hazardlands mapping will be used as a surrogate for valleylands within the Site Investigation. The Haldimand County Official Plan or other planning authorities do not provide mapping of significant wetland, and candidate wetlands were therefore candidate features of these types were determined using orthophoto interpretation prior to conducting field investigations. This information is now provided in the Site Investigation section, as requested by MNR.. Of the significant wildlife habitat types described in the SWHTG, no SWH records that have been evaluated following MNR criteria were identified within 120 m of the Project Location for any known SWH locations. Several species of conservation concern, as provided in Table 7, were listed by the NHIC as having

element occurrences within the Project Area. The determination of whether the habitats of the historically recorded species of conservations concern are present within 120 m of the Project Location was determined during the Site Investigation and if any of these species were present during Evaluation of Significance. The SAC-10 wetland is an MNR evaluated wetland that is also a Southern Wetland under the definition in O. Reg. 359/09 and will be carried forward and all other natural feature types will be further evaluated in the Site Investigations.

3.0 SITE INVESTIGATION

O. Reg. 359/09 requires that a person who proposes to engage in a renewable energy project shall conduct an investigation of the air, land and water within 120 metres of the project location in order to determine:

(a) whether the results of the analysis summarized in the records review report prepared under subsection 25 (3) are correct or require correction, and identifying any required corrections;

(b) whether any additional natural features exist, other than those that were identified in the records review report prepared under subsection 25 (3);

(c) the boundaries, located within 120 metres of the project location, of any natural feature that was identified in the records review or the site investigation; and

(d) the distance from the project location to the boundaries of the natural feature.

The following subsections explain any updates to the results presented in the Records Review and additional information on natural features identified through Site Investigation. In many cases, the field component of the Site Investigation was carried out in conjunction with the Evaluation of Significance.

3.1 Scoping Site Investigations

The proposed site investigations for the Project can be broadly categorized as being either “area based” surveys or “site specific” surveys. Area based surveys, including a site reconnaissance, avian use studies and fall bat migration studies that were initiated in 2008 to meet the O. Reg. 116/01 requirements which were in place at the time. Bird studies, for example, included species observations at specific observation stations located strategically within the Project Area . With the passing of the Green Energy and Green Economy Act and O. Reg. 359/09, the study emphasis for Natural Heritage Assessments shifted to site specific assessment of features within 120 m of a Project Location. . In all cases, area based surveys produced information that was useful in establishing wildlife habitat use patterns in the features that were individually assessed for habitat functions.

The general approach taken for site investigations is summarized below. As discussed in the Introduction of this Report, at the request of MNR (OMNR 2010g), specific components of the natural environment which MNR has deemed to be outside of the O. Reg. 359/09 REA Application process for natural heritage and reviewed and approved through other Regulatory processes have been removed from the NHA Report at the request of MNR. These include information pertaining to Endangered and Threatened Species, Mineral Aggregate Resources,

and Petroleum (Oil Salt and Gas) Resources, now provided in the APRD Reports (in progress). All drainage site investigations are now provided in the Water Assessment Report. Additional permitting requirements of the LPRCA for working within Regulation Limit boundaries and of the Department of Fisheries and Oceans for works in or adjacent to fish habitat and aquatic resources are provided under separate reports (in progress), as requested by MNR, since they are not required for a complete NHA Report (OMNR 2010g). Information regarding petroleum, aggregate and mineral resources is provided in the APRD Reports (in progress) to be reviewed by MNR.

GIS was used to identify and map all instances of natural features occurring within 120 m of the project location (including construction disturbance area). Watercourses with intact riparian zones received a corresponding ELC polygon based on orthophoto interpretation while the remaining watercourses were compared to the County Riverine Hazard Lands; NRVIS map layers or the LPRCA Regulation Limit.

3.2 Site Investigation Methods and Results

Stage 1 of the Site Investigation included a desktop habitat assessment using aerial imagery and results of the Records Review to determine the location and boundaries of potential wildlife habitat, woodlands, wetlands and valleylands. Using this digital layer, a classification of what potential types might apply to each natural feature was determined. Biologists then conducted stage 2, the physical Site Investigation to confirm or refute the presence of any of these potential natural features and determine candidate wetlands, woodlands, valleylands and wildlife habitat.

Figures 2a through 2g depict wetlands, valleylands and woodlands that were visited as part of the site investigations. Data collected within areas outside of 120 m of the Project Location that are no longer applicable due to layout changes have been excluded from this Report but have been archived by Golder. Also, all drainage features that may provide Fish habitat or aquatic resources and were provided in Table 11 of the Natural Heritage Report Version 1 have been removed from this Report and are now provided in the Water Assessment Report, as directed by MNR (OMNR 2010g) or in other permit and approval documents that are not required as part of the REA Application. In total, 96 natural features within 120 m of the Project Location remain. Table 8 and Figures 2a to 2g identify the natural features assessed. All 96 natural features were a candidate for at least one of a significant woodland, wetland, valleyland or wildlife habitat. The records review indicated that multiple categories of significant wildlife habitat may exist within 120 m of the Project Location and in several cases, a feature was a candidate significant habitat for more than one natural feature type (e.g. a woodland with a specific significant wildlife habitat) or more than one category of significant wildlife habitat (e.g. a feature that may contain both amphibian breeding and a raptor wintering area).

Table 9 summarizes the NHA Site Investigations conducted for the Project REA Application. Photocopies of Site Investigation field notes and forms are provided in Appendix A, which were given to MNR for them to evaluate the information obtained and provide written confirmations required in O. Reg. 359/09.

Table 8: Master Table of Natural Features Identified within 120 m of the Project Location

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
7b	a, b	13 and 14	Underground cable within 120 m	0	FOD 9-3: Fresh-Moist Bur Oak Deciduous Forest Type	25/06/10	Jamie Weir Amber Sabourin	Woodland	The dominant species within this natural feature are Burr Oak and Willow spp. The feature appears to have been disturbed by farming activities. In the open areas, the understory is dominated by gray dogwood, reed canary grass, and goldenrod spp., while the shaded areas are dominated by garlic mustard, wild geranium and white avens.	This is a 1.66 ha community that is very young with patchy canopy cover and no interior habitat. It is connected to other natural features only by a small stream and has no unique or uncommon characteristics
7c	a, b	13 and 14	Underground cable directionally drilled within 120 m	<10	CUW1:Cultural Woodland	25/06/10	Derek Morningstar Amber Sabourin	Woodland	The dominant species within this natural feature is Crack Willow. In the open areas, the understory is dominated by staghorn sumac and Manitoba maple and some reed canary grass, jewelweed and teasle.	This is a 1.66 ha community that is partly open with patchy canopy cover, no interior habitat and very disturbed by farming activities. It is a riparian forest, but not a wetland and is connected to other natural features only by a small, intermittent stream. No uncommon characteristics were revealed during site investigations.
7x	a, b	13 and 14	Underground cable within 120 m	0	MAM2-2: Reed Canary Grass Mineral Meadow Marsh	25/06/10	Jamie Weir Amber Sabourin	Wetland	Riparian area dominated by reed canary grass.	This 1.27 ha riparian natural feature exhibited mainly reed canary grass, and is therefore considered a wetland. It is heavily disturbed by farming activities.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
8	a, b	13	Access road, underground cable within 120 m	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	25/06/10	Lasha Milne Jamie Weir	Woodland, wetland	The dominant species within this natural feature were green ash, basswood and bitternut hickory. The understory was dominated by green ash, bitternut hickory and basswood saplings, common buckthorn, and blue beech. The over-all species composition of the canopy, subcanopy and groundlayer is indicative of a mesic habitat, tending toward a wetland habitat. No seeps, springs or vernal pools were observed in this community.	This is a 1.91 ha community that is young, has no interior habitat and is surrounded by farming activity, and therefore very disturbed. It is a lowland forest which is isolated from any other natural feature. No uncommon characteristics were revealed during site investigations.
9	b	12	T12 and associated access road and underground cable are within 120 m	<10	FOD 8-1: Fresh-Moist Poplar Deciduous Forest Type	10/06/10	Jamie Weir Amber Sabourin	Woodland, wetland	The dominant species within this natural feature was trembling aspen. The understory was dominated by trembling aspen saplings, common buckthorn, red osier dogwood, jewelweed and poison ivy. The canopy and subcanopy indicates a mesic community, but the abundance of dogwood in the understory and other moisture-loving species in the groundlayer result in a wetland designation for the community as a whole. No seeps, springs or vernal pools were observed in this community.	This is a 1.67 ha community that is young and has no interior habitat. The feature is surrounded by farming activity, and therefore is very disturbed. It is a lowland forest which is isolated from any other natural feature. No uncommon characteristics were revealed during site investigations.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
19	a	59	Access road, underground cable within 120m on opposite side of road. Overhead cable <10 m at Concession 6 Walpole	<10	CUM1-1: Dry-Moist Old Field Meadow Type	28/06/10	Jamie Weir Mark Katchouni	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a natural feature	This community is dominated by non-native grasses, sedges and forbes and is heavily disturbed.	This 9.0 ha community is a small patch of cultural meadow that has resulted from the abandonment of an agricultural field. No uncommon characteristics were revealed during site investigations.
26a	c	7 and 8	Access road, underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	28/06/10	Derek Morningstar Mark Katchouni	Woodland	The dominant species within this natural feature are shagbark hickory and burr oak. The understory is dominated by sugar maple and shagbark hickory, blue beech and various ground vegetation including wild geranium and enchanter's nightshade.	This is a 2.56 ha community that is semi-mature deciduous forest, has no interior habitat and is connected to other natural features only by small hedgerows. It is otherwise surrounded and disturbed by agricultural activity. No uncommon characteristics were revealed during site investigations.
31	c	57	Access road, underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	28/06/10	Lasha Milne Amber Sabourin	Woodland	The dominant species within this natural feature are shagbark hickory and burr oak. The understory is dominated by shagbark hickory and red maple seedlings, blue beech, Virginia creeper and poison ivy.	This is a 2.8 ha community that is mature, has a small amount of interior habitat and is connected to other natural features only by small hedgerows. It is otherwise surrounded and disturbed by agricultural activity. There were some wet indicator species, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
37	c	58	T58 and associated access road and underground cable are within 120 m	50	FOD 9-3: Fresh-Moist Bur Oak Deciduous Forest Type	11/06/10	Jenn Braun Amber Sabourin	Woodland	The dominant species within this natural feature are burr oak and green ash. The understory is dominated by hawthorn sp., slippery elm, buckthorn, raspberry and reed canary grass.	This is a 33.2 ha community that is mature, has interior habitat and is connected to other large natural features outside of 120 m from infrastructure. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the Stoney Creek. There were some wet indicator species, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.
38	c	58	T58 and associated underground cable and access road adjacent to natural feature	<10	SWD 1-2: Bur Oak Mineral Deciduous Swamp Type	11/06/10	Jenn Braun Amber Sabourin	Woodland, Wetland	The dominant species within this natural feature are burr oak, hickory and green ash. The understory is dominated by seedlings of these species, hawthorn sp., dogwood sp., reed canary grass and violet sp.	This is a 10.3 ha community that is mature swamp, has interior habitat and is connected to other large natural features along the Stoney Creek. Canopy cover is patchy, and there are a diversity of microhabitats along this riparian zone. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the Stoney Creek. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
38v	c	58	T58 and associated underground cable and access road within 120m of valleyland	<10	SWD 1-2: Bur Oak Mineral Deciduous Swamp Type	11/06/10	Jenn Braun Amber Sabourin	Valleyland	This valleyland is situated within the wetland (38). The dominant species within this natural feature are burr oak, hickory and green ash. The understory is dominated by seedlings of these species, hawthorn sp., dogwood sp., reed canary grass and violet sp..	This is a 2.04 ha community that is mature swamp, situated in a valleyland that has interior habitat and is connected to other large natural features along the Stoney Creek. Canopy cover is patchy, and there are a diversity of microhabitats along this riparian zone. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the Stoney Creek. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.
42	d	27	Underground cable within 120 m	25	CUP 3-2/SWD: White Pine Coniferous Plantation Type / SAC 10 Non-provincially significant wetland, Deciduous Swamp	29/06/10	Derek Morningstar Mark Katchouni	Woodland, Wetland	The periphery of this natural feature is a cultural plantation composed primarily of white pine and gray dogwood. The wetland feature inside this boundary is a deciduous swamp, and is further described by NHIC in the wetland evaluation for the SAC 10 wetland.	The wetland within this feature is one of four parts that comprise the SAC 10 wetland complex. This portion is surrounded by cultural plantation and agricultural fields. There are no visible surface water connections directly from this wetland to the other wetlands in the complex or elsewhere, but it is within 150m of the Stoney Creek. No uncommon characteristics were revealed during site investigations.
44	c	25, 26	Access road and underground cable within 120m	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	29/06/10	Derek Morningstar Mark Katchouni	Woodland	This natural feature is dominated by white ash, silver maple and burr oak. Other species in this feature include white elm, violet sp. and poison ivy. Although some of these are hydrophitic plants, the community as a whole was dominated by upland species.	This is a 2.1 ha community that is young, has no interior habitat, and is connected to other natural features only the intermittent Dry Creek. It is otherwise surrounded and disturbed by agricultural activity. No uncommon characteristics were revealed during site investigations.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
47	c	24	Access Road, underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	29/06/10	Derek Morningstar Mark Katchouni	Woodland	The dominant species within this natural feature are shagbark hickory and burr oak. The understory is dominated by American beech, blue beech, some jewelweed, enchanter's nightshade and poison ivy.	This is a 5.8 ha community that is mature, has a small amount of interior habitat. It is isolated, and surrounded by agricultural activity. There are some wet indicator species in small localized areas, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland. Carolina Wren and Red-breasted nuthatch are interior Carolinian species that are area sensitive, found in this natural feature.
51	c	24	Access Road, underground cable within 120 m	60	CUW/CUM: Cultural Meadow/Cultural Woodland	29/06/10	Derek Morningstar Lasha Milne Amber Sabourin Mark Katchouni	Woodland	This natural feature is dominated by non-native grasses, sedges and forbes and intermixed with white poplar and hawthorne sp., gray dogwood and goldenrod.	This 0.9 ha natural feature is a small patch of cultural meadow and cultural woodland that has resulted from the abandonment of an agricultural field. No uncommon characteristics were revealed during site investigations.
63a	b	20	T20, access road and underground cable is within 120 m	<10	CUM 1-1: Dry-Moist Old Field Meadow Type	10/06/10	Jenn Braun Amber Sabourin	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a woodland or other natural feature	This community is dominated by non-native grasses, sedges and forbes such as timothy and Canada bluejoint and is heavily disturbed.	This community contains upland field species and is actively farmed, but also contains some pockets of wet meadow (63x). The fields adjacent to this are actively cultivated, and there is a thicket to the south.

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63b	b	20	T20, access road and underground cable is within 120 m	<10	CUT 1-4: Gray Dogwood Cultural Thicket Type	10/06/10	Jamie Weir Amber Sabourin	Woodland	This natural feature was dominated by white ash and burr oak in the sparse canopy, with hawthorns, European buckthorn, elm and gray dogwood dominating the subcanopy and understory. The primary species observed in the groundlayer was wild strawberry. Despite the presence of gray dogwood, the majority of species observed are indicative of upland habitat. No seeps or springs were observed. Evidence of ephemeral pooling was observed.	This 4.9 ha thicket is a recent re-vegetation of an abandoned agricultural field. Although it is primarily upland, some small wet pockets may serve as amphibian or waterfowl breeding habitat, but they are not substantial in size.
63c	b	20	T20 and associated access road and underground cable are within 120 m	40	FOM 3-2: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type	10/06/10	Jamie Weir Amber Sabourin	Woodland	This natural feature is part of a large lowland mixed forest comprised of red maple, burr oak, hemlock and red oak in the canopy, and blue beech, buckthorn and heart-leaved aster in the understory.	This 21.3 ha large mixed forest is primarily comprised of upland species, with some slough forest characteristics and hemlock intermixed with deciduous trees. Several small ephemeral pools exist in this feature and a great blue heron rookery is located at the southeastern corner, approximately 800m from turbine 20. The ephemeral pools may function as small habitat pockets for breeding amphibians and/or wood duck, but they appear to be unlikely to persist into July. Property access restricted extensive research within the interior of this feature. Although this feature is large, it is isolated and surrounded by agricultural activity.

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63x	b	20	T20 and associated access road and underground cable are within 120 m	<10	MAM2-1: Canada Bluejoint Mineral Meadow Marsh	10/06/10	Jenn Braun Amber Sabourin	Wetland	These two small depressions within the dry cultural meadow were dominated by Canada bluejoint and some sedges. No seeps or springs observed. Evidence of vernal pooling was observed.	This 0.7 ha natural feature contains pockets of wet meadow. The fields adjacent to this are actively cultivated, and there is a thicket to the south. Within the wetland, seasonally wetted areas likely create ephemeral open pools and potential amphibian breeding habitat, although very small.
66	a, b	21, 16	Access road, underground cable, overhead cable, T21 within120 m	<10	FOD 4-1: Dry-Fresh Beech Deciduous Forest Type	29/06/10	Derek Morningstar Mark Katchouni	Woodland, reptile hibernacula, areas of high diversity	The dominant species within this natural feature are American beech and shagbark hickory. The understory is dominated by ironwood, blue beech, and wild geranium.	This 6.4 ha deciduous forest is located along the Sandusk creek and is part of the Sandusk Creek Floodplain Woods, designated by Haldimand County and has some interior habitat. It is upslope from the riparian forest community, but connected to these larger forest blocks. An old building foundation and pile of waste rocks is located in this feature which may serve as a reptile hibernacula, but the hibernacula is located within the interior of this natural feature, and greater than 120m from the project location.
69	a, b	59	T59 and associated underground cable and access road are within 120 m	<10m	CUS 1-1: Hawthorn Cultural Savannah Type	29/06/10	Lasha Milne Amber Sabourin	Woodland, areas of high biodiversity	This features is a mix of a few microhabitats and has mixed dominance of willow sp. basswood, ash spp. and white elm. The subcanopy and ground layer also have mixed dominance between hawthorn sp., European buckthorn, gray dogwood, goldenrod and giant ragweed.	This 7.5 ha community is located along the Sandusk creek, adjacent to the Sandsusk Creek Floodplain woods, has some interior habitat and is along a riparian slope with a diversity of microhabitat types. Some monarch were observed in the field and remnants of turtle nesting (sp. unknown) in the agricultural field.

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72	a, b	59	T59 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	29/06/10	Lasha Milne Amber Sabourin	Woodland, areas of high diversity	This natural feature is comprised of a mix of burr oak, shagbark hickory and green ash in the canopy. The understory was dominated by saplings of these species and gray dogwood, wild grape, goldenrod and reed canary grass.	This 3.7 ha community is also linked with Feature ID 66 and 69, along the Sandusk Creek. This is a relatively open and young community with some interior habitat. Wild turkey and turkey vulture were observed.
84d	d	62	T62 and associated access road and underground cable is within 120 m	<10	FOD 9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite	16/06/10	Derek Morningstar Lasha Milne	Woodland, bat maternity roost habitat, site supporting area sensitive species, areas of high diversity	This features has a mixed dominance of several deciduous tree species, including shagbark hickory, red oak, sugar maple and American beech. The understory was comprised of many seedlings of these species, blue beech, jewelweed and wild geranium.	This 7.2 ha community is part of a much larger community containing a diversity of habitats and interior forest types. The trees are very mature and several cavity trees and wildlife trees were present, which could provide habitat for bat maternity roosting, various bird habitats and reptile and amphibian breeding although ephemeral pools were not visible from the area that was accessible.

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84e	d	62	T62 and associated access road and underground cable is within 120 m	35	FOD 7-4: Fresh-Moist Black Walnut Lowland Deciduous forest	16/06/10	Derek Morningstar Lasha Milne	Woodland, reptile hibernacula, bat maternity roost habitat, rare vegetation community, site supporting area sensitive species, areas of high diversity	This natural feature is dominated by black walnut, which has choked other species from surviving, including the remnants of large sugar maple trees. The ground cover is mostly early successional grass species and raspberry.	This 1.8 ha walnut dominated riparian community is small, but connected to a much larger forest patch along with 84d. The remaining snags of very large old sugar maples have several cavities which provide likely maternity roost and cavity nesting habitat, evidenced by the discovery of scat/guano. The soil is shallow in some locations where small exposed fissures in the rock were observed, which may provide reptile hibernacula locations, but are not large enough for bat colonies. Adjacent to the Stoney Creek with several tributaries and an active hayfield and pasture.
85	d	62	Access road, underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Rick Baldwin Lasha Milne	Woodland	This natural feature is dominated by shagbark hickory, white ash and red oak. The understory is comprised of seedlings of these species, blue beech, wild geranium and enchanter's nightshade.	This 1.2 ha forest is heavily disturbed and very young. There is no interior habitat and it is surrounded by agricultural crops. No uncommon or distinctive characteristics were part of this natural feature.
92b	d	19	Access road, underground cable and T19 within 120 m	<10	FOD 5-3:Dry-Fresh Sugar Maple-Oak Deciduous Forest Type	11/06/10	Derek Morningstar Jamie Weir	Woodland	This natural feature is dominated by sugar maple, with red oak and basswood also present. In the subcanopy, Ironwood, blue beech and seedlings of all of the dominant trees were common.	This 15.3 ha sugar maple forest contains interior habitat and is part of a string of woodland communities. It appears to have been managed as a sugar bush, but has some mature wildlife trees which could provide habitat for nesting raptors. Although no springs or seeps were observed in the field, this feature is at the headwaters of some first order tributaries through agricultural fields.

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93a	d	19	Access road, underground cable within 120	<10	SWD 6-1: Red Maple Organic Deciduous Swamp Type	14/06/10	Lasha Milne Kurt Stamm	Woodland, wetland	This natural feature is dominated by red maple and bur oak with ash spp. and shagbark hickory also present in pockets. The understory is comprised of blue beech, grape woodbine and enchanters nightshade.	This 2.1 ha deciduous swamp is part of the interior of a larger complex, where there is evidence of timber harvest. There are a diversity of habitat types some and pooling (which could be evidence of springs or seeps, though none were actually found.
93b	d	19	Access road, underground cable within 120	<10	FOD 4-1: Dry-Fresh Beech Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	Woodland	This natural features is dominated by American beach, green ash and sugar maple and the understory is comprised of white ash, American beach, enchanter's nightshade and jack-in-the-pulpit.	This 9.0 ha forest is part of the complex patch including 93a, contains interior habitat, and appears to have been heavily managed. Several mature trees may provide nut mast for foraging, and possible amphibian breeding ponds.
95	d	28	Access road and T28 within 120 m	100	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/07/10	Lasha Milne Kurt Stamm	Woodland	This natural features is dominated by shagbark hickory, green and white ash. The understory is comprised of seedlings of these species, along with apple, hawthorn sp., common buckthorn, gray dogwood, ironwood, enchanter's nightshade and goldenrod spp.	This 10.8 ha forest contains interior habitat and mature trees. Monarch butterfly and tiger swallowtail were observed, but not in large numbers. Property access prevented assessment of the interior of this natural feature; observations were made primarily from the edge.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
96b	f	33	T33 and associated underground cable and access road is within 120 m	20	SWD 1: Oak Mineral Deciduous Swamp Ecosite	10/06/10	Lasha Milne Gary Pritchard	Woodland, wetland, woodlands supporting amphibian breeding ponds, areas of high diversity	This natural feature is dominated by burr oak, silver and red maple and black ash. The subcanopy and ground layer include blue beech, red osier dogwood, jewelweed, rush spp. and sedge spp.	This is an 8.2 ha swamp with interior habitat, which has both wet pockets and dry areas along a gradient of various microhabitat types. Several mature trees exist which may provide nuts for forage and roosting locations, although there were few large snags or cavities. The wet areas contain several small pools and some open areas which may act as nesting areas for wood duck. .
97c	d	32	T32 and associated underground cable and access road is within 120 m	<10	FOD 5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	10/06/10	Lasha Milne Gary Pritchard	Woodland	This natural feature is dominated by sugar maple, with American beech, white ash and shagbark hickory. The understory and ground layers include ironwood, blue beech, red osier dogwood, mayapple and goldenrod.	This feature is 4.1 ha with a small area of interior habitat and a small wet pocket at the southeast corner which may provide amphibian breeding habitat. This feature is connected by a very small hedgerow to a larger woodland patch, but is otherwise surrounded by agriculture. No rare or unique features were found during the site investigation.
103c	e	35	Access road, underground cable and T35 are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	10/06/10	Lasha Milne Gary Pritchard	Woodland	This natural feature is dominated by shagbark hickory, white and green ash and bur oak. Seedlings of these species were in the understory and ground layer along with blue beech, choke cherry, wild geranium and jewelweed.	This 20.6 ha forest has interior habitat, but a sparse canopy cover and more dense sub-canopy. There are several mature trees which may provide forage and roosting locations. It is along a string of forests and plantations to the east.

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104 b	e	36	Access road, underground cable and T36 within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/07/10	Derek Morningstar Amber Sabourin	Woodland	This natural feature is dominated by shagbark hickory, white and green ash and bur oak. Seedlings of these species were in the understory and ground layer along with blue beech, choke cherry, wild geranium and jewelweed.	This 20.6 ha forest has interior habitat and is connected with ID # 103c, which has very similar characteristics. Although there are large mature trees, no cavities and few snags were found. There was no evidence of pooling, but American toad and leopard frog were heard calling from this feature. A small vacant stick nest was observed, but no raptors were found during the site investigation and it was not adjacent to a large undisturbed field.
105a	e	37	T37 and associated access road and underground cable are within 120 m	55	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/07/10	Derek Morningstar Amber Sabourin	Woodland	This natural features is dominated by shagbark hickory, with basswood and blue beech in the understory and a ground cover of violet spp. And wild geranium.	This 8.2 ha forest contains interior habitat and is located along a string of other forest features. It has mature trees and evidence of ephemeral pools. A red-tailed hawk was observed, but there was no indication of raptor nesting activity. It is adjacent to a white pine cultural plantation which may provide winter cover for white-tailed deer and wild turkey.
105b	e	37	T37 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/07/10	Derek Morningstar Amber Sabourin	Woodland	This natural feature is dominated by red oak and shagbark hickory, with basswood and blue beech in the understory. The ground cover is mixed, but primarily enchanter's nightshade.	This 4.9 ha forest does not have interior habitat, and is surrounded by agricultural crops. The forest appears to have been managed for timber and/or firewood and is mostly young trees. No rare or unique features were found during the site investigation.

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106	e	38	Access road, underground cable within 120	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Derek Morningstar Amber Sabourin	Woodland	This natural feature is dominated by shagbark hickory, bur oak, basswood and sugar maple, along with blue beech and American beech and wild geranium and large-leaf aster in the ground layer.	This 26.5 ha feature is relatively young and had only a few larger trees with cavities. Some ephemeral pooling is present which may provide habitat for amphibian breeding, but it is unlikely that these pools would persist into July.
107	e, f, g	39	Access road, underground cable within 120	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Derek Morningstar Amber Sabourin	Woodland	This natural feature is dominated by shagbark hickory, American beech, basswood and blue beech with wild geranium in the ground layer.	This 14.8 ha features is large, with interior habitat, but young. There were tracks of wild turkey observed and ephemeral pooling is present, but it is unlikely that these pools would persist into July.
108	g	39, 40	Access road, underground cable within 120	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Derek Morningstar Amber Sabourin	Woodland	This natural feature is dominated by shagbark hickory, red oak, white ash and sugar maple. The understory contained American beech, blue beech with jewelweed and wild geranium in the ground layer.	This 17.8 ha feature contains mature interior forest and a diversity of microhabitat types. Ephemeral pooling is present, which may provide amphibian breeding habitat, but the water did not persist into July. Monarch and leopard frog were observed, but not in large numbers.

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111	f	43	Underground cable and T43 are within 120 m	65	FOD 4-2: Dry-Fresh White Ash Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	Woodland	Canopy dominated with green ash and shagbark hickory with a sparse successional layer of shagbark hickory and blue beech. Vegetation cover dominated with enchanter's nightshade, Canada goldenrod and jewelweed.	This 2.4 ha feature has a low degree of connectivity other than small stream to west; otherwise surrounded by agriculture. Ephemeral pools and moist soils suitable for amphibians are present but in very small quantity. Evidence of historical dumping of waste and wood harvesting. High amount of disturbance contributes to low habitat quality and diversity. No unique communities or species observed.
113	f	44	Access road and underground cable are within 120 m	90	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	Woodland, Landbird Migratory Stopover, site supporting area sensitive species	This natural feature is dominated by ash spp., red oak, sugar maple and American beech. Saplings of these are in the understory along with ironwood, blue beech and serviceberry and wild strawberry and goldenrod spp. are common in the ground layer.	This large 38.5 ha forest contains interior habitat, but is relatively isolated. A small stream goes through this feature, but it is predominantly very dry. It has mature trees which may provide forage and habitat for bird roosting and stopover.
114	f	45	T45, underground cable and access road are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	Woodland	This natural feature is dominated by shagbark hickory, green ash and sugar maple with blue beech and ironwood chokecherry and hawthorn spp. In the understory. The groundlayer was comprised primarily of enchanter's nightshade, jewelweed and several seedlings.	This is a 2.6 ha fragmented feature that is isolated from other natural features by agriculture. It contains some mature trees which could provide forage and roosting habitat, but is otherwise littered with farming debris and heavily disturbed. Three monarch were observed passing through.

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116b	f	47	T47 and associated access road and underground cable are within 120 m	100	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	Woodland	This natural feature is comprised of very young sugar maple, green and white ash and American beech. The ground layer is mostly seedlings along with wild geranium, white trillium and jack-in-the-pulpit.	The soil of this 19.6 ha forest is mostly dry organic soil. This feature is a young regrowth and has interior habitat. The small tree size suggests that it is unlikely to support raptor nesting or roosting.
117	f	47,46	Access road and underground cable within 120 m	<10	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	Woodland	Canopy is moderately open and dominated with mature sugar maple, white and green ash and American beech. Understory dominated with sugar maple, American beech and blue beech. Ground cover dominated primarily with enchanter's nightshade, jewelweed and wild leek.	Small (8.364 ha) sized deciduous complex surrounded by open agriculture. Size and maturity of complex suitable for woodland raptor nesting, but is not adjacent to large natural fields. Has potential for osprey and bald eagle habitat given mature habitat and proximity to Lake Erie but neither of these species or evidence of use by them observed.
118a	f	46	Access road within 120 m	25	FOD 4-1: Dry-Fresh Beech Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	Woodland	Canopy is moderately open and dominated with medium aged white and green ash, American beech and shagbark hickory. Understory dominated with American beech and blue beech. Ground cover dominated primarily with enchanter's nightshade and American beech saplings.	Small woodland part of medium (8.364 ha) sized deciduous complex surrounded by open agriculture. Young, disturbed stand with some small downed woody debris and very few wildlife trees. Very low species diversity observed. No structures within feature suitable for reptile hibernacula. Dominance of American beech supplemented with shagbark hickory. No unique species or communities observed.

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118b	f	46	Access road within 120 m	<10	FOD 5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	Woodland	Canopy is cluttered and dominated with green and white ash, American beech and shagbark hickory. Understory dominated with American basswood, shagbark hickory, green ash, blue beech and basswood. Ground cover dominated primarily with grape woodbine, enchanter's nightshade and poison ivy.	Small woodland part of medium (8.364 ha) sized deciduous complex. Feature contains small woody debris with few large woody cover or wildlife trees. This feature may be suitable for woodland raptor nesting but no nests were observed. No unique communities or species observed.
120b	e	50	T50 and associated access road and underground cable within 120 m and SMT04 met tower is within 120m	30	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	10/06/10	Derek Morningstar Jamie Weir	Woodland, bat maternity roost habitat, areas of high diversity	Shagbark hickory, red oak and green ash dominate the canopy with blue beech, American beech, gray dogwood and multi-flora rose in the successional layers. Ground cover dominated with jewelweed and wild geranium. High percentage of exotic species throughout. Several wildlife trees such as those exhibiting one to several cavities. Evidence of ephemeral pools.	Small woodland (6.488) isolated by vast open agricultural land with small Lake Erie tributary ending at the most southern edge. Woodland exhibits high diversity of habitat, with several trees over 40cm dbh and a few over 100cm dbh, wildlife trees, cavities and deadfall. Due to proximity to Lake Erie, habitat may be suitable for osprey and bald eagle although no evidence of either species was observed. Although feature appears to have tributary end at feature's southern edge, only one seep/spring was. Composition and structure of woodland has potential for bat roost and maternal colonies.

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120x	e	50	SMT04 met tower is within 120 m	3	MAM2: Mineral Meadow Marsh	10/06/10	Derek Morningstar Jamie Weir	Wetland, areas of high diversity	This is a small marsh wetland comprised mostly of reed canary grass and cattails.	This 1.6 ha wet meadow is heavily impacted by adjacent farming activities and is a mix of wetland and some upland and invasive vegetation. Water in this feature is primarily from rain events and it dries when there is no precipitation.
126	e	48	T48 and associated access road and underground cable within 120m	80	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	15/07/10	Derek Morningstar Amber Sabourin	Woodland, Landbird Migratory Stopover, site supporting area sensitive species	Woodland with mature Shagbark hickory and white ash dominating the canopy with blue beech and sugar maple in the lower succession. False Solomon seal and jewelweed dominate the ground cover. Woodland surrounded by open agriculture with western expanse connected to large woodland complex. Small, highly disturbed headwaters of Lake Erie tributary connected to feature at most southern edge.	Very large (54.75 ha) woodland connected with 241 and 242. The feature is a large area within 5 km of Lake Erie, forested with mature trees and adjacent to open agriculture. It may support habitat for migratory stopover of landbirds. Habitat may support osprey or bald eagles although none were observed. Vegetation inventory indicates a moderate level of species diversity dominated by mature hickory trees which may provide abundant nuts. One monarch was observed, as well as a northern harrier, and a red-tailed hawk.

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127a	e, g	51	Access road, underground cable are in feature	0	CUT 1-1: Sumac Cultural Thicket Type	15/07/10	Derek Morningstar Amber Sabourin	Woodland	Sparsely covered thicket with a green ash and willow dominated canopy and staghorn sumac and hawthorn in understory. Ground heavily covered with burdock and Canada goldenrod. Small, highly disturbed drainage runs through feature and drains into adjacent Lake Erie but otherwise isolated by open agriculture from other natural features.	Very small (2.160 ha) feature. Low diversity and no unique species or communities were observed and feature does not support large trees or habitat suitable for raptors including osprey and bald eagle.
130	e, g	51	T51 and associated access road and underground cable are within 120 m	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	16/06/10	Derek Morningstar Jamie Weir	Woodland	Cluttered canopy dominated with moderately aged white ash, sugar maple and shagbark hickory with these species and American beech in the sub canopy. The understory is dominated with blue beech, chokecherry and American beech. Wild geranium, white trillium, garlic mustard and jewelweed dominates the ground cover. Woodlot part of larger wooded complex extending relativity extensively to the west. Small pond in shaded centre of woodlot.	Medium sized (17.67 Ha), mature woodland. One brown snake was observed at edge of feature and agricultural field but no evidence of suitable cover was found. One green frog was observed in the vicinity. On route to field survey, one juvenile bald eagle was observed flying low above the woodland canopy. Given proximity to Lake Erie and the presence of suitable roosting habitat, this feature may be suitable for raptors such as bald eagle and osprey, but no nest was observed.

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133	g	52	Access road, underground cable and T52 within 120 m	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	10/06/10	Derek Morningstar Jamie Weir	Woodland	Feature is well within 5 km of Lake Erie. Semi-open canopy dominated with black walnut and green ash with an understory of blue beech. Ground with thick cover predominantly with jewelweed, jack-in-the-pulpit and white trillium.	Small (1.421 ha) woodland surrounded by open agriculture and connected slightly by narrow hedgerow to larger woodland to the southeast. Feature contains few trees providing high quality wildlife habitat. Low species diversity with a large proportion of exotic species indicates high disturbance. No unique species or communities. Small size and low abundance of suitable large trees would not likely support raptors such as osprey and bald eagle that may be otherwise attracted to its proximity to Lake Erie.
135	g	52, 53	T52, access road, underground cable within 120 m	<10	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Derek Morningstar Amber Sabourin	Woodland	Large (20.687 ha), mature Sugar maple, red oak and white ash dominated closed canopy with American beech, sugar maple and black walnut in the understory. Jewelweed and wild geranium dominate. Woodland surrounded by open agriculture with connection by thin hedgerow to very large woodland to the east and dissected by Lake Erie drainage feature. Some open pockets dominated with reed canary grass and trees marked likely for harvest.	This 21.8 ha natural feature contains very few large trees providing cavities and gaps. Woodland raptor nesting may also be supported by this habitat, but no nests were observed. This feature is not relatively high in species diversity and no species or communities unique to area observed. Evidence of ephemeral pools combined with high abundance of small deadfall but the pools did not persist into July.

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138	g	53	Access road underground cable and T53 within 120 m	<10	FOD 5-3: Dry-Fresh Sugar Maple-Oak Deciduous Forest Type	11/06/10	Derek Morningstar Jamie Weir	Woodland, Landbird Migratory Stopover, bat maternity roost habitat, site supporting area sensitive species, area of high diversity	Feature well within 5 km of Lake Erie and isolated by open agriculture other than to smaller woodland to the east by small hedgerow. Feature contains mature sugar maple, red oak and shagbark hickory dominates canopy with blue beech in the understory. Species such as enchanter's nightshade, jewelweed, wild geranium and avens dominate the interior portion of the woodland groundcover. Evidence of ephemeral pools.	Very large (48.561 ha) woodland. Several wildlife trees observed with abundant cavities may provide habitat for tree roosting bats, and birds, especially cavity nesters. Ephemeral pools with moderate level of woody debris may provide habitat for aquatic species life processes, but they did not persist into July. Large size of woodland adjacent to open areas <5km of Lake Erie may support migratory stopover of landbirds and habitat for raptors such as osprey and bald eagle, though none were observed.
142	g	54	T54 and associated underground cable and access road within 120 m	<10	CUW: Cultural Woodland	11/06/10	Lasha Milne Gary Pritchard	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a natural feature	Mix of open and treed feature surrounded by open agriculture and dissected by small watercourse. Vegetation dominated with white poplar, white ash and sugar maple with an understory of white poplar, hawthorn, apple and chokecherry. Open canopy cover provides a lot of light to support a thick layer of Canada goldenrod and several species of exotic grasses and forbs. Farming access route crosses southern portion of feature through watercourse.	Small (6.693 ha) feature. Highly disturbed and dominated by exotic species, this feature does not provide exceptional cover or diverse habitat availability. Vegetation does provide some protection to the riparian edge of small watercourse. No unique species or communities observed however one painted turtle traversing across agricultural field. One leopard frog and American toad observed.

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147b	g	55	Access road, underground cable within 120 m	<10	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	Woodland, Landbird Migratory Stopover, adjacent to habitat of species of conservation concern (chimney crayfish), site supporting area sensitive species	Feature dominated with mature sugar maple, green ash and shagbark hickory with a succession of sugar maple, American beech, ironwood and blue beech. Ground cover dominated with wild geranium and enchanter's nightshade. Small Gate's Creek tributary dissects feature and vernal pools evident and small depressions with deciduous swamp characteristics. Old bottle dump on south side of woodland.	Very large (36.563 ha) woodland. Feature supports a diversity of species due to an abundance of both upland and lowland vegetation. Area sensitive species observed include black-throated green warbler. A Raptor (buteo sp.) skeleton was found in an interior portion of forest with mature hardwoods suitable for nesting/roosting. This feature may support nesting woodland raptors due to size, composition and proximity to Lake Erie, but no evidence of raptors, including bald eagle or osprey were observed.
149	g	55	Access road, underground cable within 120 m	<10	CUP 3-2: White Pine Coniferous Plantation Type	15/07/10	Derek Morningstar Amber Sabourin	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a natural feature	Young pure stand within 5 km of Lake Erie. Comprised of rows of white pine with little understory and ground cover well shaded and dominated with a thin layer of detritus. Part of large deciduous woodland complex with small disturbed Gate's Creek tributary dissecting.	This small (0.592 ha),plantation provides little diversity and minimal wildlife habitat. However, as part of complex adjacent to Lake Erie and open agriculture, it contributes to suitable habitat for landbird stopover, and woodland raptor nesting.

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154	a, b	14	Overhead cable within 120 m of Nanticoke Road	80	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	04/08/10	Lasha Milne Amber Sabourin	Woodland	Feature surrounded by open agricultural land, Concession 6 and private residence with small highly disturbed drainage feature dissecting. Fresh to moist soils with a canopy and successional layers dominated with green ash, black walnut, white elm and shagbark hickory interspersed with silver maple. Understory comprised of a thicker layer of European buckthorn and gray dogwood. Ground cover dominated with timothy grass, Canada goldenrod and teasel.	Very small (1.101 ha) feature. Low species diversity and presence of non-native species indicate disturbance. No evidence of suitable reptile hibernacula observed. Little wildlife observed and no unique communities or species observed.
156	a	4,15	Overhead cable within 120 m of Concession 6, Rainham	<10	CUM: Cultural Meadow	04/08/10	Lasha Milne Amber Sabourin	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a natural feature	Open area dominated by exotic forbs and grasses along hydro corridor. Dominant species include brome grass, bird's foot trefoil, teasel and common ragweed.	This very small (1.291 ha) community exhibits low habitat quality due to high disturbance. Suitability for area-sensitive grassland birds likely minimal as feature is small and isolated by rotational crops providing little vegetation diversity or cover. No unique species or communities observed.

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159a	a	5	Underground cable within 120m	100	CUP 1-3: Black Walnut Deciduous Plantation Type	04/08/10	Derek Morningstar Rachelle Clinch	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a woodland or other natural feature	Canopy dominated with black walnut appears to have been planted, with hawthorn and red raspberry in the understory. Canada goldenrod dominates the ground cover.	This habitat is highly disturbed and low in biodiversity as indicated by abundance of non-native species and low number of overall species in inventory. No unique communities or species observed.
161	a	5,16	Overhead cable within 120 m of Concession 6, Walpole	<10	CUM 1-1: Cultural Meadow	04/08/10	Lasha Milne Amber Sabourin	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a woodland or other natural feature	Well drained, dry open feature with no canopy cover or understory dominated with exotic grasses (orchard, timothy, smooth brome) and forbs such as Queen Anne's lace. Isolated by vast expanse of open agriculture.	Small (3.501 ha) community. Few species were observed in this highly disturbed feature. No connectivity to natural features other than a highly disturbed portion of Sandusk Creek tributary.
161b	a	5,16	Overhead cable and underground cable within 120 m	<10	MAM 2-2: Reed-canary Grass Mineral Meadow Marsh Type	04/08/10	Derek Morningstar Rachelle Clinch	Wetland	Disturbed, riparian marsh within small upper tributary of Sandusk Creek. A wet relatively open feature with green ash and willow species dominating the canopy in sparse layers with grey dogwood in the understory. A thick covering of reed canary grass dominates the ground cover.	No unique species or communities observed in this 8.371 ha feature. High disturbance as indicated by abundance of exotic plant species. No unique species or communities observed.

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162a	a	5,16	Directionally drilled underground cable adjacent to natural feature	<10	FOD 9-3: Fresh-Moist Bur Oak Deciduous Forest Type	04/08/10	Lasha Milne Amber Sabourin	Woodland	Transitional area from very moist to fresh soils as Sandusk creek riparian woodland surrounded by open agricultural land. Mature bur oak, sugar maple and red oak and green ash dominate the canopy and blue beech, choke cherry and green ash in the understory. Ground cover consists primarily of poison ivy, running ground strawberry and wild geranium.	This feature contained no vernal pools, and downed woody debris is restricted to smaller materials. Some buttonbush was observed but not dominant in the habitat. Riparian area does not exhibit enough open shoreline to support an abundance of shorebirds. Aquatic wildlife such as warm water fish (observed) likely benefit from heavy riparian cover.
175b	b, c	61	T61 and overhead transmission line within 120 m	95	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	06/08/10	Derek Morningstar Rachelle Clinch	Woodland	Woodland surrounded by open agriculture with small disturbed drainage features crossing through. Evidence of ephemeral pools. Canopy dominated with mature shagbark hickory, bur oak with American beech, sugar maple and blue beech in the understory. Wild geranium, violet species, white avens and enchanter's nightshade are common species in the ground cover.	This (6.910 ha) feature supports a combination of shagbark hickory, oak and beech. Some trees within this feature contain cavities but not in high abundance. One vacant stick nest was observed and site composition (size and tree maturity) is suitable for nesting woodland raptors, but it is not adjacent to a suitable natural feeding field. Ephemeral pools may support breeding amphibians, but they did not persist into July. No unique species or communities observed.

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177c	b	22	transmission line within 120 m	120	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	06/08/10	Lasha Milne Amber Sabourin	Woodland	Woodland surrounded by open agricultural land. Canopy dominated with white ash, sugar maple, shagbark hickory and red oak. Understory comprised primarily of European buckthorn, chokecherry and hawthorn. Ground dense cover dominated with enchanter's nightshade, herb Robert and garlic mustard. Not many species observed. Historical disturbance such as wood harvesting as indicated by very large stumps left and brush piles but still quite a few large trees suitable for wildlife.	High disturbance level and a high proportion of non-native species contribute to the low biodiversity of this Small (.951 ha) feature. This Feature is linked to Dry Creek by a very small disturbed drainage feature; it is otherwise isolated from other features. No unique species or communities observed.
185c	d	27	Underground cable directionally drilled adjacent to natural feature in road right-of-way at two locations and overhead cable within 120m	<10m	SWD 4-1: Willow Mineral Deciduous Swamp Type	05/08/10	Derek Morningstar Rachelle Clinch	Woodland, wetland	Riparian area dominated with willows with bur oak, green ash, basswood and hawthorns. Exotic species dominate the ground cover such as reed canary grass and garlic mustard with some hydrophytic plants such as arrowhead at the extreme shoreline edge. Assessed from edge due to property access issues.	This large (27.099 ha) feature is part of a larger complex which includes a mix of aquatic, forested upland and open agriculture. This feature provides cover at bank of Stoney Creek and is suitable as a small wildlife corridor for various terrestrial and aquatic species. Feature is characterized by prevalence of non-native species and low diversity. No unique species or communities observed. Provides no suitable open banks with substrate suitable for turtle nesting and lacks suitable conifer cover for mink.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
198a	d	31	Overhead and directionally drilled underground cable within 120 m of Concession 4, Rainham	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	05/08/10	Derek Morningstar Rachelle Clinch	Woodland	Open agriculture isolated woodland with small highly disturbed drainage feature to the east. Within 5 km of Lake Erie. Mature shagbark hickory and bur oak dominate the canopy with American beech, shagbark hickory and blue beech in the understory. The ground is well covered with enchanter's nightshade and Virginia creeper.	This (4.397 ha) feature's canopy is dominated by hickory and beech and may support abundant nut forage. Monarch butterfly were observed. Downy woodpecker, an area sensitive species was observed, however woodland is not large enough to support abundance of area sensitive bird habitat (e.g. no 100m buffer at edge). Habitat characteristics and proximity to Lake Erie indicate that this feature may support migrating landbird species, but only to a small extent.
199	d	31	Overhead and directionally drilled underground cable within 120 m of Concession 4, Rainham	<10	CUW: Cultural Woodland	05/08/10	Derek Morningstar Rachelle Clinch	Woodland	Young, sparsely covered woodland surrounded by open agriculture and within 5 km of Lake Erie. Dominated primarily with shagbark hickory with some hawthorn in the understory. The highly disturbed patchy nature of the canopy allows a thick covering of goldenrod species as well as several exotic species.	This very small (1.455 ha) woodland is isolated from other natural features. High disturbance level contributes to low biodiversity within feature. No unique species or communities observed other than monarch.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
202d	e, f	39	Overhead cable within 120 m on concession 3	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	05/08/10	Lasha Milne Amber Sabourin	Woodland	Deciduous woodland within 5 km of Lake Erie, surrounded by agricultural fields and connected to two wooded natural features to the west and east by small hedgerows. Relatively moderately mature shagbark hickory, red maple and black ash throughout the canopy and successional layers along with nanny berry in the understory. Ground cover dominated with wild strawberry, avens and wild geranium. Several other species that thrive on fresh to moist soils present.	(14.778 ha) Feature dominated by mature mast producing species and may provide abundant forage. Size and proximity to Lake Erie may provide suitable landbird and butterfly migratory stopover habitat. No unique species or communities observed.
220	e	37,38	Overhead cable within 120 m of Fisherville Road	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	05/08/10	Lasha Milne Amber Sabourin	Woodland	Large forest within 5 km of Lake Erie surrounded by open agriculture with small hedgerow connecting to wooded natural feature to the north. Canopy dominated with mature shagbark hickory, bur oak and red maple, shagbark hickory and bur oak. No	Woodland size (26.54 ha) and tree composition may provide suitable nesting for some raptor species. No suitable structures for snake hibernacula observed. Some wildlife trees are present, otherwise no unique species or communities observed. One garter snake observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
241	e	48,51	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	<10	FOD 6-5: Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type	06/08/10	Lasha Milne Amber Sabourin	Woodland, Landbird Migratory Stopover, site supporting area sensitive species	Very large woodland surrounded by open agriculture and dissected by Fisherville road to large wooded natural features to the west. Feature is within 5 km of Lake Erie. Canopy dominated with pure stand of mature sugar maple (other than edge species) with an understory of sugar maple and choke cherry. Ground layer dominated with garlic mustard, zigzag goldenrod, white trillium and wild leek. Fresh to moist soils.	Large (54.754 ha) woodland containing mature hardwoods is adjacent to open agriculture. It may provide suitable habitat for raptors, including osprey and bald eagle due to its proximity to Lake Erie, though none were found. The habitat and proximity to Lake Erie may also provide a suitable landbird migratory stopover area. Low species diversity is present in canopy likely due to historical disturbance. An increase in successional species diversity and evidence of ephemeral flooding indicates an increasing state of naturalization.
242	e	48,51	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	06/08/10	Lasha Milne Amber Sabourin	Woodland, Landbird Migratory Stopover, site supporting area sensitive species	Medium woodland part of very large woodland complex at edge of Fisherville road and within 5 km of Lake Erie. Adjacent to open agriculture and two private residences. Canopy dominated with mix of young and mature shagbark hickory and white ash with some American beech, hickory, blue beech and basswood in the understory. Avens, enchanter's nightshade and sedges dominated the ground layer. Evidence of ephemeral pools. Few species observed with exotic species such as domestic pear and herb Robert.	Woodland (13.796 ha), connected with 241, dominated by hickory and beech in the canopy may provide abundant nut forage. Ephemeral pools may provide minimal support for portion of some life processes. Woodland size, composition and proximity to Lake Erie may provide conditions suitable for stopover of migrating landbirds, and habitat for woodland raptor nesting, though no large natural field for feeding was nearby. Low species diversity and evidence of historical disturbance including dumping and trails. No evidence of past or present osprey or bald eagle use (no nests or species) observed. No unique species or communities observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
254	a	4	T4 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	27/08/10	Derek Morningstar Lasha Milne	Woodland	Small woodland isolated by vast open agriculture with one small highly disturbed tributary of Sandusk Creek adjacent to feature to the north. Canopy dominated with bur oak, shagbark hickory, bitternut hickory and green ash. Understory dominated with bur oak, shagbark hickory and European buckthorn. Ground cover dominated with enchanter's nightshade, Canada goldenrod and asters. Few trees with cavities or abundant deadfall. Evidence of ephemeral pools. Integration of upland, hydrophytic and exotic vegetation.	This (3.914 ha) woodland with a canopy dominated by hickories and oak may provide abundant nut forage. Ephemeral pools were present, but would not persist into July and may support some wetland species life processes. Overall habitat quality low. Evidence of disturbance is visible and feature is isolated from other natural features. White-breasted nuthatch were observed. Monarch butterflies observed.
266	d	10	T10 and associated access road and underground cable are within 120 m	50	SWD 6-1: Red Maple Organic Deciduous Swamp Type	31/08/10	Lasha Milne Kurt Stamm	Woodland, wetland, woodlands supporting amphibian breeding ponds, areas of high diversity	Medium woodland surrounded by open agriculture and to small woodland by think hedgerow to the east. Canopy dominated with red maple, shagbark hickory, black ash and green ash with an understory of red maple, American beech and blue beech. Ground cover dominated by barren ground strawberry, goldthread, large-leaved aster. High amount of downed woody debris. Historical disturbance evident with turn of the century residential dump (milk cans, china, etc).	This (6.174 ha) forest contains an abundance of wildlife habitat including standing snags, deadfall and several cavities. Swamp characteristics and large amounts of downed woody debris may support some amphibian life processes. Feature contains several large trees over 40 cm dbh, with some tress over 50 cm dbh. Size of trees, woodland and adjacent to open agriculture may provide suitable habitat for woodland raptor nesting, but no nests were found. Evidence of disturbance is present. Soils varying from dry to wet support a wider range of vegetation species. No unique communities or species observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
267	d	10	T10 and associated access road and underground cable are within 120 m	30	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	31/08/10	Lasha Milne Kurt Stamm	Woodland, areas of high diversity	Small, mature canopy dominated with shagbark hickory, sugar maple, beech with sugar maple, beech, ironwood and blue beech in the understory. Saplings of sugar maple and green ash make dominate the groundcover. Several other species observed. Variable soils, evidence of ephemeral pooling and some wildlife habitat such as cavity trees. Feature contains small hedgerow connecting it to larger woodland to west and separate from Stoney Creek headwaters to east by agricultural land.	Feature is 4.55 ha in area and contains a high diversity of species compared to other features assessed in the area. Ephemeral pools, abundant cavities in mature trees, deadfall and standing snags, and cover suitable for several species of wildlife are present. Incidental observations of the area sensitive species white-breasted nuthatch and amphibians such as leopard frog and green frog were made. This feature is connected to separate woodland differing in ecology. No species or communities unique to area observed other than one monarch butterfly but in no high abundance and no associated suitable habitat observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
268	d	11	T11 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/08/10	Lasha Milne Kurt Stamm	Woodland	Large woodland surrounded by open agriculture, connected to small coniferous plantation to south and by thin hedgerow to deciduous woodland to the east. No aquatic features observed. Well covered canopy dominated with mature shagbark hickory, sugar maple, green ash and American beech with an understory of blue beech, European buckthorn and green ash. Dry-fresh soils in ground layer dominated with ash and maple saplings, enchanter's nightshade and running strawberry. Evidence of historical dumping of refuse material and recreational trails.	Large (11.609 ha) feature contains woody debris, few wildlife trees and mature hickory and beech. Some monarch butterfly larvae and species observed. Feature is separated from Stoney Creek headwaters by open agriculture to the west. No other unique species or communities observed.
288	d	28	T28 and associated access road and underground cable are within 120 m	95	CUT 1-4: Gray Dogwood Cultural Thicket Type	31/08/10	Lasha Milne Kurt Stamm	Woodland	Sparse canopy of a mix of sugar maple, white elm, black ash and basswood. Thick understory of gray dogwood and hawthorns with rice cut grass, jewelweed, asters, sedges and rushes in the ground cover. Small downed woody debris and wildlife trees. Pockets of very moist soils interspersed with dryer upland. Access trail through feature covered with cement. Small woodland (2.855 ha) but part of large complex as is situated between two large deciduous woodland to west and east, ultimately leading to Hemlock Creek riparian to the east and adjacent to open agriculture.	Natural feature is lower in elevation and serves as drainage between two features. It provides small pockets of habitat for hydrophytic species, but is dominated by upland plants. Despite high disturbance, this feature serves as a connection between deciduous woodlands and Hemlock Creek as part of a larger complex.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
290	e	30	Access road and underground cable within 120 m	<10	CUW: Cultural Woodland	10/09/10	Lasha Milne Kurt Stamm	Woodland	Small feature, sparse canopy cover dominated with shagbark hickory, green ash and bur oak with small patch of coniferous plantation to west. A thicker succession of green ash, shagbark hickory and gray dogwood, with Canada goldenrod, asters and non-native grasses. Connected to deciduous forest and Stoney creek riparian to the east. Otherwise surrounded by open agriculture. Within 5 km of Lake Erie.	This (4.178 ha) feature is connected to the Stoney Creek riparian corridor. It has low habitat value, high disturbance, and no species or communities unique for area.
312	d	27	Overhead cable within 120 m of Concession 4, Rainham	<10	SWD: Deciduous Swamp Type/Non-Provincially Significant Wetland	10/09/10	Lasha Milne Kurt Stamm	Woodland, Wetland	Small feature, fresh to moist deciduous dominated stand with a mature shagbark hickory, green ash, and white elm in the canopy. Surrounded by open agricultural land and road. Because feature is surrounded by vast open agriculture and Concession 4, a large proportion of feature is buffered by a disturbed edge more characteristic of a cultural woodland given low canopy cover, varying rate of succession and presence of non native species such as Norway maple, European buckthorn and reed canary grass. Small drainage feature connects north to another Non-Provincially Significant Wetland and drains into tributary of Dry Creek to the south.	This (5.474 ha) evaluated wetland feature has been designated as Non-Provincially Significant Wetland and is largely isolated from other terrestrial natural features other than by small, highly disturbed drainage to south and north. Wetland character and thick cover may have potential for woodland amphibian life processes but not for many waterfowl species. No open water, no high abundance of wildlife habitat or unique species and communities observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
314	d	18	Overhead cable within 120 m of Concession 5, Rainham	60	CUP 3-8: White Spruce Coniferous Plantation Type	10/09/10	Lasha Milne Kurt Stamm	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a woodland or other natural feature	Planted and maintained stand with open patches of young and intermediate aged white spruce interspersed with non native grasses and forbs.	This natural feature is 4.6 ha and has low species diversity and habitat value but may provide suitable cover for species in winter utilizing adjacent woodlands with suitable forage. Part of larger complex providing suitable interior habitat for area sensitive species. No unique species observed. Attached to large deciduous woodland to south. Residence within feature to north.
335	e	34	Access road and underground cable within 120 m	<10	CUP 3-2: White Pine Coniferous Plantation Type	10/09/10	Lasha Milne Kurt Stamm	ELC community field assessed as Project Location is within 120m, but community does not meet definition of a woodland or other natural feature	Planted stand with open patches of young and intermediate aged white pine interspersed with non native grasses and forbs.	Small plantation (5.9 ha) attached to small deciduous woodland to north and large deciduous woodland to south. Two small tributaries connect feature to Stoney creek to west across open agriculture. Low species diversity and habitat value. No unique species or communities observed.
342	f	13	Underground cable within 120 m	15	FOD 4-2: Dry-Fresh White Ash Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	Woodland	Canopy dominated by green ash and shagbark hickory with a sparse successional layer of shagbark hickory and blue beech. Vegetation cover dominated by enchanter's nightshade, Canada goldenrod and jewelweed.	Small (4.291 ha), young stand surrounded by agricultural land with small stream running through the western portion, and within 5 km of Lake Erie. Evidence of historical dumping of waste and wood harvesting. Ephemeral pools and moist soils suitable for amphibians, but did not persist into July. Low amount of suitable wildlife habitat such as mature trees or downed woody debris and no interior habitat. No unique communities or species observed.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
353	g	55	Access road and underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	22/10/10	Lasha Milne	Woodland	Natural, deciduous stand dominated with mature shagbark hickory, sugar maple and green ash in the canopy with a succession of sugar maple and green ash. Canada goldenrod and enchanter's nightshade dominate the ground layer the ground layer.	Small woodland (3.611 ha), within 5 km of Lake Erie. Connected to smaller treed feature to the east but otherwise isolated by surrounding open agriculture. Small disturbed tributary to west leading to Gate's Greek but separated by open agricultural land. Canopy dominance of shagbark hickory may provide abundant nut production for wildlife. Low species diversity and no unique communities or species observed.
354	g	55	Access road and underground cable within 120 m	20	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	22/10/10	Lasha Milne	Woodland	Young, small (0.937 ha), deciduous stand dominated with patchy shagbark hickory, sugar maple and green ash in the canopy with a thicker succession of sugar maple and green ash with Canada goldenrod and enchanter's nightshade in the ground layer.	Other than disconnected small woodland feature to west, this 0.9 ha feature is enclosed by open agriculture. Low degree of connectivity to other woodlands and aquatic features as divided by roads and residential area which also contributes to high disturbance indicated by stand thinning from historical wood harvest and low species diversity. Patchiness of canopy cover and young age of trees indicates low habitat suitability for wildlife. Small size, relative to adjacent features indicated that it is not likely as suitable for raptors. No unique communities or species observed.
444	b	61	Transmission line is within 120m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	27/08/10	Derek Morningstar, Lasha Milne	Woodland , Wetland	Riparian lowland forest containing hickory, maple oak and white ash, dogwood and giant ragweed along the bank of the creek with a few wetland plants, but not dominated by these.	This 16.0 ha natural feature is adjacent to the deeply incised Sandusk Creek and is very disturbed by local roads and farming activity. A painted turtle was observed in the creek, but no probable nesting banks were

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
										observed.
445	B	61	Transmission line is within 120m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	06/08/11	Derek Morningstar, Rachelle Clinch	Woodland	Small riparian lowland forest containing hickory, oak and some willow, dogwood and giant ragweed along the bank of the creek with a few wetland plants, but not dominated by these.	This 0.8 ha natural feature is a riparian woodland on the steep bank of the Sandusk Creek. It is connected to the Sandusk Creek Floodplain Woods ESA, and strongly impacted by adjacent farming activities
7a	a, b	13, 14	Underground cable crosses feature in 3 locations and access road crosses in two locations	0	Valleyland	25/06/10	Derek Morningstar Amber Sabourin	Valleyland	Contains cultural woodland, small riparian wetland and woodland.	Part of the Sandusk Creek System, this valley contains agricultural cropland.
55	c	23	crossed by overhead cable at Concession 5 Walpole	0	Valleyland	29/06/10	Lasha Milne Amber Sabourin	Valleyland	Contains: reed canary, hawthorn, common plantain, common ragweed, dandelion.	Part of the Dry Creek system, runs through agricultural cropland, partly channelized, partly meandering. Fair to poor riparian conditions, slightly stable to unstable banks. Intermittent flow.
70	a, b	59	At T59, turbine, access road, underground cable are within natural feature, and at Concession 6, directionally drilled cable is in natural feature and overhead cable is within 120m	0	Valleyland	29/06/10	Lasha Milne Amber Sabourin	Valleyland	Contains: giant ragweed, stinging nettle, white vervain, willow, ash, and sugar maple	Part of the Sandusk Creek system, it partially contains the Sandusk Creek Floodplain Woods. It runs through agricultural cropland and receives runoff from these fields. Good riparian conditions and some instream cover provides habitat for some warm water fishes.
158	a	3	crossed by access road and underground cable to T3	0	Valleyland	04/08/10	Lasha Milne Amber Sabourin	Valleyland	Contains: reed canary, red raspberry, milkweed, goldenrod, hawthorn, ash, European buckthorn, cottonwood, and white elm	Intermittent tributary of Sandusk Creek, with no evidence of groundwater input and poor to fair bank stability. Slightly meandering.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
160a	a	5	underground cable within 120 m	0	Valleyland	04/08/10	Derek Morningstar Rachelle Clinch	Valleyland	Contains: Queen Anne's Lace, common St. John's wort, Canada goldenrod, burdock, teasle, terrestrial grasses, white willow, hawthorn, reed canary grass, stinging nettle, Canada thistle, mullein, daisy fleabane, milkweed	Slightly meandering tributary of Sandusk Creek with ephemeral flow.
161a	a	59	Underground cable directionally drilled in feature and overhead cable is within 120m	0	Valleyland	04/08/10	Lasha Milne Amber Sabourin	Valleyland	Contains: emergent macrophytes including broad-leaved arrowhead. Also contains, reed canary, giant ragweed, willows, grey dogwood, red osier dogwood, white elm, buttonbush.	Permanent tributary of Sandusk Creek. Meandering valley, creek has stable banks and fair riparian.
184c	d	26	Underground cable directionally drilled in feature and overhead cable is within 120m	0	Valleyland	04/08/10	Lasha Milne Amber Sabourin	Valleyland	Contains: Willows, reed canary, in riparian.	Part of the Stoney Creek system, stream with permanent flow, good riparian, some instream cover. Pasture land and agricultural cropland surround the creek riparian.
185b	d	27	Underground cable directionally drilled in feature and overhead cable is within 120m	0	Valleyland	05/08/10	Derek Morningstar Rachelle Clinch	Valleyland	Contains: common ragweed, soy, biennial wild lettuce	Part of the Stoney Creek system. Intermittent flow of meandering to straightened field swale. Poor riparian dominated by non-native vegetation. This valley is dominated by a large soy field which is bisected by the field swale.
216	e	31, 32	Underground cable directionally drilled in feature and overhead cable is within 120m at road, overhead cable, underground cable and access road within 120m	0	Valleyland	05/08/10	Derek Morningstar Rachelle Clinch	Valleyland	Contains: cattail, grey dogwood, goldenrod, reed canary grass.	Contains part of Hemlock Creek, which flows into Stoney Creek. Meandering and fed by field swales.
296	a	4	Turbine is within 120 m of natural features	30	Valleyland	10/09/10	Lasha Milne Kurt Stamm	Valleyland	Contains: Deciduous forest dominated by green ash, and agricultural fields.	Contains a tributary that flows towards Sandusk Creek, this valleyland is dominated by agricultural fields.

Natural Feature ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Candidate Natural Feature Types	Composition of Feature (see datasheets in Appendix A for other species identified)	Attributes and Functions
304	b	62	Transmission line crosses natural feature two locations and is adjacent in one location.	0	Valleyland	10/09/10	Lasha Milne Kurt Stamm	Valleyland	Contains: Brome grass, Queen Anne's Lace, aster spp, purple loosetrife, arrowhead.	Part of the Stoney Creek System. Fed by many field swales. Meandering and permanent, with poor riparian habitat. Creek is surrounded by heavily grazed pasture land.
330	d, e	30, 62	T62 is within 120m and directionally drilled underground cable is in this natural feature and overhead cable is within 120m	<10m	Valleyland	10/09/10	Lasha Milne Kurt Stamm	Valleyland	Contains: cattail, broad-leaved arrowhead, and rushes	Part of the Stoney Creek System. Permanent creek fed by many field swales. Contains pasture land and some areas of exposed flat bedrock.
347	c	26	Directionally drilled underground cable crosses natural feature and overhead cable is within 120m	0	Valleyland			Valleyland	Contains: agricultural fields	Part of the Dry Creek system fed by field swales this valley runs through agricultural cropland.

Table 9: Summerhaven Site Investigation Survey Information.

Survey Type	Dates	Methods	Times	Duration	Weather	Field Personnel and Qualifications
General Site Reconnaissance						
Site Reconnaissance	May 28, 2008	■ Visited 35 potential bird survey stations				Steve Timmermans, M.Sc.
Site reconnaissance and turbine and project infrastructure siting	June 22, 2010 June 23, 2010	■ Turbine siting and constraints determinations	June 22 0900-1930 June 23 0900-1700	June 22 10.5 hrs June 23 8 hrs		Jeff Wright, R.P. Bio., A.Sc.T. (Dip. Fish and Wildlife Technology)(OWES certified)
Natural Feature Identification and Site Investigation						
Natural Features	June 10, 2010 June 11, 2010 June 14, 2010 June 16, 2010 June 25, 2010 June 28, 2010 June 29, 2010 June 30, 2010 July 14, 2010 July 15, 2010 Aug 4, 2010 Aug 5, 2010 Aug 6, 2010 Aug 11, 2010	11 natural features 6 natural features 6 natural features 3 natural features 17 natural features 25 natural features 33 natural features 27 natural features 27 natural features 28 natural features 49 natural features 55 natural features 23 natural features 17 natural features	June 10 0830-1700 June 11 0930-1600 June 14 ~0900-1700 June 16 1000-1830 June 25 1200-2030 June 28 0900-2030 June 29 1000-2300 June 30 0900-2100 July 14	June 10 8.5hrs June 11 8.5hrs June 14 8hrs June 16 10.5hrs June 25 8.5hrs June 28 11.5hrs June 29 13hrs June 30 12hrs July 14	June 10 Temp 20ºC No precipitation June 11 Temp 23ºC No precipitation June 14 Temp 24ºC No precipitation June 16 Temp 25ºC No precipitation June 25 Temp	Derek Morningstar, B.Sc (OWES and ELC certified) Lasha Milne, B.Sc (OWES certified and ELC proficient) Amber Sabourin Jenn Braun, B.Sc. (OWES and ELC proficient) Jamie Weir, A.Sc.T (Dip. Fish and Wildlife) (OWES certified) Rick Baldwin, A.Sc.T (Dip. Fish and Wildlife) Gary Pritchard, A.Sc.T (Dip. Fish and Wildlife) Kurt Stamm, C.E.T.T. Rachelle Clinch, B.Sc. Mark Katchouni, B. Sc.

Survey Type	Dates	Methods	Times	Duration	Weather	Field Personnel and Qualifications
	Aug 27, 2010 Aug 30, 2010 Aug 31, 2010 Sept 10, 2010	11 natural features 10 natural features 18 natural features 31 natural features	0900-1630 July 15 0900-1830 Aug 4 0600-1800 Aug 5 0800-2100 Aug 6 0730-1600 Aug 11 0800-1400 Aug 27 0830-1400 Aug 30 0900-1730 Aug 31 0900-2000 Sept 10 0800-1845	7.5hrs July 15 9.5hrs Aug 4 12hrs Aug 5 13hrs Aug 6 10.5hrs Aug 11 6hrs Aug 27 7.5hrs Aug 30 8.5hrs Aug 31 11hrs Sept 10 12.75	24ºC No precipitation June 28 Temp 26ºC Rain June 29 Temp 19ºC No precipitation June 30 Temp 20ºC No precipitation July 14 Temp 26ºC No precipitation July 15 Temp 30ºC No precipitation Aug 4 Temp 28ºC No precipitation Aug 5 Temp 28ºC No precipitation Aug 6 Temp 25ºC No precipitation	

Survey Type	Dates	Methods	Times	Duration	Weather	Field Personnel and Qualifications
					Aug 11 Temp 30ºC No precipitation Aug 27 Temp 23ºC No precipitation Aug 30 Temp 30ºC No precipitation Aug 31 Temp 30ºC No precipitation Sept 10 Temp 20ºC No precipitation	

3.2.1 Candidate Significant Wetlands

Wetlands not identified through the Records Review process were identified during fieldwork undertaken as part of the Site Investigations. Communities were identified initially using the Ecological Land Classification (ELC) system developed by Lee et al. (1998). If potential wetlands were found, boundaries of these wetlands were identified using high resolution orthophotography and subsequent field observations, and according to the procedures outlined in the Ontario Wetland Evaluation System (OWES), Southern Manual (OMNR, 2002). During the Site Investigation, each of these wetland features was also assessed to determine if the feature provides candidate significant wildlife habitat or if it is likely to provide habitat for Species at Risk (see Candidate Significant Wildlife Habitat section).

Confirmed wetland features were identified at Location ID 7x, 8, 9, 38, 42, 63x, 93a, 96b, 120x, 161b, 185c, 266 312 and 444 (see Table 10). A list of other natural features which were considered as possible wetlands at the Site Investigation stage 1 and in consultation with the MNR are provided in Table 10. Only two of these, ID 42 and ID 314 were identified in the Records Review process, and both are part of a wetland complex that has been evaluated by the MNR and was deemed not to be provincially significant, called SAC 10 Wetland. The remainder are previously unmapped wetland communities, or potential wetland communities identified by MNR (OMNR 2011b).

Many communities presented characteristics from the desktop habitat assessment which could suggest that they are wetlands, although field investigation may determine that they are in fact uplands. These communities are addressed in Table 10, and those that were classified as wetlands by the OWES were carried forward to the site investigation.

The above wetlands were evaluated using the Wetland Characteristics and Ecological Functions Assessment (WCEFA), as described in the Natural Heritage Assessment Guide (MNR, 2010d), which requires that each of these wetlands be ‘treated’ as significant The evaluation of significance for wetlands is provided in Section 4.1.1.

Table 10: Confirmation of Presence of Natural Features Considered as Potential Wetlands.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
7b	a, b	13 and 14	Underground cable within 120 m	0	FOD 9-3: Fresh-Moist Bur Oak Deciduous Forest Type	25/06/10	Jamie Weir Amber Sabourin	No	The dominant species within this natural feature were bur oak and willow spp., with a subcanopy composition of basswood and ironwood. Despite the presence of some willows, the majority of canopy and subcanopy species observed are indicative of upland habitat. No seeps, springs or vernal pools were observed in this feature.
7x	a,b	13 and 14	Underground cable within 120 m	<10m	MAM2-2: Reed Canary Grass Mineral Meadow Marsh	25/06/10	Jamie Weir Amber Sabourin	Yes	This riparian natural feature exhibited mainly reed canary grass, and is therefore considered a wetland.
7c	a, b	13 and 14	Underground cable directionally drilled within 120 m	<10	CUW1: Mineral Cultural Woodland	25/06/10	Derek Morningstar Amber Sabourin	No	The dominant species within this natural feature was Crack Willow. In the open areas, the understory was dominated by staghorn sumac and manitoba maple and some reed canary grass, jewelweed and teasel. This riparian area exhibited mesic vegetation. No seeps, springs or vernal pools were observed in this feature.
8	a, b	13	Access road, underground cable within 120 m	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	25/06/10	Lasha Milne Jamie Weir	Yes	The dominant species within this natural feature were green ash, basswood and bitternut hickory. The understory was dominated by green ash, bitternut hickory and basswood saplings, European buckthorn, and blue beech. The over-all species composition of the canopy, subcanopy and groundlayer is indicative of a mesic habitat, tending toward a wetland habitat. No seeps, springs or vernal pools were observed in this community.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
9	b	12	T12 and associated access road and underground cable are within 120 m	<10	FOD 8-1: Fresh-Moist Poplar Deciduous Forest Type	10/06/10	Jamie Weir Amber Sabourin	Yes	The dominant species within this natural feature was trembling aspen. The understory was dominated by trembling aspen saplings, European buckthorn, red osier dogwood, jewelweed and poison ivy. The canopy and subcanopy indicates a mesic community, but the abundance of dogwood in the understory and other moisture-loving species in the groundlayer result in a wetland designation for the community as a whole. No seeps, springs or vernal pools were observed in this community.
31	c	57	Access road, underground cable within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	28/06/10	Lasha Milne Amber Sabourin	No	The dominant species within this natural feature were shagbark hickory and bur oak. The understory was dominated by shagbark hickory and red maple seedlings, blue beech, Virginia creeper and poison ivy. The dominance of upland and mesic species in all layers of the community are indicative of upland habitat. Evidence of vernal pools was observed in this community. No seeps or springs were observed.
37	c	58	T58 and associated access road and underground cable are within 120 m	50	FOD 9-3: Fresh-Moist Bur Oak Deciduous Forest Type	11/06/10	Jenn Braun Amber Sabourin	No	The canopy of this natural feature consisted of scattered, sparse green ash. The dominant layer was the subcanopy, which consisted of bur oak. The understory was dominated by hawthorn sp., slippery elm, European buckthorn, red raspberry and reed canary grass. Despite a sparse green ash canopy, the dominant layers are the subcanopy and understory, which are dominated by upland species, with slippery elm (mesic). This natural feature is therefore not considered a wetland. No seeps or springs were observed. Evidence of vernal pooling was observed.
38	c	58	T58 and associated underground cable and access road adjacent to natural feature	<10	SWD 1-2: Bur Oak Mineral Deciduous Swamp Type	11/06/10	Jenn Braun Amber Sabourin	Yes	The dominant species within this natural feature were hickory, green ash and bur oak. The understory was dominated by saplings of these species, hawthorn sp., dogwood sp., reed canary grass and violet sp. The dominant species in all layers of this feature indicate a mesic-to-wet community. No seeps, springs or vernal pools were observed in this feature.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
42	d	27	Access road, underground cable within 120 m	25	CUP 3-2/SWD: White Pine Coniferous Plantation Type / SAC 10 Non-provincially significant wetland, Deciduous Swamp	29/06/10	Derek Morningstar Mark Katchouni	Yes	The wetland within this feature is one of four parts that comprise the SAC 10 wetland complex. This portion is surrounded by cultural plantation and agricultural fields. There are no visible surface water connections directly from this wetland to the other wetlands in the complex or elsewhere, but it is with 150m of the Stoney Creek. No uncommon characteristics were revealed during site investigations.
44	c	25, 26	Access road and cable within 120m.	<10	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	29/06/10	Derek Morningstar Mark Katchouni	No	This natural feature was dominated by white ash, silver maple and bur oak. Other species in this feature included white elm, violet sp. and poison ivy. Although some of these are hydrophytic plants, the community as a whole was dominated by upland species. No seeps, springs or vernal pools were observed in this feature.
51	c	24	Access Road, underground cable within 120 m	60	CUW/CUM: Cultural Meadow/Cultural Woodland	29/06/10	Derek Morningstar Lasha Milne Amber Sabourin Mark Katchouni	No	This natural feature was dominated by non-native grasses, sedges and forbs, and intermixed with white poplar and hawthorn sp., gray dogwood and goldenrods. This was a disturbed site, and did not exhibit wetland characteristics. No seeps, springs or vernal pools were observed in this community.
63x	b	20	T20 and associated access road and underground cable are within 120 m	<10	MAM2-1: Canada Bluejoint Mineral Meadow Marsh	10/06/10	Jenn Braun Amber Sabourin	Yes	These two small depressions within the dry cultural meadow were dominated by Canada bluejoint and some sedges. No seeps or springs observed. Evidence of vernal pooling was observed.
63a	b	20	T20, access road and underground cable is within 120 m	<10	CUM 1-1: Dry-Moist Old Field Meadow Type	10/06/10	Jenn Braun Amber Sabourin	No	This natural feature was dominated by non-native grasses and forbs typical of abandoned agricultural landscapes. No seeps, springs or vernal pools were observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
63b	b	20	T20, access road and underground cable is within 120 m	<10	CUT 1-4: Gray Dogwood Cultural Thicket Type	10/06/10	Jamie Weir Amber Sabourin	No	This natural feature was dominated by white ash and bur oak in the sparse canopy, with hawthorns, European buckthorn, elm and gray dogwood dominating the subcanopy and understory. The primary species observed in the groundlayer was wild strawberry. Despite the presence of gray dogwood, the majority of species observed are indicative of upland habitat. No seeps or springs were observed. Evidence of ephemeral pooling was observed.
63c	b	20	T20 and associated access road and underground cable are within 120 m	40	FOM 3-2: Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type	10/06/10	Jamie Weir Amber Sabourin	No	Within 120 m of the project location, this natural feature was comprised of red maple, bur oak, hemlock and red oak in the canopy, and blue beech, European buckthorn and heart-leaved aster in the understory. These species are indicative of upland habitats. No seeps, springs or vernal pools were observed within 120 m of the project location.
69	a, b	59	T59 and associated underground cable and access road are within 120 m	<10m	CUS 1-1: Hawthorn Cultural Savannah Type	29/06/10	Lasha Milne Amber Sabourin	No	This natural feature was comprised of a mix of a few microhabitats and had mixed dominance of willow sp. basswood, ash spp. and white elm. The subcanopy and ground layer also showed mixed dominance between hawthorn sp., European buckthorn, gray dogwood, goldenrod and giant ragweed. This feature included slope and bottomlands. The bottomland portions of the feature, though riparian, had an abundance of upland species indicating an upland habitat. No seeps, springs or vernal pools were observed.
72	a, b	59	T59 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	29/06/10	Lasha MilneAmber Sabourin	No	This natural feature was comprised of a mix of bur oak, shagbark hickory and green ash in the canopy. The understory was dominated by saplings of these species and gray dogwood, wild grape, goldenrod and reed canary grass. Despite the presence of green ash, the over-all species composition of the canopy and subcanopy is indicative of a mesic / upland habitat. No seeps, springs or vernal pools were observed in this community.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
84d	d	62	T62 and associated access road and underground cable is within 120 m	<10	FOD 9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite	16/06/10	Derek Morningstar Lasha Milne	No	Within 120 m of the Project, this natural feature exhibited a mixed dominance of several deciduous tree species, including shagbark hickory, red oak, sugar maple and American beech. The understory was comprised of many saplings of these species, blue beech, jewelweed and wild geranium. These species are indicative of an upland habitat. No seeps, springs or vernal pools were observed in this feature.
84e	d	62	T62 and associated access road and underground cable is within 120 m	35	FOD 7-4: Fresh-Moist Black Walnut Lowland Deciduous forest	16/06/10	Derek Morningstar Lasha Milne	No	This natural feature was dominated by black walnut, which had choked-out other species, including the remnants of large sugar maple trees. The ground cover was mostly early successional grass species and red raspberry. The absence of mesic or wetland species indicates that this community is an upland habitat which was determined to be a woodland. No seeps, springs or vernal pools were observed in this community.
93a	d	19	Access road, underground cable within 120 m	<10	SWD 6-1: Red Maple Organic Deciduous Swamp Type	6/14/2010	Lasha Milne Kurt Stamm	Yes	This 2.1 ha deciduous swamp is part of the interior of a larger complex, where there is evidence of timber harvest. There are a diversity of habitat types and pooling (both ephemeral and permanent) which could be evidence of springs or seeps, but none were found. This natural feature is dominated by red maple and bur oak with ash spp. and shagbark hickory also present in pockets. The understory is comprised of blue beech, grape woodbine and enchanters nightshade.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
96b	f	33	T33 and associated underground cable and access road is within 120 m	20	SWD 1: Oak Mineral Deciduous Swamp Ecosite	6/10/2010	Lasha Milne Gary Pritchard	Yes	This is an 8.2 ha swamp with interior habitat, which has both wet pockets and dry areas along a gradient of various microhabitat types. This natural feature is dominated by burr oak, silver and red maple and black ash. The subcanopy and ground layer include blue beech, red osier dogwood, jewelweed, rush spp. and sedge spp. Several mature trees exist which may provide nuts for forage and roosting locations, although there were few large snags or cavities. The wet areas contain several small pools and some open areas which may act as nesting areas for wood duck. Although the community is not listed as rare provincially, it seemed unique to the study area.
107	e, f, g	39	Access road, underground cable within 120	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Derek Morningstar Amber Sabourin	No	This natural feature was dominated by shagbark hickory, American beech, basswood and blue beech with wild geranium in the ground layer. The strongly upland nature of the canopy species, coupled with the mesic understory indicates that this is an upland habitat. No seeps or springs were observed in this feature. Some evidence of vernal pooling was observed.
108	g	39, 40	Access road, underground cable within 120	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	30/06/10	Derek MorningstarAmber Sabourin	No	This natural feature was dominated by shagbark hickory, red oak, white ash and sugar maple. The understory contained American beech, blue beech with jewelweed and wild geranium in the groundlayer. The strongly upland nature of the canopy species, coupled with the upland/mesic understory indicates that this is an upland habitat. No seeps or springs were observed in this feature. Some evidence of vernal pooling was observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
114	f	45	T45, underground cable and access road are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	14/06/10	Lasha Milne Kurt Stamm	No	This natural feature was dominated by shagbark hickory, green ash and sugar maple with blue beech, ironwood, chokecherry and hawthorn spp. in the understory. The groundlayer was comprised primarily of enchanter's nightshade, jewelweed and seedlings. Despite the presence of some green ash, the strongly upland nature of the majority of the canopy species, coupled with the upland/mesic understory indicates that this is an upland habitat. No seeps, springs or vernal pools were observed in this feature.
117	f	47,46	Access road and underground cable within 120 m	<10	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Lasha MilneKurt Stamm	No	The canopy of this community was moderately open and dominated by mature sugar maple, white and green ash and American beech. The understory was dominated by sugar maple, American beech and blue beech. Ground cover species included primarily enchanter's nightshade, jewelweed and wild leek. Despite the presence of some green ash, the strongly upland nature of the majority of the canopy species, coupled with the upland/mesic understory indicates that this is an upland habitat. No seeps or springs were observed. Evidence of vernal pooling was observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
118a	f	46	Access road within 120 m	25	FOD 4-1: Dry-Fresh Beech Deciduous Forest Type	15/07/10	Lasha Milne Kurt Stamm	No	The canopy in this feature was moderately open and dominated by medium-aged white and green ash, American beech and shagbark hickory. The understory was dominated by American beech and blue beech. Ground cover species included enchanter's nightshade and American beech saplings. Despite the presence of some green ash, the strongly upland nature of the majority of the canopy species, coupled with the upland/mesic understory and groundlayer indicates that this is an upland habitat. No seeps, springs or vernal pools were observed in this feature.
118b	f	46	Access road within 120 m	<10	FOD 5-6: Dry-Fresh Sugar Maple-Basswood Deciduous Forest Type	15/07/10	Lasha MilneKurt Stamm	No	The canopy of this community was dominated with green and white ash, American beech and shagbark hickory. The understory was dominated by American beech, shagbark hickory, green ash, blue beech and basswood. Ground cover species included Virginia creeper, enchanter's nightshade and poison ivy. Despite the presence of some green ash, the strongly upland nature of the majority of the canopy species, coupled with the upland/mesic understory and groundlayer indicates that this is an upland habitat. No seeps or springs were observed in this feature. Evidence of vernal pooling was observed.
120x	e	50	SMT04 met tower is within 120 m	3	MAM2: Mineral Meadow Marsh	10/06/10	Derek Morningstar Jamie Weir	Yes	This riparian natural feature is likely a moist feature, consisting of hydrophytic graminoid and forb vegetation. This is a conservative designation, based on orthophoto interpretation and information collected during site investigation at this location.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
120b	e	50	T50 and associated access road and underground cable within 120 m and SMT04 met tower is within 120m	3	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	10/06/10	Derek Morningstar Jamie Weir	No	The dominant canopy species in this natural feature included shagbark hickory, red oak and green ash, with blue beech, American beech, gray dogwood and multi-flora rose in the successional layers. The groundcover was dominated with jewelweed and wild geranium. Despite the presence of some green ash, the majority of canopy, subcanopy and understory species indicate an upland / mesic community. No seeps or springs were observed. Evidence of vernal pooling was observed.
126	e	48	T48 and associated access road and underground cable within 120m	80	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	15/07/10	Derek MorningstarAmber Sabourin	No	This natural feature was dominated by shagbark hickory and white ash in the canopy, with blue beech and sugar maple in the lower successional layers. False Solomon seal and jewelweed dominated the groundlayer. The canopy, subcanopy and understory species represent a strongly upland habitat. Seeps and springs observed. No evidence of vernal pooling. Comments received from the MNR (March 14, 2011) indicates that adjacent drainage features and possible wetland communities may be present based on their review. No such features were observed in the field.
135	g	52, 53	T52, access road, underground cable within 120 m	<10	FOD 5-8: Dry-Fresh Sugar Maple-white Ash Deciduous Forest Type	15/07/10	Derek MorningstarAmber Sabourin	No	This natural feature consisted of sugar maple, red oak and white ash in the canopy, with American beech, sugar maple and black walnut in the understory. Jewelweed and wild geranium dominated the groundlayer. Some open pockets were dominated by reed canary grass and trees marked likely for harvest. The absence of hydrophytic species in any layers except the groundlayer indicates that this is an upland habitat. No seeps or springs observed. Evidence of vernal pooling observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
142	g	54	T54 and associated underground cable and access road within 120 m	<10	CUW: Cultural Woodland	11/06/10	Lasha Milne Gary Pritchard	No	Vegetation in this natural feature was dominated by white poplar, white ash and sugar maple with an understory of white poplar, hawthorn, apple and chokecherry. The open canopy cover provided plenty of light to support a thick layer of Canada goldenrod and several species of exotic grasses and forbs. The strong representation of upland species, and the absence of wetland species, indicates that this is an upland habitat. No seeps or springs were observed here. Evidence of some vernal pooling was observed.
149	g	55	Access road, underground cable within 120 m	<10	CUP 3-2: White Pine Coniferous Plantation Type	15/07/10	Derek Morningstar Amber Sabourin	No	This natural feature was comprised of rows of white pine with little understory. Groundcover was well shaded and dominated with a thin layer of detritus. The feature is part of large deciduous woodland complex with small disturbed Gate's Creek tributary dissecting. Absence of wetland species indicates that this is an upland habitat.
154	a, b	14	Overhead cable within 120 m of Nanticoke Road	80	FOD 7-2: Fresh-Moist Ash Lowland Deciduous Forest Type	04/08/10	Lasha Milne Amber Sabourin	No	This natural feature was highly disturbed, with a canopy consisting of green ash, black walnut, white elm and shagbark hickory. The understory was comprised of a thicker layer of European buckthorn and gray dogwood. Ground cover was dominated by timothy grass, Canada goldenrod and teasel. Despite the presence of green ash and a small amount of grey dogwood, the majority of the species present were indicative of an upland habitat. No seeps, springs or vernal pools were observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
161b	a	15, 16	Overhead cable and underground cable within 120 m	<10	MAM 2-2: Reed-canary Grass Mineral Meadow Marsh Type	8/4/2010	Derek Morningstar Rachelle Clinch	Yes	Disturbed, riparian marsh within small upper tributary of Sandusk Creek. A wet relatively open feature with green ash and willow species dominating the canopy in sparse layers with grey dogwood in the understory. A thick covering of reed canary grass dominates the ground cover. No unique species or communities observed in this 8.371 ha feature. High disturbance as indicated by abundance of exotic plant species. No unique species or communities observed.
185c	d	27	Underground cable directionally drilled adjacent to natural feature in road right-of-way at two locations and Overhead cable within 120m	<10	SWD 4-1: Willow Mineral Deciduous Swamp Type	05/08/10	Derek Morningstar Rachelle Clinch	Yes	This large (27.099 ha) feature is part of a larger complex which includes a mix of aquatic, forested upland and open agriculture. Riparian area dominated with willows with bur oak, green ash, basswood and hawthorns. Exotic species dominate the ground cover such as reed canary grass and garlic mustard with some hydrophytic plants such as arrowhead at the extreme shoreline edge. Assessed from edge due to property access issues. This feature provides cover at bank of Stoney Creek and is suitable as a small wildlife corridor for various terrestrial and aquatic species. Feature is characterized by prevalence of non-native species and low diversity. No unique species or communities observed. Provides no suitable open banks with substrate suitable for turtle nesting and lacks suitable conifer cover for mink.
254	a	4	T4 and associated access road and underground cable are within 120 m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	27/08/10	Derek Morningstar Lasha Milne	No	The canopy in this community was dominated by bur oak, shagbark hickory, bitternut hickory and green ash. The understory was dominated by bur oak, shagbark hickory and European buckthorn. Ground cover species included enchanter's nightshade, Canada goldenrod and asters. Despite the presence of some green ash, the strongly upland nature of the majority of the canopy species, coupled with the upland understory and groundlayer indicates that this is an upland habitat. No seeps or springs were observed. Some vernal pooling was observed.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
266	d	10	T10 and associated access road and underground cable are within 120m	50	SWD 6-1: Red Maple Organic Deciduous Swamp Type	31/08/10	Lasha Milne Kurt Stamm	Yes	This (6.174 ha) forest contains an abundance of wildlife habitat including standing snags, deadfall and several cavities. Swamp characteristics and large amounts of downed woody debris may support some amphibian life processes. Feature contains several large trees over 40 cm dbh, with some tress over 50 cm dbh. Size of trees, woodland and adjacent to open agriculture may provide suitable habitat for woodland raptor nesting, but no nests were found. Evidence of disturbance is present. Soils varying from dry to wet support a wider range of vegetation species. No unique communities or species observed.
267	d	10	T10 and associated access road and underground cable are within 120 m	30	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	31/08/10	Lasha Milne Kurt Stamm	No	This natural feature had a canopy dominated by shagbark hickory, sugar maple, white ash and American beech, with sugar maple, American beech, ironwood and blue beech in the understory. Saplings of sugar maple and green ash made up the dominant groundcover. Despite the presence of some green ash in the groundlayer, the majority of species observed in all layers are indicative of an upland habitat. No seeps or springs were observed. Evidence of vernal pooling was observed.
312	d	27	Overhead cable within 120m of Concession 4, Rainham	<10	SWD: Deciduous Swamp Type/Non-Provincially Significant Wetland	10/09/10	Lasha Milne Kurt Stamm	Yes	This (5.474 ha) evaluated wetland feature has been designated as Non-Provincially Significant Wetland and is largely isolated from other terrestrial natural features other than by small, highly disturbed drainage to south and north. Fresh to moist deciduous dominated stand with a mature shagbark hickory, green ash, and white elm in the canopy. Wetland character and thick cover may have potential for woodland amphibian life processes but not for many waterfowl species. No open water, no high abundance of wildlife habitat or unique species and communities observed.
158x	a	3	crossed by access road and underground cable to T3	<10	CUM1: Mineral Cultural Meadow	04/08/10	Lasha Milne Amber Sabourin	No	This riparian natural feature was dominated by upland species typical of abandoned agricultural landscapes, including hawthorns, European buckthorn, scattered cottonwoods, elms and ashes. Groundlayer species included common milkweed, red raspberry, goldenrods and reed canary grass. This is a typical riparian mesic community.

Location ID	Map Reference	Nearest Turbine	Project Component Within REA Setback of Natural Feature	Distance to Nearest Project Component (m)	ELC Ecosite and Description	Date Visited (dd/mm/yy)	Field Crew	Wetland (Y/N)	Justification for Determination as Wetland / Non-wetland
444	b	61	Transmission line is within 120m	<10	FOD 9-4: Fresh-Moist Shagbark Hickory Deciduous Forest Type	27/08/10	Derek Morningstar, Lasha Milne	Y	Riparian woodland with some upland and wetland species. Adjacent Sandusk Creek infiltrates soils, providing sufficient wet soils to promote growth of wetland plants, though they drain rapidly.

3.2.2 Candidate Significant Valleylands

As discussed in the Records Review, the surrogate used for the valleyland boundary at the Record Review level was the County Riverine Hazard. During the site investigations, Golder identified candidate Valleylands within 120 m of the Project Location and assessed these at the same time as the water body assessments.

The presence of indicators of significance (as available in Table 8-1 of the NHRM) was considered while making observations within valleylands during site investigations. These included:

- the presence of watercourses and surface water functions
- the presence of groundwater or apparent, groundwater functions;
- landform prominence and the presence of distinctive geomorphic landforms;
- where the above were present, the naturalness of the area, relative community and species diversity,
- presence of unique communities or species, habitat values or linkage functions; and,
- the potential for restored ecological functions (restoration potential and value).

All 14 valleyland features identified in the records review were considered to be candidate significant valleylands, and were forwarded to the evaluation of significance, which are listed in Table 8 depicted on Figures 2a-g.

3.2.3 Candidate Significant Woodlands

During the Records Review, it was evident that there were no prior records or data layers which identify significant woodlands within 120 m of the Project Location. In the absence of woodland data from the County, Golder used 2006 orthophotography acquired from LPRCA, supplemented with LIO NRVIS data to digitally delineate terrestrial features that could be woodlands within 120 m of the Project Location. Using these sources, 68 features appeared at stage one of the Site Investigation to potentially contain vegetation communities consistent with woodlands, based on the modified 2011 O. Reg. 359/09 definition, and which are located within 120 m of the Project Location (including disturbance area). These features range in size from 0.01 ha to 73 ha, with the average size being 2.8 ha. Relative to the Natural Heritage Report Version 1, one candidate woodland has been excluded from this Report, as this feature is no longer within 120 m as a result of a shift in the Project Location.

In total, all 71 natural features (Table 8), identified as woodland communities were considered to be candidate significant woodlands, and were forwarded to the Evaluation of Significance.

3.2.4 Candidate Significant Wildlife Habitat

Wildlife habitat observations were made during the Site Investigations. If concentrations of wildlife or if individuals of a species of conservation concern were observed, they were documented either as an attribute of the other natural feature that they were observed in or as a discrete feature. Where a species of conservation concern was observed, that observation record was considered in the Evaluation of Significance for "*Significant Habitat of Species of Conservation Concern*". Indicators and criteria associated with the evaluation of various

types of significant wildlife habitat were also assessed during the Site Investigation and recorded on the applicable field form(s) contained in Appendix A. Habitat data were collected from each natural feature within 120 m of the Project Location to facilitate subsequent evaluation of significance for SWH. 82 natural features within 120 m of the Project Location that were assessed for SWH contain candidate SWH (Table 8). This includes wildlife habitats that may coexist with other natural features, and wildlife habitats that are associated with woodland, valleyland or wetland natural features. In some cases where the predicted boundaries of a wildlife habitat were limited to a smaller area contained within an ELC community, the assumption that the SWH may occupy the entire feature was followed and the polygon area and unique identifier of the parent feature was used. This represents a more conservative approach for the purpose of the analysis of negative effects. Where a wildlife habitat has been mapped using a distinct polygon, a unique identifier has been provided specific to the wildlife habitat.

All natural features including their composition, attributes, form and function are described in Table 8. The type of vegetation community associated with the natural feature is based on ELC. All of the natural features within 120 m of the Project Location and visited in the Site Investigation are provided on Figures 2a to 2g.

3.2.4.1 Seasonal Concentration Habitats

3.2.4.1.1 Colonial Bird Nesting Sites

A great blue heron rookery is associated with feature 63c, with at least 24 known nests, and therefore was carried through from the Record Review. The location of this feature is at the southeast corner of natural feature 63c, greater than 800m from the Project Location. Even when a 300m buffer is placed around this great blue heron rookery, it is not within 120 m of the Project Location. At no other locations were rookeries, banks, or any other potential colonial bird nesting sites found. Therefore, no candidate colonial bird nesting sites will be carried forward to the Evaluation of Significance.

3.2.4.1.2 Waterfowl Stopover and Staging Areas

Waterfowl Stopover and Staging Areas are described in the SWHTG and supplemented by Schedule 3 for Ecoregion 7E. Large bodies of water or open wetlands that would harbour a large number of individuals or species during a major migratory event were considered for the assessment of candidate sites.

In accordance with the SWHTG, large concentrations of waterfowl within appropriate habitat observed during migration were treated as significant.

Although one wildlife habitat was identified in stage 1 of the Site Investigation (feature 96b) based on the community type, it does not contain any large open water or marsh habitat that would be sufficient for waterfowl stopover. Therefore, 96b was not confirmed, and will not be carried forward to the Evaluation of Significance. Features 63a and 63b have wet depressional areas, but did not provide the open water habitat that would be necessary for waterfowl stopover, and was not considered as a candidate waterfowl stopover and staging area. Therefore, no natural features of this SWH sub-type were carried forward to the Evaluation of Significance.

3.2.4.1.3 Waterfowl Nesting Areas

Waterfowl nesting areas are described in the SWHTG and the Habitat Management Guidelines for Waterfowl in Ontario (Hickie, 1985). The most important habitat requirement for waterfowl is access to large open shallow water areas that produce high numbers of small aquatic invertebrates (Sugden, 1973), and would support a large number of waterfowl broods. These form a high-quality diet for egg-laying females and actively growing young. Most waterfowl that breed in Ontario nest within or close to marshes and other wetlands.

In accordance with the SWHTG, the ratio of open water to emergent vegetation is a part of the assessment of nesting waterfowl. A combination of both upland and lowland habitat and a substantial amount of suitable nesting material are needed for significant habitat. Although natural feature 96b provided some habitat which would be conducive to nesting of wood duck, it is not large enough to support many broods at the same time, and therefore was not confirmed as a candidate significant wildlife habitat.

Therefore, no natural features of this SWH sub-type will be carried forward to the Evaluation of Significance.

3.2.4.1.4 Shorebird Migratory Stopover Areas

Natural features with access to large expanses of exposed, wet substrate such as mudflats or sandy shorelines and some non-waterbodies (according to REA definition) such as sewage lagoons may be considered significant depending on the type and abundance of species using them.

During the desktop habitat assessment and site investigation, no areas as described above, which would provide habitat for shorebird migratory stopover were identified. Therefore, no natural features of this SWH sub-type were carried forward to the Evaluation of Significance.

3.2.4.1.5 Landbird Migratory Stopover Areas

Landbird migratory stopover areas are typically mature, undisturbed forests less than 5 km from Lake Erie and greater than 30 ha in size. The best sites have a mix of habitat types (e.g., forest, grassland, etc)and have been used for several years. In most cases, only one or a few exist in a planning area, but due to the proximity of the Project to the shoreline of Lake Erie, four natural features have been identified as candidate landbird Migratory Stopover Areas (Table 13). These natural areas are depicted on Figures 4-1a, b, c and d.

Four natural features, namely 113, 138, 147b and 126/241/242 combined communities will be carried forward to the Evaluation of Significance.

Table 11: Candidate Landbird Migratory Stopover Natural Features

Location ID	Landbird Migratory Stopover Areas
113	<5km of Lake Erie. Very large (>30 ha). Road, residence disturbance at north portion of feature.
138	<5km of Lake Erie. Very large (>30 ha) and very close to Lake Erie. Adjacent to another very large woodland. Some disturbance from a few residences within eastern portion of feature. Surrounded by annual row crop dominated field.
147b	<5km of Lake Erie. Very large (>30 ha) and diverse. Little disturbance from development but surrounded by annual row crop dominated fields. Very close to Lake Erie.
126, 241 and 242	<5km of Lake Erie. Very large woodland. Some disturbance from road and church building to the east, otherwise not highly disturbed.

3.2.4.1.6 Raptor Winter Feeding and Roosting Areas

Large undisturbed natural fields (>15 ha) adjacent to large woodlands with little disturbance during the winter were considered as possible raptor winter feeding and roosting areas. Since large, undisturbed grasslands are uncommon in this agricultural landscape, no features met this criterion. Therefore, no natural features of this SWH sub-type will be carried forward to the Evaluation of Significance.

3.2.4.1.7 Bald Eagle Winter Feeding and Roosting Areas

Area based avian use surveys (AUS) were conducted by Golder throughout the winter of 2008 (Appendix B)and by Dave Martin (Appendix C). Golder surveys included roadside counts that covered natural and cultural habitats, which were supplemented by road-based area searches. This provided an understanding cross- of the bird species and communities within the Project Area. These results were considered in evaluating specific criteria and indicators associated with categories of SWH that pertain to bald eagle winter feeding and roosting areas. Twelve bald eagles observations were made winter surveys by Golder and Martin, although there is a possibility that this may include repeat observations of specific individuals observed on both of the survey dates. Observations of bald eagle were made at AUS stations 19, 20 and 29, all of which are outside of the Project Area and beyond 120 m from the Project Location. Habitat for bald eagle wintering includes very large, undisturbed woodland sites directly adjacent to large bodies of flowing water that remain open through most of the winter. Based on the records review and site investigation, no natural features meeting this description were identified within 120 m of the Project Location and no natural features of this SWH sub-type were carried forward to the evaluation of significance.

3.2.4.1.8 Turkey Vulture Summer Roosting Areas

Area based avian use surveys were conducted throughout the breeding season of 2008 (Appendix B). Surveys included roadside counts that covered natural and cultural habitats, which were supplemented by road-based area searches. This provided a cross-section of bird species and communities within the Project Area. These results were considered in evaluating specific criteria and indicators associated with categories of SWH that

pertain to birds. No concentrations of turkey vultures were observed on any visit for avian use or during any Site Investigation at any time. Therefore, and no natural features of this SWH sub-type were carried forward into the Evaluation of Significance.

3.2.4.1.9 Reptile Hibernacula

Although no natural features were specifically identified during the Records Review, all locations surveyed during the Site Investigation were searched for reptile hibernacula. Five natural features, 66, 84e, 147b, 202d and 268 included attributes which may provide reptile hibernacula. In the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010j) MNR has suggested that for suitable known hibernacula used by the eastern hog-nosed snake, eastern ribbonsnake, or milksnake at least once within the past 5 years habitat would include the area within a 30 m radius or as otherwise defined by an ESA habitat description or habitat regulation. Three of these locations, within 147b, 266 and 268 had bottle dumps and scattered debris, but none of this would be suitable as an overwintering hibernacula for any snake species. None of these habitats for milksnake or eastern ribbonsnake or the species themselves were observed at these locations during the Site Investigations, and therefore no natural features for these species will be carried forward to the Evaluation of Significance.

The old building foundation within natural feature 66, with a 30 m buffer was not within 120 m of the Project Location and therefore will not be carried forward to the Evaluation of Significance. The small crack in the exposed limestone within natural feature 84e with a 30 m buffer is within 120 m of the Project Location and will therefore be carried forward to the Evaluation of Significance. The specific point where the potential hibernaculum is found is described in Table 12, and depicted on Figures 4-2a and b.

Table 12: Specific Locations of Potential Reptile Hibernacula

Natural Feature ID	Candidate SWH within 120 m of Project Location(Yes/No)	Potential Hibernacula Description	Point Location
66	No	Old building foundation	17T 577530N, 4746676E
84e	Yes	Small limestone crevice	17T 587605N, 4746906E

3.2.4.1.10 Migratory Butterfly Stopover Areas

The SWHTG has suggested that sites within 5km of Lake Erie and greater than 10 ha of undisturbed grassland or meadow adjacent to forest be considered significant. These large undisturbed fields were not common on the agriculturally dominated landscape, and so there were no natural features which met this criteria, and no natural features of this SWH sub-type were carried forward.

3.2.4.1.11 Bullfrog Habitat

No natural features were carried forward from the Records Review. Large, permanent, open wetlands with flowing and relatively deep water is known to harbour bullfrogs. The site investigation did not reveal any of these

habitats within 120 m of the Project Location, and therefore no natural features of this SWH sub-type were carried forward.

3.2.4.1.12 Bat Maternity Roosting Habitat and Hibernacula

No known natural features of bat maternity roosts or hibernacula were identified in the Records Review. All treed communities within 120 m of the Project Location as identified in the desktop habitat assessment and were further evaluated during the physical site investigation.

O. Reg. 359/09 requires the assessment of significance for natural features within 120 of a Project Location, including potentially significant bat habitat. The draft MNR *Bats and Bat Habitats; Guidelines for Wind Power Projects* (MNR, 2010) requires proponents to assess the potential maternity roost use.

MNR (2010b) has suggested that preconstruction acoustic bat migration monitoring is not necessary at proposed wind power facilities in Ontario. However, its predecessor, MNR (2007) did require intensive acoustic preconstruction monitoring, based on a prescribed design. Golder undertook pre-construction fall migration bat surveys since 2008 and a substantial amount of acoustic bat monitoring data was collected. This data was in the process of being analyzed and a report written when the 2010 MNR bat guidance documents were released. In summary, fall migration acoustic data was collected over two years from mid-July through to mid-September at 24 stations, resulting in 944 detector-nights of data, stratified by habitat, elevation and proximity to the lakeshore (Golder, 2010c).

The survey requirements set out in MNR (2010b) state that significant hibernacula and maternity roosts and their habitat must be identified and assessed as part of the pre-construction sampling. However, MNR (2010b) does not clearly outline how the maternity roost assessment can be feasibly accomplished over a large landscape such as that of the Project Area and in areas where multiple entrances to roosts may be present. MNR (2010b) indicates that visual and acoustic monitoring must be completed for up to ten nights in the month of June at any candidate maternity roost. However, the guideline does not clearly describe what constitutes a candidate maternity roost. If a candidate maternity roost is located, the significance of this roost is to be determined based on the number of bats that are using it.

To address logistical and practical considerations in MNR 2010b that have been communicated to MNR by Golder through responding to the EBR posting of the draft bat guidelines document, Golder used an approach to estimate the relative bat activity and potential for bat roosting within specific ecological communities that provides relative abundance estimates of the activity levels of bats and a species list (richness) at the community level. The methods employed by Golder have been developed to screen habitats in three stages, of which the first two are described in Table 13.

Table 13: Bat Maternity Season Relative Activity Screening Process

Stage	Activity	Measurement Indices	Result
Stage 1 – Desktop vegetation community classification	■ Desktop vegetation community classification to delineate treed communities within 120 m of turbines	■ Does the community have trees and/or known karst or potential roosting features?	■ Target communities for field investigation
Stage 2 – Daytime habitat assessment for the presence of possible roosting habitat	■ Traverse vegetation community closest to turbine, and walk transects through the community.	■ Tree species composition ■ Stand Structure ■ Biodiversity ■ Clutter ■ Abundance of cavities ■ Proximity to water ■ Presence of karstic features ■ Abundance of large trees ■ Abundance of standing snags ■ Abundance of deadfall ■ Abundance of wildlife trees ■ Abundance of bark trees ■ Details regarding each cavity identified ■ Comments on any potential foliage-roosting habitat	■ If several of these indicators are observed, the community is considered to be potentially favourable bat roosting habitat, and the community is classified as a "Candidate Bat Roost Community." ■ One or more evening Bat Use Surveys are conducted

Three natural features, 84d/84e, 120b and 138, as depicted on Figures 4-3a, b and c were carried forward as candidate significant bat maternity roost communities to the Evaluation of Significance.

At natural feature number 84e, some small limestone crevices were observed, but they were not large or deep enough to provide hibernacula. Therefore, there were no candidate significant bat hibernacula locations to carried forward to the Evaluation of Significance.

3.2.4.2 Significant Habitats of Species of Conservation Concern

During all Site Investigations, particular attention was paid to the presence of any of the species of conservation concern listed in the Records Review. In addition to these species, field biologists skilled in the identification of plants and animals also watched for any additional species of conservation concern and their habitats while conducting all field activities.

Fish of conservation concern identified in the Records Review within the Project Area include the greater redhorse. This species prefers fast flowing clear rivers, of which none were found within 120 m of the Project

Location. Further descriptions of the aquatic habitat impacted by the Project has been detailed in the Water Assessment Report.

Plants of conservation concern identified in the Records Review within the Project Area include Virginia mallow, narrow-leaved wild leek, Cary's sedge, weak stellate sedge, yellow corydalis, lowland brittle fern, prostrate tick-trefoil, green dragon, cooper's milk-vetch, hairy green sedge, sharp-fruited rush, sundial lupine, halberd-leaved tearthumb and broad beech fern. None of these species were identified within their respective habitats during the Site Investigations. Monarch Butterfly was often observed throughout the study area using a variety of habitats, some of which contained small pockets of milkweed. However, these monarchs were not seen in large numbers at any time and the habitat in which they were found did not appear optimal for their requirements. Therefore, these individuals were considered to be transient, and the habitat was not considered to be significant. These are further described in Section 3.2.4.1.10. The habitat of Monarch will not be carried forward to the Evaluation of Significance.

Herptiles habitats, including for the northern map turtle, milksnake and eastern ribbonsnake were watched for throughout the Site Investigations. Trained observers lifted logs and fallen debris where possible to search for snakes, and observed basking areas from a distance with binoculars to look for both snakes and turtles. None of these habitats for milksnake, eastern ribbonsnake or northern map turtle or the species themselves were observed during the Site Investigations, and therefore no natural features for these species will be carried forward to the Evaluation of Significance.

Mammals of conservation concern and their habitat were watched for during the Site Investigation. In particular, the habitat of woodland vole includes forests with deep leaf litter over a deep layer of peaty soils. No communities contained a deep layer of leaf litter, essential for the borrowing of woodland voles. Also, due to the fact that the type of habitat which this species would use will not be directly impacted, no specific mammal trapping studies were conducted. The habitat of this species will not be carried forward to the Evaluation of Significance.

Avian species of conservation concern identified through the NHIC query include black tern and cerulean warbler. Habitats for these species, or individuals were not identified during the physical Site Investigation. In addition to these species, during the avian area-based field surveys described further in Appendix B and Appendix C, other avian species of conservation concern were observed. This includes several species, although they were not attributed to a particular natural feature within 120 m of the Project Location and were not identified within critical habitat. These species and their habitats will not be carried forward to the Evaluation of Significance.

Chimneys of chimney crayfish were identified at the wetland adjacent to natural feature 147b, but not within 120m of the project location. This natural feature, depicted in Figure 4-4a will be not carried forward to the Evaluation of Significance.

3.2.4.3 Animal Movement Corridors

Based on SWHTG criteria and consultation with MNR (OMNR, 2011c) it was recommended by MNR that animal movement corridors are evaluated only after the evaluation of significance for other natural features, including other sub-types of SWH is completed. Therefore, all potential animal movement corridors that were observed

during site investigations and that are within 120 m of the Project Location were carried forward to the Evaluation of Significance (these where often main riparian expanses within the Project Area).

3.2.4.4 Rare Vegetation Communities and Specialized Wildlife Habitat

3.2.4.4.1 Rare Vegetation Communities

Although no rare vegetation communities were identified from the records review, the ELC classification conducted as part of the Site Investigation may reveal rare vegetation communities that were not known and could not be identified from the desktop habitat assessment. A list of the rare vegetation communities to be considered is provided in Appendix M of the SWHTG. Natural feature ID 84e is an FOD 7-4 Moist – Fresh Black Walnut Deciduous Forest Type, which is included in Appendix M of the SWHTG as a rare vegetation community. In addition to this natural feature, 63c and 96b are communities that may contain uncommon vegetation which may be unique to the planning area, although they were not considered rare in the SWHTG Appendix M. Natural feature 84e has been identified as a candidate significant wildlife habitat, is depicted on Figure 4-5a will be carried forward to the Evaluation of Significance.

3.2.4.4.2 Sites Supporting Area Sensitive Species

Area sensitive grassland birds may utilize natural grassland that is greater than 30 ha in size, of which none were located within 120 m of the Project Location. Five natural features consisting of mature large forest or swamp which provide greater than 10 ha of interior habitat have been identified as candidate sites supporting area sensitive species (Table 14). These are all large woodlands or woodland complexes with mature interior habitat and a low level of disturbance or fragmentation.

Within these features, area sensitive bird species were either implied to be present based on the results of the area-based avian surveys described in Appendix C or were observed within the features during site investigations or evaluation of significance surveys within these features. All five natural features which meet the criteria for sites supporting area sensitive species, depicted on Figures 4-6a,b,c and d, were carried forward to the Evaluation of Significance.

Table 14: Candidate sites supporting area sensitive species

Sites Supporting Area-Sensitive Species	
Location ID	Natural Feature Description
84d/e	>10 ha with 100 m buffer at edge, Black-throated Green Warbler observed. Part of complex with 84d. Adjacent to hay-dominated open upland and river. Community is candidate for other SWH types.
113	>10 ha with 100 m buffer at edge (road, residence at north portion of feature).
138	> 10 ha interior habitat with an edge buffer of at least 100m. Very large feature (> 40 ha). Adjacent to another very large woodland. Some disturbance from a few residencies within eastern portion of feature. Surrounded by annual row crop dominated field.

Sites Supporting Area-Sensitive Species	
147b	> 10 ha interior habitat with an edge buffer of at least 100m, Black-throated Green Warbler observed
126, 241, 242	>10 ha with 100 m buffer at edge. Low species and habitat diversity. Very large feature

3.2.4.4.3 Woodlands Supporting Amphibian Breeding Habitat

Observations of reptiles and amphibians were recorded during site investigations and any features that were deemed to provide candidate SWH for herpetofauna were documented. Trained observers noted any indication of vernal pooling or other temporary and/or permanent water features that would be conducive to amphibian breeding. Vernal pools must persist until at least mid-July to provide sufficient wetland habitat for all life stages of amphibian emergence. Where woodlands or woodland complexes contained vernal pool habitat which may be used by amphibians during the spring breeding period, these were noted and considered in the evaluation of SWH.

Although amphibians may use the small wetland pockets at Natural Feature 63x, these are not woodland breeding ponds. Therefore, neither these nor the cultural thicket, 63b adjacent to these were considered to be "Woodlands supporting amphibian breeding habitat."

Natural feature 96b contained water adjacent to a woodland which would meet this criterion. At this natural feature, the soil stays saturated for a good portion of amphibian breeding season as indicated by high water observed during surveys and information from landowner. There is plenty of emergent debris and vegetation and it is adjacent to a more upland forest which moist but not saturated. Gray treefrog was observed.

Natural feature 266 has evidence of ephemeral pools which may be permanent past mid July. Some evidence of low disturbance was observed (i.e., selective harvesting). It is probable that some woodland amphibian breeding habitat would be present here.

Natural feature 267 has evidence of ephemeral pools but no evidence of permanence into mid July. Leopard and Green Frog were observed

Natural Feature 135 has evidence of ephemeral pools and several puddles were observed, but these would not persist into mid-July. Some pockets of reed canary grass were found, but trees are marked for selective timber harvest and few structures for habitat such as cavities and downed woody debris suggests disturbance and low diversity.

Therefore, natural features 96b and 266, depicted on Figures 4-7a and b, were carried forward to the Evaluation of Significance. The remaining features were not advanced.

3.2.4.4.4 Old Growth or Mature Forest Stands

During stage one of the Site Investigation, preliminary classification of woodland habitats were conducted. From orthophoto interpretation, it could not be determined how old a woodland was. When the stage two, the physical Site Investigation was conducted, an approximate age of the stand was determined. For a woodland to be classified as Old Growth, the stand age must be greater than 140 years with limited to no disturbance. In

landscapes where these forests do not exist, a greater than 100 year old stand with limited to no disturbance would be considered old growth. Although there were a few individual trees of very large size in some communities, the stand age did not meet this criteria at any natural feature within 120 m of the Project Location. Therefore no natural features of this type will be carried forward to the Evaluation of Significance.

3.2.4.4.5 Osprey and Eagle Nesting Habitat

No natural features were identified in the Records Review to be carried forward to the Site Investigation. Eagles and osprey typically prefer to nest in undisturbed mature woodlands that are adjacent to large rivers and lakes. No natural features within 120 m of the Project Location met this criteria and no nest or indication of nesting adults were observed. Therefore, no natural features will be carried forward to the Evaluation of Significance.

3.2.4.4.6 Turtle Nesting Habitat

Observations of reptiles and amphibians were recorded during the Site Investigations and any features that were deemed to provide candidate SWH for herpetofauna were documented. Observers noted any indication of temporary and/or permanent water adjacent to sandy or gravely banks where turtles would lay nests. At aquatic features observers used binoculars when approaching the feature to watch for basking turtles. From stage 1 of the Site Investigation, there were no areas which may be characterized by shoreline beach or gravel habitat. Many of the Site Investigations were carried out during the turtle nesting season, and no indication of turtles nesting was observed. Therefore, no natural features of this type will be carried forward to the Evaluation of Significance.

3.2.4.4.7 Areas of High Diversity

No natural features which are areas of high diversity were carried forward from the Records Review. During the physical Site Investigation of all natural features, observers recorded community and stand characteristics, species composition and all incidental wildlife species. These provide a mix of habitat types in relatively undisturbed communities with various wildlife – supporting characteristics like snags, cavity trees, fallen debris, mix of soil conditions, high community and species diversity relative to other sites in the planning area, and are typically large sites with interior habitat.

Table 15: Candidate Areas of High Diversity

Areas of High Diversity Sites (including Forest)	
Location ID	Natural Feature Description
66, 72, 69	Part of complex that includes watercourse, floodplain, upland and lowland deciduous forest and cultural savanna.
84d/e	High relative abundance of cavities observed in large mature cavity trees, heterogeneous stand structure and composition

96b	Relative highly diverse amount of native species. Varying elevations and moisture regimes contributing a mix of species. And transitional micro communities
120b/120x	Mature wildlife trees, relative abundant standing snags, deadfall, bark trees, heterogeneous stand composition and structure.
138	Relative abundant mature (>40 cm dbh) wildlife trees, cavities, snags, deadfall, bark trees, heterogeneous stand composition and structure.
266 and 267	Vegetation and wildlife in relatively high biodiversity. Some disturbance (selective wood harvesting) observed. Relatively abundant cavities in mature trees, deadfall, standing snags and heterogeneous stand structure and composition

All six of these natural features, depicted on Figures 4-8a,b,c,d,e and f, will be carried forward to the Evaluation of Significance.

3.2.4.4.8 Seeps and Springs

Although no seeps and/or springs were identified during the Records Review, field biologists searched for indications of this type of feature and its associated habitat when conducting the Site Investigation at all natural features. During these Site Investigations, a seep was observed at natural feature 120b. The seep location itself is greater than 120 m from infrastructure (17T 590572N 4741659E), and is the only one present at this community. The SWHTG indicates that several seeps and/or springs must be present at a natural feature to be a candidate significant natural feature. Therefore, no natural features will be carried forward to the Evaluation of Significance.

3.3 Summary of Site Investigation

In summary, 68 candidate woodlands, 14 candidate valleylands and 13 candidate wetlands were identified and carried forward to the Evaluation of Significance. Sixteen wildlife habitat features (in some situations a few are combined) were carried forward in the following categories:

- landbird migratory stopover;
- reptile hibernacula;
- bat maternity roost habitat;
- habitat of species of conservation concern;
- rare vegetation communities;
- sites supporting area sensitive species;
- woodlands supporting amphibian breeding ponds; and
- areas of high diversity.

4.0 NATURAL FEATURE EVALUATION OF SIGNIFICANCE

The following section includes an evaluation of significance for the natural features identified during the Records Review and Site Investigation, advanced from Section 3 of this Report. The evaluation of significance was undertaken by Golder in accordance with O. Reg. 359/09 and in consideration of the evaluation criteria or procedures established or accepted by MNR in place at the time the Records Review and Site Investigations were undertaken.

Relative to the evaluation presented in the Natural Heritage Report Version 1 the evaluation process contained in this Report has been modified based on extensive consultation stemming from the provision of MNR review comments and subsequent meetings and communications with MNR referenced within this Report.

Consistent with Version 1, the evaluation of valleylands follows guidance outlined in the NHRM (OMNR, 2010a) The evaluation of significance for woodlands now utilized the amended definition of woodland contained in the 2011 Amendments to O. Reg. 359/09 and adopts the evaluation criteria and approach outlined in the NHAG (OMNR, 2010d). Evaluation of wetlands now follows the Wetland Characteristics and Ecological Functions Analysis (WCEFA) as described in the NHAG (OMNR, 2010d), supplemented with certain criteria from the OWES for Southern Ontario (OMNR, 1994). Evaluation of wildlife habitat follows the SWHTG (MNR, 2000a), supplemented with the Criteria Schedules for Ecoregion 7E (OMNR, 2009b) for a few specific wildlife habitat subtypes based on consultation with the MNR. Relative to the Natural Heritage Version 1, as a result of clarification from MNR (OMNR 2010g) the term candidate is longer used once the natural feature has been evaluated for significance since the provision of a confirmation letter by MNR would validate that the evaluation procedures have used applicable evaluation criteria or procedures established or accepted by MNR, as amended from time to time.

4.1 Approach to Evaluating Significance

Candidate Natural Features were carried forward from the site investigation into the evaluation of significance were evaluated as described in Section 27 of O. Reg. 359/09. The evaluation of significance of natural features along with a summary of the criteria used by Golder to evaluate each type of natural feature is provided within Sections 4.2 to 4.5, arranged by natural feature type.

In addition to site visits listed in Table 16, some of the Evaluation of Significance was carried out concurrently with the Site Investigations, for which the schedule is outlined in Table 9.

Table 16: Schedule of Field Surveys for Evaluation of Significance

Survey Type	Dates	Methods	Times	Duration	Weather	Field Personnel
Birds						
Summer breeding Season Surveys	June 13, 2008; July 2-3, 2008	■ AUS points 1-30 completed per event ■ 10 minute visual and acoustic identification of all birds.	June 13, 0530-1100 July 2 0430-1100 July 3 0430-1045	June 13, 5.5hrs July 2 6.5hrs July 3 6.25hrs	June 13 Temp 25ºC No precipitation July 2 Temp 19ºC No precipitation July 3 Temp 17ºC No precipitation	Ryan Zimmerling Fergus Nicoll Sarah Smith
Fall migration Surveys (hawk-specific and swan-specific)	September 2, 2008; September 16-17, 2008; October 11, 2008; October 12, 2008; November 2, 2008; and November 3, 2008	■ AUS points 1-30 completed per event ■ Nov 2-3, 2008 29 AUS points completed	Sept 2, 0500-1300 Sept 16, 0700-1130 Sept 17 0700-1130 Oct 11 0630-1630 Oct 12 0615-1615 Nov 2 0630-1715 Nov3 0630-1400	Sept 2, 8hrs Sept 16, 4.5hrs Sept 17 4.5hrs Oct 11 10hrs Oct 12 10hrs Nov 2 10.75hrs Nov3 7.5hrs	Sept 2 Temp 26ºC No precipitation Sept 16 Temp 15ºC No precipitation Sept 17 Temp 15ºC No precipitation Oct 11 Temp 10ºC No precipitation Oct 12 Temp 10ºC No precipitation Nov 2 Temp 7ºC No precipitation Nov 3 Temp 15ºC No precipitation	Ryan Zimmerling Fergus Nicoll Sarah Smith Derek Morningstar
Winter Use Surveys	January 14, 2009; January 31, 2009; and February 20, 2009	■ AUS points 1-29 completed per event	Jan 14 0730-1700 Jan 31 0800-1530 Feb 20 0715-1715	Jan 14 9.5hrs Jan 31 7.5hrs Feb 20 10hrs	Jan 14 Temp -15ºC No precipitation Jan 31 Temp -10ºC No precipitation Feb 20 Temp -5ºC No precipitation	Ryan Zimmerling Fergus Nicoll Sarah Smith

Spring migration	April 8, 2009; April 30, 2009; May 13, 2009; and May 14, 2009 May 29-30, 2009;	■ AUS points 1-30 completed per event ■ AUS points 1-42 completed May 13-14,29-30, 2009	Apr 8 0700-1600 April 30 ~0700-1600 May 13 0600-1530 May 14 0930-1545 May 29 0545-1700 May 30 0530-0830	Apr 8 11hrs April 30 ~11hrs May 13 9.5hrs May 14 8.25hrs May 29 10.75hrs May 30 3hrs	Apr 8 Temp 5ºC No precipitation Apr 30 Temp 13ºC No precipitation May 13 Temp 17ºC No precipitation May 14 Temp 20ºC No precipitation May 29 Temp 23ºC No precipitation May 30 Temp 8ºC No precipitation	Ryan Zimmerling Fergus Nicoll Sarah Smith
Bat SWH						
2010	June 15, 2010	■ 2 natural features	2115hrs-2215hrs	1 hour at each point	Temp 20 ºC No precipitation	Derek Morningstar Lasha Milne Rick Baldwin Jamie Weir
	June 25, 2010	■ 1 natural point	2114hrs-2216hrs	1hour	Temp 18.5ºC No precipitation	Derek Morningstar Lasha Milne
	June 28, 2010	■ 2 natural features	2118hrs-2218hrs	1 hour at each point	Temp 22ºC No precipitation	Lasha Milne Amber Sabourin Derek Morningstar Mark Katchouni
	June 29, 2010	■ 1 natural point	2112hrs-2219hrs	1 hour	Temp 15ºC No precipitation	Derek Morningstar Amber Sabourin

4.1.1 Significant Wetlands

The first assignment of significance for wetlands is from the provincial designation of a Provincially Significant Wetland (PSW). The evaluation of wetlands is a provincial responsibility and wetland evaluation records and the official designation and maps are the responsibility of MNR. No wetlands within 120 m of the Project were identified in the Records Review as PSW's using records provided to Golder by MNR. The MNR had previously evaluated the SAC 10 wetland and determined that it is not provincially significant, though it is part of a wetland complex. For the SAC10 wetland the official designation and wetland type identified by MNR (OMNR 2010g), is an "Other Wetland". The designation of a non-provincially significant wetland was identified on the wetland evaluation scoring card from the NHIC website.

Data collected during the Site Investigation and Records Review, in conjunction with interpretation of detailed orthophotography by OWES certified evaluators, was used to evaluate wetlands within 120 m of the Project (with the exception of the SAC 10 Wetland) in accordance with the Wetland Characteristics and Ecological Functions Assessment (WCEFA) protocol as described in the Natural Heritage Assessment Guide (OMNR, 2010d). This assessment is provided in Table 17, which summarizes the functions and attributes for each wetland. For the purposes of the NHA, all wetlands within 120 m of the Project Location that were advanced from the Site Investigation have been treated as significant, for a total of 7 wetlands carried forward to the EIS section.

The above wetlands were evaluated by certified OWES wetland evaluators using methods described above and in the WCEFA, as provided in the Natural Heritage Assessment Guide (MNR, 2010d), which requires that each of these be 'treated' as significant for NHA evaluation purposes though they may or may not be significant under a full OWES evaluation.

A minimum size criteria can be applied to wetlands in accordance with the OWES (OMNR, 2010d). For this criteria, a wetland that is less than 2ha and not in complex with other wetlands or exhibiting unique or rare characteristics or attributes would be considered "not significant." Five wetland features, 7x, 8, 9, 63x and 120x did not meet this size criteria. However, for completeness of data, they were included in Table 10. These wetlands will not be carried forward to the EIS.

Since the WCEFA was used, all communities which were deemed to meet the definition of wetlands (see Table 10) were carried forward to the EIS as significant consistent with the WCEFA protocol.

Table 17: Evaluation of wetlands based on Wetland Characteristics and Ecological Functions Assessment (WCEFA) protocol as described in Appendix B of the Natural Heritage Assessment Guide (MNR, 2010d)

Location ID	Wetland Size	Wetland Type	Site Type[1]	Vegetation Community[1]	Proximity to Other wetlands	Interspersion	Open Water Type	Flood Attenuation	Water Quality Improvement	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitat (also see SWH assessment)	Fish Habitat	Significance Level
7x	1.27 ha	Marsh	Palustrine	gc	Not in appropriate proximity for complexing with any adjacent wetlands	Moderate - somewhat complex shape	Type 1	Moderate - palustrine with inflow	High - palustrine with inflow; agricultural landscape; emergent vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay (dominant soil type in the landscape)	No rare species identified	No significant features and habitats identified	Fish habitat within stream	Not significant, does not meet minimum size criteria
8	1.91 ha	Swamp	Palustrine	h, ts, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - palustrine with inflow	High - palustrine with inflow; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not significant, does not meet minimum size criteria
9	1.67 ha	Swamp	Palustrine	h, ts, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Moderate - somewhat complex shape	Type 2	Moderate - palustrine with no inflow	Moderate - palustrine with no inflow; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not significant, does not meet minimum size criteria
38	10.3ha	Swamp	Riverine	h, ts, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Moderate - somewhat complex shape	Type 2	Moderate - riverine	High - riverine; agricultural landscape; woody vegetation; mineral soils	High - riverine; shores with trees and shrubs	Low - Riverine on clay	No rare species identified	No significant features and habitats identified	Fish habitat within stream	Assumed significant
42	7.127ha (part of complex)	Swamp	Palustrine	h, ts, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - palustrine with inflow	High - palustrine with inflow; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not Significant
63x	0.750 ha	Marsh	Palustrine	gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 2	Moderate - palustrine with no inflow	Moderate - palustrine with no inflow; agricultural landscape; emergent vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not significant, does not meet minimum size criteria

Location ID	Wetland Size	Wetland Type	Site Type[1]	Vegetation Community[1]	Proximity to Other wetlands	Interspersion	Open Water Type	Flood Attenuation	Water Quality Improvement	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitat (also see SWH assessment)	Fish Habitat	Significance Level
93a	2.083ha	Swamp	Palustrine	h, ts, ls, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - palustrine with no inflow	Moderate - palustrine with no inflow; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Assumed significant
96b	8.969ha	Swamp	Palustrine /Riverine	h, ts, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 2	Moderate - palustrine and riverine	High - riverine and palustrine; agricultural landscape; woody vegetation; mineral soils	High - riverine portion; shores with trees and shrubs	Moderate to Low - Palustrine / Riverine on clay	No rare species identified	No significant features and habitats identified	Minimal in small pools and stream	Assumed significant
120x	1.586 ha	Marsh	Palustrine	gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - palustrine with inflow	High - palustrine with inflow; agricultural landscape; emergent vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not significant, does not meet minimum size criteria
161b	8.371 ha	Marsh	Riverine	gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - riverine	High - riverine; agricultural landscape; emergent vegetation; mineral soils	Moderate - riverine shores with herbaceous vegetation	Low - Riverine on clay	No rare species identified	No significant features and habitats identified	Minimal in small pools and stream	Assumed significant
185c	27.099ha	Swamp	Riverine	h, ts, ls, gc	Not in appropriate proximity for complexing with any adjacent wetlands	High - narrow and complex shape	Type 2	Moderate - riverine	High - riverine; agricultural landscape; woody vegetation; mineral soils	High - riverine; shores with trees and shrubs	Low - Riverine on clay	No rare species identified	No significant features and habitats identified	High - several fish habitat types on stream	Assumed significant
266	6.174ha	Swamp	Palustrine / Isolated	h, ts, ls, gc	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	High - isolated / palustrine with no inflow	Moderate - palustrine with no inflow / isolated; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine / Isolated on clay	No rare species identified	No significant features and habitats identified	Low - no stream, but some small pooling	Assumed significant

Location ID	Wetland Size	Wetland Type	Site Type[1]	Vegetation Community[1]	Proximity to Other wetlands	Interspersion	Open Water Type	Flood Attenuation	Water Quality Improvement	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitat (also see SWH assessment)	Fish Habitat	Significance Level
312	7.127ha (part of complex)	Swamp	Palustrine	h, ts	Not in appropriate proximity for complexing with any adjacent wetlands	Low - simple shape	Type 1	Moderate - palustrine with no inflow	Moderate - palustrine with no inflow; agricultural landscape; woody vegetation; mineral soils	None - not riverine or lacustrine	Moderate - Palustrine on clay	No rare species identified	No significant features and habitats identified	No fish habitat identified	Not Significant
444	16.0ha	Swamp	Riverine	h	Other wetlands along Sandusk Creek within 850m, but these were not accessible during site investigations	Moderate, riverine with complex wetland shape	Type 2	Moderate – riverine with bottomlands	High - riverine; agricultural landscape; woody vegetation; mineral soils	High – riverine; variability in vegetation on banks	Low – riverine	No rare species identified	No significant features and/or habitats identified	Fish habitat within Sandusk Creek	Significant

1 – Definition of terms and acronyms are found in the OWES Manual

4.1.2 Significant Valleylands

The evaluation of significance of valleylands requires an understanding of the hydrological and geomorphic structure and functions of candidate valleylands. Geomorphic criteria define the macro-form or “wall” of the valley, indicating where the slope of the valley form begins to grade into the surrounding upland plains or tablelands. Where topography does not define the valley form well, criteria based on flood lines or the meander belt width of a river system may be used. For this Project the latter was recommended through consultation with MNR.

The primary criteria for the evaluation of valleylands identified in the NHRM (OMNR, 2010a) and utilized for the assessment of significance by Golder considered:

- landform-related functions and attributes (surface water functions, groundwater functions, landform prominence, distinctive geomorphic landforms);
- ecological features degree of naturalness, community and species diversity, unique communities and species, habitat value, linkage function); and,
- the potential for restored ecological functions (restoration potential and value).

For the evaluation of significance Golder used the MNR recommended significant valleylands evaluation criteria and standards available in Table 8-1 of the NHRM (OMNR, 2010a).The assessments relied on the results of the records review and site investigation for natural features as presented in the community classification and SWH datasheets provided in Appendix A of this report.

Of the 14 valleylands visited during the Site Investigation, 9 were classified as Significant Valleylands (Table 18) using evaluation criteria outlined in the NHRM (OMNR, 2010a). The classification was based on a relative ranking of Low, Moderate or High for each of ten criteria.

Table 18: Evaluation of Significance of Valleyland Features in or within 120 m of Project Location

	Landform-Related Functions and Attributes				Ecological Features					Restored Ecological Functions	
Location ID	Surface Water Functions	Groundwater Functions	Landform Prominence	Distinctive Geomorphic Landforms	Degree of Naturalness	Community and Species Diversity	Unique Communities and Species	Habitat Value	Linkage Function	Restoration Potential and Value	Significant (Y/N)
7a	M	L	L-M	M	L-M	L-M	L	M	M	M	Y
38v	L	L	L	L	L	L	L	L	L-M	M	N
55	L	L	L-M	L	L-M	L	L	L	M	M	N
70	M-H	M	M	M	L-M	M	L-M	M-H	M-H	M	Y
158	M	L	M	L	L-M	L-M	L	M	M	M	N
160a	L	L	L	L	L	L	L	L	M	M	N
161a	M	L	L-M	L	L-M	L-M	L	M	M	M	Y
184c	L-M	L	L-M	L	M	L-M	L	M	M	M	Y
185b	L	L-M	M	L	M	L-M	L	M	M-H	M	Y
216	M-H	M	H	M	M	M	M	M-H	M-H	M	Y
304	L-M	L	M	L	L-M	L-M	L	M	M	M	Y
296	M	L	M-H	L	L	L	L	L-M	M	M	Y
330	L-M	L	M	L	L-M	M	L	M	M	M	Y
347	M	L-M	M	L	L	L	L	L-M	L-M	M	N

L = Low, M = Moderate, H = High

4.1.3 Significant Woodlands

The Evaluation of Significance for all woodlands as defined in the O. Reg. 359/09, January 2011 Amendment is based on criteria in section 6.2.2.1 of the NHAG. Woodland cover in Haldimand County has been reported as 14% (CCC, 2009), and therefore, 5-15% woodland cover was used to determine the threshold woodland area for consideration of significance as described in Table 7 of the NHAG (OMNR, 2010d). The Evaluation was stepwise, where the first woodland criterion examined was area, progressing through each subsequent criteria in the order identified in Table 19. Based on the SWHTG (MNR, 2000a), once a woodland feature has met one criteria, it is considered significant. Most of the criteria evaluated could be readily assessed through the interpretation of orthophotos and GIS queries. The remaining criteria were assessed using information obtained during the Site Investigations including the ELC classification and Woodland and SWH assessments, as recorded on the datasheets found in Appendix A.

In total, 63 of the 71 woodlands have been classified as significant. Of the 63 woodland features, 49 were significant woodlands based on size criteria alone. Figures 3a through 3g depict the significant woodlands within 120 m of the Project Location.

Table 19: Evaluation of Significance of Woodland features within 120 m of Project Location

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
	> 4 ha	Any interior habitat	30m from a significant natural feature or fish habitat AND >1ha	Between 2 woodlands <120 m AND >1ha	within 50m of sensitive groundwater discharge, recharge, headwater, watercourse or fish habitat AND >0.5ha	Area dominated by [*see spp. List*] AND >1ha	S1-S3 species, >10 stems of rare, uncommon or restricted woodland plant species, ETC AND >1ha	Yes (Y) or No (N)
7b	N	N	Y - fish habitat	N	Y - fish habitat	Y - Bur Oak	N	Y
7c	N	N	N	N	Y-fish habitat, Sandusk Creek	N	N	Y
8	N	N	N	N	N	N	N	N
9	N	N	N	N	N	N	N	N
26a	N	N	N	N	N	Y - Shagbark Hickory	N	Y
31	N	N	N	N	N	Y - Bur Oak	N	Y
37	Y	Y	N	N	N	Y-Bur Oak	N	Y
38	Y	Y	Y- fish habitat	N	Y-fish habitat	Y-Bur Oak	N	Y
42	Y	Y	N	N	N	Y - White Pine	N	Y
44	N	N	N	N	N	N	N	N
47	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
51	N	N	N	N	N	N	N	N

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
63b	Y	N	N	N	N	N	N	Y
63c	Y	Y	N	N	N	Y-Sugar Maple	Y-old, mature and rare species composition (mature hemlock)	Y
66	Y	Y	Y-supports SWH	N	Y-Sandusk Creek Floodplain	Y-American Beech	N	Y
69	Y	Y	Y – 66 and 72	Y – 66 and 72	Y – Sandusk Creek Floodplain	N	N	Y
72	N	N	Y - fish habitat	Y-between 66 and 69	Y-Sandusk Creek Floodplain	Y-Shagbark Hickory	N	Y
84d	Y	Y	Y-supports SWH	N	Y-Stoney Creek	Y-Red Oak, Sugar Maple, Shagbark Hickory	Y-old, mature growth	Y
84e	Y	Y	Y-supports SWH	Y-42 and woodland to east	Y-Stoney Creek	Y-Black Walnut	Y-old, mature growth, S2S3 community	Y
85	N	N	N	N	N	Y - Shagbark Hickory	N	Y
92b	Y	Y	N	N	N	Y-Sugar Maple	N	Y

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
93a	N	Y	N	Y-between 93a and woodland to east	N	Y-Red Maple	N	Y
93b	Y	Y	N	Y-between 93a and woodland to east	N	Y-American Beech	N	Y
95	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
96b	Y	Y	Y-supports SWH	N	N	Y-Bur Oak	Y-diversity of species not frequent to area	Y
97c	Y	Y	N	N	N	Y-Sugar Maple	N	Y
103c	Y	Y	N	Y-292 and riparian woodland to west	N	Y-Shagbark Hickory	N	Y
104b	Y	Y	N	Y-292 and riparian woodland to west	N	Y-Shagbark Hickory	N	Y
105a	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
105b	Y	N	N	N	N	Y-Shagbark Hickory	N	Y
106	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
107	Y	Y	N	Y-106 and 108	N	Y-Shagbark Hickory	N	Y

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
108	Y	Y	N	N	N	Y-Shagbark Hickory	Y - Mature Trees	Y
111	N	N	N	Y-342 and woodland to east	N	N	N	Y
113	Y	Y	Y-supports SWH	N	Y-Gates Creek drainage	Y-Sugar Maple	N	Y
114	N	N	Y - 113, supports SWH	N	N	Y-Sugar Maple	N	Y
116b	Y	Y	N	N	Y-Gates Creek Headwaters	Y-Sugar Maple	N	Y
117	Y	Y	N	N	N	Y-Sugar Maple	N	Y
118a	Y	Y	N	N	N	Y-American Beech	N	Y
118b	Y	Y	N	N	N	Y-Sugar Maple	N	Y
120b	Y	Y	N	N	Y-seeps observed, Lake Erie drainage	Y-Shagbark Hickory	Y - Mature Trees	Y
126	Y	Y	Y-242, supports SWH	Y-242 and woodland to northwest	Y-seeps	Y-Shagbark Hickory	N	Y
127a	N	N	N	N	N	N	N	N
130	Y	Y	N	N	Y-Lake Erie drainage	N	N	Y

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
133	N	N	N	N	N	Y-Black Walnut	N	N
135	Y	Y	Y-, 138,	Y-133 and 138	Y-Lake Erie drainage	N	N	Y
138	Y	Y	Y-, supports SWH	Y-135 and woodland to east	Y-Lake Erie drainage	Y-Sugar Maple	N	Y
147b	Y	Y	Y-supports SWH	N	Y-Gates Creek drainage	Y-Sugar Maple	N	Y
154	N	N	N	N	N	N	N	N
162a	Y	Y	Y-fish habitat	N	Y-fish habitat, Sandusk Creek	Y-Bur Oak	N	Y
175b	Y	Y	N	N	Y-Sandusk creek drainage	Y-Shagbark Hickory	N	Y
177c	N	N	N	N	N	Y-Sugar Maple	N	Y
185c	Y	N	Y-fish habitat	Y	Y-Stoney Creek	N	N	Y
198a	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
199	N	N	N	N	N	N	N	N
202d	Y	Y	N	Y	N	Y-Shagbark Hickory	N	Y

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
220	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
241	Y	Y	Y-242, supports SWH	Y-242 and woodland to northwest	Y-seeps	Y-Shagbark Hickory	N	Y
242	Y	Y	Y-242, supports SWH	Y-242 and woodland to northwest	Y-seeps	Y-Shagbark Hickory	N	Y
254	Y	N	N	N	N	Y-Bur Oak, Shagbark Hickory	N	Y
266	Y	Y	Y-supports SWH	N	N	Y-Red Maple	N	Y
267	Y	N	Y-Supports SWH	N	N	Y-Shagbark Hickory	N	Y
268	Y	Y	N	N	N	Y-Shagbark Hickory	N	Y
288	N	Y	N	N	Y-Hemlock Creek drainage	N	N	Y
290	Y	N	N	N	Y-Stoney Creek drainage	N	N	Y
312	Y	N	N	N	Y - fish habitat	N	N	Y
342	Y	N	N	Y	N	N	N	Y
353	N	N	N	Y	N	Y-Shagbark Hickory	N	Y
354	N	N	N	N	N	Y-Shagbark Hickory	N	Y

Location ID	1. Woodland Size Criterion	2.a) Woodland Interior	2.b) Proximity to other Significant woodlands or habitats	2.c) Linkages	2.d) Water protection	2.e) Woodland Diversity representation (composition)	3. Uncommon Characteristics	Significant Woodland
444	Y	Y	Y	Y	Y-Sandusk Creek Floodplain	Y – Shagbark Hickory	N	Y
445	N	N	Y	Y	Y-Sandusk Creek Floodplain	Y – Shagbark Hickory	N	Y

4.1.4 Significant Wildlife Habitat

Consistent with the SWHTG (MNR, 2000) the Evaluation of Significance for wildlife habitat was divided into four categories, namely:

1) wildlife seasonal concentration areas;

2) rare vegetation communities and specialized habitats;

3) habitats of species of conservation concern; and

4) animal movement corridors.

These four SWH categories were then further divided into 30 SWH sub-categories in a manner consistent with that presented in Appendix Q of the SWHTG (MNR, 2000a). For bat maternity roost and hibernacula SWH and for woodland raptor nesting SWH, these subcategories were supplemented with two additional sub-categories from the MNR Draft Criteria Schedules for Ecoregion 7E (OMNR, 2009). The use of the two categories from the Draft Criteria Schedules were considered to be pertinent to the habitat within specific ELC communities. Since the Draft Criteria Schedules were used for bat hibernacula, the sub-category previously intended for snake and bat hibernacula has been adapted to include only snake hibernacula. The criteria for each SWH sub-category and the rationale that was used by Golder to determine whether each natural feature was significant is described in the associated text description.

4.1.4.1 Seasonal Concentration Habitats

4.1.4.1.1 Landbird Migratory Stopover Areas

Four candidate Landbird Migratory Stopover Habitat, 113, 138, 147b and 126/241/242 areas were identified as landbird migratory stopover areas and carried forward from the Site Investigation. Though area based surveys for avians were conducted, no species-specific landbird data was collected directly in these features to evaluate the significance of these natural features. Based on consultation with the MNR, all four natural features will be treated as significant, and carried forward to the EIS.

4.1.4.1.2 Reptile Hibernacula

One candidate significant reptile hibernacula, within natural feature 84e was carried forward to the Evaluation of Significance. During a visit to this site on June 16, 2010, biologists inspected this small exposed limestone crack. It appeared to be less than 1m in depth, was the only feature of its type in the general area. No snakes were observed on that date under any debris that was on the ground in the area (of which there was very little), or basking. The Ontario Herpetofaunal Atlas (Oldham, 2000) indicates that several snake species may be found in the general area, including, Brown Snake (*Storeria dekayi),* Grey Rat Snake (*Elaphe obsoleta obsolete),* Eastern Fox Snake (*Elaphe gloydi),* Eastern Garter Snake (*Thamnophis sirtalis sirtalis),* Eastern Milk Snake (*Lampropeltis triangulum),* Northern Redbelly Snake (*Storeria occipitomaculata occipitomaculata),* Northern Ribbon Snake (*Thamnophis sauritus septentrionalis)* and, Northern Water Snake (*Nerodia sipedon sipedon),* This natural feature, 84E, was considered significant and carried forward to the EIS.

4.1.4.1.3 Bat Maternity Roosting Habitat

Three natural features (four communities), 84e/84d, 120b and 138 were carried forward from the Site Investigation. These natural features underwent a Bat Use Survey, including evening acoustic and visual observations to determine the relative abundance of bats using the area, which may be an indicator of the maternity roost usage of the natural feature.

Stage

- Stage 3 – Bat Use Survey at sunset during June

Activity

- 1hr effort during dusk walking outer edge of community to observe bats emerging from vegetation community
- Visual bat counts and classification of relative abundance of bats
- Acoustic recordings of echolocation for species presence or absence

Measurement Indices

- Range classification of bat activity
- Details about movement patterns of bats and any source or destination location during that night
- Details about whether bats appear to be commuting, feeding or drinking during that night
- Estimates of the height bats are flying above ground (when possible)

Result

- Relative abundance of bat use measure based on visual counts
- Relative abundance of bat use measure based on number of echolocation calls on a bat detector
- Richness measure of bats based on presence / absence and counts along the edge of the vegetation community

During the Bat Use Survey, the observer measured the relative abundance of bats within a 1 hour interval, classified into four codes:

Code 0: No bats observed;

Code 1: Few individuals observed, can be counted accurately;

Code 2: Some individuals observed, but overlapping makes counting difficult, estimated number of bats; and

Code 3: Swarming. Several bats would make counting difficult.

This measure is done twice; first, based on viewing the bats with the naked eye, and second by listening to the reproduced echolocation sounds through the bat detector aimed up towards the bats. Concurrent to this survey, the bat detector carried with the surveyors recorded echolocation calls produced by the bats for later species classification. The resultant acoustic data is not used for a classification of relative abundance because it does not distinguish between individuals passing repeatedly and several individuals passing singly.

Within the communities surveyed, three were within 120 m of turbines and were classified during the daytime community classification to be "candidate maternity roost communities." These communities are identified as Location ID 84d/e, 120b and 138 (Figure 4-3a, 4-3b and 4-3c, end of the Report). Each were woodlands that contained several tree cavities and had features as described in Table 13 which were conducive to bat use during the maternity roosting season. These communities underwent a Bat Use Survey to quantify the relative bat activity and species composition.

Table 20: Bat Use Survey Results

Location ID	Nearest Turbine	Community Ecosite	Survey Date	Visual Relative Abundance Code	Acoustic Relative Abundance Code	Species Identified Acoustically
84d/e	62	FOD 9 / FOD 7-4	25-Jun-10	3	3	big brown\silver-haired, myotis, red bat, hoary bat
84d/e	62	FOD 9 / FOD 7-4	28-Jun-10	2	2	big brown\silver-haired, myotis, red bat, hoary bat
120b	50	FOD 9-4	15-Jun-10	2	2	big brown\silver-haired, myotis, red bat, hoary bat
120b	50	FOD 9-4	28-Jun-10	1	1	detector error
138	53	FOD 5-3	15-Jun-10	2	2	detector error
138	53	FOD 5-3	28-Jun-10	2	2	big brown\silver-haired, myotis, red bat, hoary bat

Given the potential that a large number of entrance and exit crevices in woodlands could exist, all three natural features identified in the Site Investigation Section based on suspected or potential roosts have been carried forward as Significant Wildlife Habitat for maternity roosting bats.

4.1.4.2 Significant Habitats of Species of Conservation Concern

The chimneys of chimney crayfish were identified at a wetland adjacent to natural feature 147b. The presence of one or more chimneys indicates that this habitat is considered significant. However, because this habitat is not within 120m of any proposed infrastructure, it was not carried forward to the EIS.

4.1.4.3 Animal Movement Corridors

The majority of candidate wildlife corridors/linkages across the landscape are associated with linear drainage features. The grid of roadways and farm tracks that is the infrastructure of the rural agricultural landscape has fragmented the system of wooded stream valley corridors which were likely common before European settlement. In the absence of roadside barriers or broad expanses of pavement or the presence of large grassland units, wildlife movement ground corridors are likely to occur primarily along undeveloped lakefront areas, well vegetated valley corridors and between closely connected woodland, wetland and valleyland units that are not interrupted by large development or major linear development corridors.

The Lake Erie Shoreline constitutes a major aerial migratory corridor for certain bird species during their annual migration periods. A large diversity of migrating birds and waterfowl species are known to make use of habitats along the shoreline of Lake Erie, though the use of these corridors is higher within established migratory flyways. The presence or potential for a feature to provide a linkage or animal movement corridor function was considered in conjunction with the evaluation of significance of wildlife habitat, valleylands and woodlands. The Project is set back from Lake Erie so that the shoreline corridor is not impacted.

Appendix Q-4 of the SWHTG describes animal movement corridors. These corridors are significant at a broad regional scale, and are described as very large, wide (>200m) and continuous with few breaks (including fields, water bodies, residential) in the vegetation that are greater than 20 m. The vegetation must also consist of several layers and habitat types and the ground cover must provide various habitat structures like down woody debris, stumps, rock piles, etc. Within the Project Area aside from Lake Erie, the Sandusk Creek, Stoney Creek and Hemlock Creek are the most likely animal movement corridors. At road right-of-ways where valleylands of these creeks are intersected, cable lines that are proposed will not constitute either a temporary or permanent obstruction to the ground or aerial movement of animals.

Therefore, no animal movement corridor natural features within 120 m of the Project Location will be carried forward to the EIS.

4.1.4.4 Rare Vegetation Communities and Specialized Wildlife Habitat

4.1.4.4.1 Rare Vegetation Communities

One natural feature, 84e was carried forward from the Site Investigation. Since this community has been identified by the NHIC as an S2S3 black walnut riparian community and defined as significant, no further methods were required to determine significance. This natural feature will be carried forward to the EIS.

4.1.4.4.2 Sites Supporting Area Sensitive Species

Five natural features were carried forward from the Site Investigations, 84d/e, 113, 138, 147b, 126/241/242. Avian area sensitive species are typically used as an indicator of interior habitat quality. These species require undisturbed habitat during the breeding season. These habitats include grasslands and forests, but no large (>30 ha) natural grasslands were identified within 120 m of the Project Location.

Based on consultation with the MNR, these natural features will be treated as significant and carried forward to the EIS.

Site 84d/e is within the Atlas of the Breeding Birds of Ontario (ABBO) square 17NH84, within which the species listed in Table 21 were identified, although they were not necessarily confirmed present within the natural feature by Golder

4.1.4.4.3 Woodlands Supporting Amphibian Breeding

Natural features, 96b and 266 were carried forward to the Evaluation of Significance. During the site investigation on June 10, 2010 and August 31, 2010, respectively, observers lifted debris (logs, boards, etc unless a damage to habitat was conceivable from this disturbance) to search for any amphibian species present. None were found at 96b. Green frog and leopard frog were observed within 266. Following a conservative approach, both of these natural features were considered significant and carried forward to the EIS.

4.1.4.4.4 Areas of High Diversity

Six candidate areas of high diversity, 66/69/72, 84d/e, 96b, 120b/120x, 138 and 266/267 have been carried forward to the Evaluation of Significance (Table 24). Concurrent to the Site Investigation, these communities were evaluated for significance using the SWHTG.

Table 21: Evaluation of Significance of Areas of High Diversity

Natural Feature ID	Stand Age, Structure	Microhabitats (i.e., cavities) and stratification	Natural Community Diversity	Species Diversity	Presence of Rare Species	Relative Size of Site	Significant (Y/N)
66 / 69 / 72	Semi-mature – Forest somewhat mature, but other communities are young	Low – few cavities, one possible snake hibernacula	High - several community types of upland and wetland, part of Sandusk Creek Floodplain Woods	Moderate – a few different species found within each of the different communities	None observed	Medium compared to other area communities	No
84 d/e	Mature – 84e is diverse and 84d is mature second growth walnut	High – several cavities, one possible snake hibernacula, sloped topography	High – 84d has diversity of habitat, 84e is one type, but surrounded by other community types	Moderate – low diversity in 84e, but high in 84d	None observed, 84e is a rare community	Large relative to other area communities	Yes
96b	Semi-mature – mature	High – upland and wetland communities,	Moderate – aquatic, wetland and	Moderate number of species	None observed	Medium size, but connected	No

Natural Feature ID	Stand Age, Structure	Microhabitats (i.e., cavities) and stratification	Natural Community Diversity	Species Diversity	Presence of Rare Species	Relative Size of Site	Significant (Y/N)
	swamp, but no really old trees	several snags and some cavities	upland communities	observed relative to other habitats		to a larger community	
120b/120x	Semi-mature – some areas of mature deciduous forest and others primarily pioneer species	Moderate – some cavities, one seep and small wetland	Moderate – mostly upland, with small wetland	Moderate –low species composition in both upland and wetland	None observed	Small relative to other area sites	No
138	Semi - Mature - some trees >40cm dbh	Moderate – several cavities, snags, deadfall and bark trees	Moderate – mostly upland habitat	Moderate – low species composition	None observed	Medium size relative to other local communities	No
266/267	Mature – both communities contain large trees	Moderate – several cavities, snags, soil types	Moderate – some open areas of both wetland and upland	Moderate - Few species found in 266, but many in 267	One Monarch observed	Medium size, connected to larger woodlands	Yes

Based on the evaluation of significance, natural features 84 d/e and 266/267 have been classified as significant and will be carried forward to the EIS.

4.2 Summary of Evaluation of Significance

Of the 94 natural features evaluated, 55 woodlands, 12 wetlands and 8 valleylands were considered significant natural features and were carried forward to the EIS level. Twelve natural features (in some situations a few communities are combined into larger SWH polygons, including some which are duplicated between SWH types) were carried forward as significant wildlife habitats for the following sub-categories of: landbird migratory stopover, reptile hibernacula, bat maternity roost habitat, rare vegetation communities, sites supporting area sensitive species, woodlands supporting amphibian breeding ponds and areas of high diversity.

5.0 ENVIRONMENTAL IMPACT STUDY OF SIGNIFICANT NATURAL FEATURES

Section 38 (1) of O. Reg. 359/09, 2011 Amendment requires that no person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in listed significant areas as determined through an evaluation of significance. The applicable areas listed in Section 38 (1) and advanced from the evaluation of significance include:

- A provincially significant southern wetland or within 120 metres of a provincially significant southern wetland;
- A significant valleyland or within 120 metres of a significant valleyland;
- A significant woodland or within 120 metres of a significant woodland; and
- A significant wildlife habitat or within 120 metres of a significant wildlife habitat.

Section 38 (2) of O. Reg. 269/09 indicates however that Subsection (1) does not apply if, as part of the application for the issue of a renewable energy approval in respect of the renewable energy project, the applicant submits:

a) an environmental impact study report prepared in accordance with any procedures established by the Ministry of Natural Resources, as amended from time to time, that,

   identifies and assesses any negative environmental effects of the project on (the applicable categories), which for this project are limited to significant wetlands, significant valleylands and significant wildlife habitat only;
   identifies mitigation measures in respect of any negative environmental effects (referred to in bullet (i) above),
   describes how the environmental effects monitoring plan addresses any negative environmental effects (referred to in bullet (i) above),
   describes how the construction plan report prepared in accordance with Table 1 of O. Reg. 359/09 addresses any negative environmental effects (referred to in bullet (i) above).

b) written confirmation from the Ministry of Natural Resources that the report mentioned in clause (a) has been prepared in accordance with any procedures established by that Ministry, as amended from time to time; and;

c) any written comments provided by the Ministry of Natural Resources to the applicant in respect of the project.

The EIS contained in Section 5 and in Table 25 summarizes the above noted information In accordance with O. Reg. 359/09. Features depicting the natural features for which an EIS were conducted are provided in Figures 3a through 3g (Significant Woodlands, Significant Wetlands, Significant Valleylands are shown on these figures) and Figures 4-1a through 4-8f (Significant Wildlife Habitats).

A summary of the construction, operations and decommissioning activities that will be undertaken as part of the Project, and which are relevant to the EIS, is provided in Section 5.1. Additional information regarding the specific activities and more generalized mitigation measures is provided in the Construction Plan Report, the

Design and Operations Report and the Decommissioning Plan Report. Mitigation measures to reduce negative environmental effects to significant natural features and preliminary environmental effects monitoring plans are provided in the NHA, Section 5. Consistent with prior discussions with MNR, the Environmental Effects Monitoring Plan (EEMP) for post construction bird and bat follow up monitoring is provided in a separate document and will be reviewed concurrent with the MOE review of the REA submission.

Several aspects of the EEMP are contained within the Project Description Report, Construction Plan Report, Design and Operations Report and the Water Assessment Report. Performance objectives to monitor the effectiveness of the mitigation, with contingency measures and associated protocols, have been provided in other REA Report documents consistent with MOE reporting guidelines.

In addition to the general figures for infrastructure, a set of detailed drawings have been prepared in all locations where directional drilling is necessary around significant natural features or where there is little space available between the significant natural feature and any adjacent obstructions. These are provided in Appendix D.

5.1 Overview of Potential Effects by Project Phase

In conjunction with the Natural Heritage Assessment Report, a Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report have also been submitted to the MOE, as per O. Reg. 359/09 requirements. These Reports describe, in greater detail, the specific activities that will be undertaken during the lifespan of the Project. The Construction Plan Report also provides a description of negative environmental effects, mitigation measures and environmental effects monitoring plans. Therefore it is recommended that the above noted Reports are read in conjunction with the Natural Heritage Assessment Report. The following summarizes, in more general terms, the activities to occur in each phase.

5.1.1 Construction and Decommissioning

The construction phase of the development consists of site preparation, followed by component installation and connection, and post-installation activities. Site preparation includes surveying and marking the locations of the Project Location including both the location of the components and approved extent of the disturbance area. There will be a centralized workspace area for field offices, as well as temporary storage/laydown areas around each turbine, around the substation and the POI/switchyard. Trailers will be brought on-site by the selected construction contractor to a centralized temporary storage/laydown area (see Figures 2-5) which will remain in place for the duration of construction. Designated fuelling areas which meet safety and regulatory requirements may be established.

Field offices will obtain power from Haldimand Hydro, and portable generators will only be used in the event of a power outage. A combination of snow fencing, marker ribbon, and signage will be used to identify natural areas and other exclusion areas that are not to be entered by workers and equipment. As surveys defining the above noted areas are completed, land clearing will commence. This will entail the removal and stockpiling of soils, transport of aggregate to the site and construction of gravel access roads. Most of the Project infrastructure is located in agricultural fields and as a result, no native tree or vegetation clearing will occur in any Significant Wetlands or Woodlands, though some limited tree removal and vegetation clearing or pruning will be required in certain Significant Valleylands and in portions of agricultural hedgerows not wider than the combined access and

cabling route width. Wetlands, woodland and wildlife habitat that was contained within the Significant Valleyland was treated separately within this assessment, and therefore any disturbance to vegetation within the valleylands would not cause an impact within those types of natural features unless otherwise noted in this report. The width of vegetation removal or pruning and exact location will be surveyed in the field prior to construction and vegetation removal will avoid species of conservation concern, should any be identified that were not previously observed during field investigations to date. In areas where a disturbance has been planned adjacent to a significant natural feature, work exclusion zones will be established during construction to ensure that the disturbance remains out of the natural feature. As the roads are constructed, appropriately sized culverts will be installed at watercourse crossings (see Water Report) and in other low lying areas (that are not waterbodies by REA definition) in order to convey surface drainage. Clear span bridges, culverts or an alternative watercourse crossing approved by LPRCA, DFO and Transport Canada, as applicable will be installed at locations determined to contain direct or indirect fish habitat. Other permit applications to LPRCA, DFO and Transport Canada will be submitted and reviewed by these agencies concurrent with the MNR review of the APRD Reports (in progress). Alterations to the topography within Significant Valleylands , where these areas overlap with the Regulation Limit and are associated with natural hazards ,will also require consideration by the LPRCA, and will further limit alterations to ground vegetation within these areas by limiting any potential grade changes and requiring vegetation planting or reseeding were temporary disturbance occurs..

Construction of underground and overhead collector systems will occur concurrent with or after road construction. The collector system will be a mixture of overhead cables or transmission line on monopoles and underground cabling in trenches or directional drilling that connect individual turbines to each other or junction boxes, and then connect to the transforming substation and transmission line. Overhead cables and transmission lines have been located in municipal rights-of-way, where feasible, and will require installation of wood, steel or concrete monopoles to a depth of 2 – 5 m. Underground cables will be installed using a combination of ploughing and trenching to a depth of approximately 1.1 – 1.2 m with the width of each individual plough seem being approximately 1 m. Where the underground cable must be spliced, a splice pit will be excavated that is approximately 1.5 m deep, 1 m wide, and 1 – 2 m long. Trenches and splice pits will be backfilled immediately. Where underground cable is directionally drilled or a punch and bore method is used, to pass under natural features or physical obstructions (i.e. other cables and/or roads) it will go beneath the root systems of vegetation, and beneath aquatic systems so as not to interfere with the function and/or life process of these features. Appendix D provides typical drawings of a standard directional drilling crossing and of a punch and bore crossing beneath or adjacent to a feature, as well as several detailed plan view drawings for situations where the Project Location is in close proximity to significant and certain other natural features. The detailed drawings in Appendix D include:

- Drawing 4100 Index sheet;
- Drawing 4101 –NF#7a, 7b, 7c, 7x 4102 -NF#184c, 185c;
- Drawing 4102 -NF#184c, 185c ;
- Drawing 4103 –NF# 185b, 185c;
- Drawing 4104 –NF#161A, 161B;
- Drawing 4105 –NF#330;

- Drawing 4106 –NF#162a, 70;
- Drawing 4107 –NF#304, 444;
- Drawing 4108 –NF#44;
- Drawing 4109 –NF#290;
- Drawing 4110 –NF#127A;
- Drawing 4111 –NF#347;
- Drawing 4113 –NF#198A;
- Drawing 4114 –NF#199;
- Drawing 4115 –NF#241, 242; and
- Drawing 4116 –NF#216.

To mitigate potential effects to natural features, efforts have been made to design the entry and exit points and work areas for the drilling operations such that they are kept outside of the natural feature and that a minimum 10m no work zone and buffer area between the entry/ exit point and the natural feature boundary is maintained. Where underground or overhead cable will cross watercourses or Valleylands the appropriate DFO Operational Statements will be followed (see mitigation section). Should strict adherence to a DFO Operational Statement not be possible, a Letter of Advice or Authorization will be obtained through consultation with DFO and LPRCA. The specific crossing techniques at each watercourse crossing that contains direct or indirect fish habitat is presently being discussed with LPRCA and will be provided in permit applications to LPRCA, DFO and Transport Canada as applicable which will be reviewed concurrent with the MNR review of the APRD Reports (in progress). At the direction of MNR, water and fisheries related information has been removed from the NHA Report.

At the turbine sites, soil stockpiles from stripping and the foundation excavation will be created, separated into subsoil, topsoil and other major horizons, and retained at each turbine site within the prescribed work area. The access road turnaround and crane pads will then be constructed. If excavations extend below the groundwater table, dewatering will occur and water will be pumped out to an acceptable receiving area. At present it is predicted that where water may exist in the foundation excavation the daily volume pumped will not exceed 50,000 L per day based on a records review and assessment of local well depths, geology and ground water levels (see Construction Plan Report Section 3.5).

Once formwork and rebar are installed, concrete pumps or elevators will be used to place the concrete. Formwork will be struck once the concrete is of sufficient strength and the excavated area will be back-filled and compacted until only the tower base portion of the foundation is left above ground. Once the foundation is in place, the turbines will be erected, as described in the Construction Plan Report.

As the construction of roads and turbines progresses, the construction of a transforming substation, a switchyard area, operations building and permanent met towers will be initiated. The construction of the substation primarily entails land clearing to establish the work area, stockpiling, and the development of a granular aggregate foundation to receive the components. The Operations building also requires soil removal and stockpiling,

followed by construction of a parking area and foundation base, with subsequent pouring of a concrete foundation on which the building will be constructed. The Operations building will contain staff offices, washrooms, a kitchen and a larger attached maintenance area.

The activities listed above will result in a temporary disturbance from construction machinery, which depending on proximity can create sensory disturbance to biota inhabiting natural features. Road beds, turbine foundation construction, operations building construction and meteorological tower foundation pouring will require the removal of crops and other vegetation that will result in disturbance areas that will persist permanently (in the case of roads which the landowner wants to retain) or until decommissioning.

As construction of the Project components is completed, all construction material and remnant equipment will be cleaned up and land and vegetation reclamation will be initiated Reclamation activities are the primary mitigation measure to restore disturbed areas and this is described in greater detail in Section 5.3 and in Section 2.3 of the Construction Plan Report.

5.1.1.1 Noise Effects

Turbine and access road construction have the potential to alter ambient noise levels due to the operation of heavy equipment. The sensory disturbance to wildlife as a result of heavy machinery and construction activities within the Project Location will be similar to the disturbance from the agricultural machinery that regularly operates in the Study Area. The majority of the wildlife species observed in the Study Area are adapted to anthropogenically-disturbed environments. To minimize the potential increase in noise levels, these activities will be limited to daytime periods in accordance with local noise bylaws. All construction equipment will be kept in good repair and will not exceed the noise emissions specified in Ministry of the Environment (MOE) Publication NPC-115 (MOE 1978).

Moreover, potential sensory disturbance is expected to be mitigated by restricting activities that remove or alter vegetation during the breeding season (April until August) for most wildlife species (May 1st to July 31st breeding bird season). As required under the *Migratory Bird Convention Act* (1994) or *Fish and Wildlife Conservation Act* (1997), should any construction activities be required during the breeding season, avian nest surveys will be undertaken to identify the presence of nests and appropriate species-specific setbacks will be created in consultation with Environment Canada (EC)/CWS and MNR; and exclusion zones flagged from the work area(s). With the implementation of these mitigation measures, no significant residual effects associated with sensory disturbance to wildlife are anticipated though this is discussed further for individual types of SWH and for individual features where relevant.

5.1.1.2 Surface Drainage Effects

Activities associated with the Construction Phase of the Project may result in a number of potential effects to the aquatic environment and the associated valleyland, woodland or wetland features including changes to existing runoff patterns, increased sedimentation, and effects to significant wildlife habitats. Pending outcomes of geotechnical investigations by NextEra it is not anticipated that the installation of any Project infrastructure will affect groundwater flow or quality. More details on the potential surface drainage effects described here and applicable mitigation measures and BMPs are provided under separate cover in the Water Assessment Report.

It is noted that all turbines, and the vast majority of access roads, underground cable and the substation and associated infrastructure are located predominantly on active agricultural lands that are routinely ploughed and harvested (i.e., subject to routine vegetation and soil losses). In consideration of the overall size of the Project Location and the other constraints and land uses encountered, the portion that is within 120m of natural features is relatively small. Effects related to watercourse crossings are addressed in the accompanying Water Assessment Report and it is noted that some overlap between effects with features listed in this report may occur.

The potential transport of sediment from the construction disturbance area to adjacent features can be the result of the following:

- Increased erosion in areas where vegetation has been removed;
- Erosion of stockpiles;
- Increased erosion in local areas where storm water discharge increases because of the development of the site (i.e., new gravel access roads and turbine foundations);
- Tracking of mud and soil onto local roads by construction equipment; and
- Movement of fine material from newly constructed gravel roads and construction areas.

The potential increases in sediment transport are generally highest during periods of heavy rainfall and snowmelt (spring freshet). During this time, routine inspections by an environmental monitor (to be retained by contractor) with supplementary mitigation will be employed as needed to reduce the potential effects of erosion and sedimentation on adjacent natural features. During dry and frozen periods, there will be no runoff from the site; therefore, measurable effects on suspended sediment concentrations are not expected.

During Construction, there will be a predicted <1% increase in runoff relative to existing conditions throughout the entire Study Area. Activities such as the interconnection of turbines to the substation will only result in short-term changes to runoff patterns as the existing cover will be restored through reclamation after the underground cabling has been installed and the trenches filled and re-vegetated. Therefore, changes to drainage and surface runoff during the Construction Phase are considered negligible.

Accidental spills of contaminants in or within 120 m of a water feature, including hydrocarbons (diesel fuel, oil, etc.), during the Construction Phase are considered to be potential sources of contamination, which may affect water and sediment quality in surface drainage features. The BMPs to be followed generally involve source control through good housekeeping, preventive maintenance, creation of a spill prevention and control plan, erosion and sediment control measures, employee training, and record keeping and reporting. Where possible, storm water should also be prevented from running onto surfaces where pollutants can be picked up.

5.1.2 Operations

Negative environmental effects during the Operations Phase are generally limited to sensory disturbance to wildlife from operating turbines and to potential mortality associated with bird or bat impacts with the turbine blades, the turbine tower or permanent meteorological masts. Work activities during the Operations Phase are primarily associated with routine maintenance activities with travel occurring on established access roads using

light trucks. Monitoring of bird and bat mortality is to occur through carcass search programs at selected turbine sites initiated in the first year of operations. The scope and duration of the carcass search programs will be agreed to with MNR following established MNR guidance documents and will be provided in a separate EEMP Report specific to birds and bats which will be reviewed by MNR concurrent with the MOE review of the REA submission.

No additional ongoing operational mitigation strategies, beyond those identified in this Report, the Project Description Report, Construction Plan Report, Design and Operations Report and Decommissioning Plan Report are proposed for the identified significant features located within 120 m of the Project Location. However, should a concern relating to unexpected negative effects to a significant feature be identified during these phases as a result of the EEMP, or other means, NextEra Energy Canada will undertake appropriate investigations to verify the validity of the concern and assess the effect on the significant natural features identified in this Report, and develop and undertake a mitigation strategy in consultation with the appropriate agency to address the specific issue.

The overall performance objective for natural heritage resources during the Project lifespan is to construct, operate and decommission the Project with no significant residual effects to significant natural features, and their associated features, functions and attributes.

5.1.2.1 Sensory Disturbance

All of the species observed within the Project Location are adapted to human disturbance and the associated noise of roadways, farm implements and other human activity, because of the prevalence of these activities under the current conditions. These species will not likely be affected by the presence of the turbines, or the noise generated by turbines during the operational life of the Project.

The potential for sensory effects has also been reduced by following the principle of avoidance (e.g., avoid siting near wetlands and other important habitat) and implementing good planning practices (e.g., lighting and marking selection). With the implementation of these mitigation measures, no significant residual effects associated with sensory disturbance to other wildlife species are anticipated.

5.1.2.2 Turbine Related Mortality

Monitoring of bird and bat mortality is to occur through carcass search programs at selected turbine sites initiated in the first three years of operations (discussed in Section 5.2).

5.1.2.3 Routine Maintenance during Operations

Work activities during the Operations Phase are primarily associated with routine maintenance activities with travel occurring on established access roads using light trucks.

5.1.2.4 Surface Drainage Effects

During Operations, the estimated average increase in runoff as a result of the presence of access roads and turbine foundations across the entire Study Area is <1% relative to existing conditions. This increase will not be measurable and the increase in runoff during Operations is also considered negligible.

5.2 Mitigation

The main mitigation measure employed is avoidance of natural features within 120m of the Project Location, which was implemented where feasible, in consideration of other constraints and opportunities applicable to the Project design (e.g. limiting alterations to existing land use on participating parcels, noise, archaeology, cultural heritage, etc.). The following mitigation measures, inherent in the project design, have been employed:

- There are no proposed turbines, access roads or underground cables within significant wetlands or significant woodlands though a small portion of the access roads and either underground or overhead cables needed to be within significant valleyland features;
- To the extent possible, overhead cables will be strung along existing or replaced utility poles, or at valley crossings will be bored underground using a directional drill or punch/bore method to avoid additional disturbance that may otherwise be associated with an open trench method;
- Where land access permits, underground cable will be buried below and/or adjacent to the proposed access road shoulders to reduce the avoid vegetation removal within natural features or significantly limit the disturbance required;
- An environmental monitor will be on site during construction tasks conducted proximal to significant natural features to oversee mitigation and avoidance efforts, evaluate their effectiveness and make recommendations for revised approaches if the mitigation proposed is deemed insufficient to adequately protect the natural feature and its functions and attributes;
- Existing roads, infrastructure (i.e., overhead cable poles) and/or buildings will be used wherever possible to avoid potential damage to agricultural lands; and

Other mitigation measures that will be implemented include:

- Industry BMPs for construction activities conducted within 120m of natural features will be implemented during Construction activities;
- Use of tree protection fencing including maintaining a buffer from the tree drip line to avoid disturbance or damage to root systems when working in close proximity to woodlands;
- Use of silt fencing in areas prone to surface erosion and subsequent sediment transport into wetlands and valleylands; and
- Other mitigation measures as detailed in the Construction Plan Report (Golder 2011a) and in this Report.

5.3 Environmental Impact Study for Significant Natural Features

Table 25 summarizes by individual feature ID the significant natural features, including woodlands, wetlands, valleylands and wildlife habitat that are within 120 m of the Project Location and were assessed as significant and therefore require an EIS pertaining to potential effects to the feature to be completed.

Table 22: Summary of significant natural features within 120m of Project Location and interaction with Project Location

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
7a	3a, 3b	13 and 14	Significant Valleyland
7b	3a, 3b	13 and 14	Significant Woodland
7c	3a, 3b	13 and 14	Significant Woodland
7x	3a, 3b	13 and 14	Significant Wetland
8	3a, 3b	13	Significant Wetland
9	3b	12	Significant Wetland
26a	3c	7 and 8	Significant Woodland
31	3c	57	Significant Woodland
37	3c	58	Significant Woodland
38	3c	58	Significant Woodland, Significant Wetland
42	3d	27	Significant Woodland
47	3c	24	Significant Woodland
63b	3b	20	Significant Woodland
63c	3b	20	Significant Woodland

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
63x	3b	20	Significant Wetland
66	3a, 3b, 4-2b	21 and 16	Significant Woodland
70	3a, 3b	59	Significant Valleyland
72	3a, 3b	59	Significant Woodland
84d	3d, 4-6e, 4-8b	62	Significant Woodland, Significant Reptile Hibernacula, Significant Area of High Diversity, Significant Site Supporting Area Sensitive Species, Significant Bat Maternity Roost Habitat
84e	3d, 4-3a, 4-5a, 4-6e, 4-8b	62	Significant Woodland, Significant Rare Vegetation Community, Significant Reptile Hibernacula, Significant Area of High Diversity, Significant Site Supporting Area Sensitive Species, Significant Bat Maternity Roost Habitat
85	3d	62	Significant Woodland
92b	3d	19	Significant Woodland
93a	3d	19	Significant Woodland, Significant Wetland
93b	3d	19	Significant Woodland
95	3d	28	Significant Woodland
96b	3f, 4-7b	33	Significant Woodland, Significant Wetland, Significant Area Supporting Amphibian Breeding Pond
97c	3d	32	Significant Woodland
103c	3e	35	Significant Woodland

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
104 b	3e	36	Significant Woodland
105a	3e	37	Significant Woodland
105b	3e	37	Significant Woodland
106	3e	38	Significant Woodland
107	3e, 3f, 3g	39	Significant Woodland
108	3g	39 and 40	Significant Woodland
111	3f	43	Significant Woodland
113	3f, 4-1a, 4-6a	44	Significant Woodland, Significant Site Supporting Area Sensitive Species
114	3f	45	Significant Woodland
116b	3f	47	Significant Woodland
117	3f	47,46	Significant Woodland
118a	3f	46	Significant Woodland
118b	3f	46	Significant Woodland
120b	3e, 4-3b	50	Significant Woodland, Significant Bat Maternity Roost Habitat
120x	3e	SMT04 (met tower)	Significant Wetland
126	3e, 4-1b, 4-6b	48	Significant Woodland, Significant Landbird Migratory Stopover Area, Significant Site Supporting Area Sensitive Species

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
130	3e, 3g	51	Significant Woodland
135	3g	52, 53	Significant Woodland
138	3g, 4-1c, 4-3c, 4-6c	53	Significant Woodland, Significant Landbird Migratory Stopover Area, Significant Site Supporting Area Sensitive Species, Significant Bat Maternity Roost Habitat
147b	3g, 4-1d, 4-4a, 4-6d	55	Significant Woodland, Significant Landbird Migratory Stopover Area, Significant Site Supporting Area Sensitive Species
161a	3a	59	Significant Valleyland
161b	3a	5 and16	Significant Wetland
162a	3a	5 and16	Significant Woodland
175b	3b, 3c	61	Significant Woodland
177c	3b	22	Significant Woodland
184c	3d	26	Significant Valleyland
185b	3d	27	Significant Valleyland
185c	3d	27	Significant Woodland, Significant Wetland
198a	3d	31	Significant Woodland

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
202d	3e, 3f	39	Significant Woodland
216	3e	31 and 32	Significant Valleyland
220	3e	37 and 38	Significant Woodland
241	3e, 4-1b, 4-6b	48 and51	Significant Woodland, Significant Landbird Migratory Stopover Area, Significant Site Supporting Area Sensitive Species
242	3e, 4-1b, 4-6b	48 and51	Significant Woodland, Significant Landbird Migratory Stopover Area, Significant Site Supporting Area Sensitive Species
254	3a	4	Significant Woodland
266	3d, 4-7a, 4-8a	10	Significant Woodland, Significant Wetland, Significant Area Supporting Amphibian Breeding Pond, Significant Area of High Diversity
267	3d, 4-8a	10	Significant Woodland, Significant Area of High Diversity
268	3d	11	Significant Woodland
288	3d	28	Significant Woodland
290	3e	30	Significant Woodland
296	3a	4	Significant Valleyland

Location ID	Figure reference	Nearest Turbine(s)	Type of Significance
304	3b	62	Significant Valleyland
312	3d	27	Significant Woodland
330	3d, 3e	62	Significant Valleyland
342	3f	13	Significant Woodland
353	3g	55	Significant Woodland
354	3g	55	Significant Woodland
444	3b	61	Significant Woodland, Significant Wetland

5.3.1 Environmental Impact Study for Significant Wetlands

Seven natural features were assumed to be significant wetlands as a result of following the Wetland Characteristics and Ecological Functions Assessment (WCEFA) protocol as described in Appendix B of the Natural Heritage Assessment Guide (MNR, 2010d). A description of the characteristics of each of these wetlands in accordance with the WCEFA have been provided in Section 4.1.1.

Potential effects on wetlands from the construction operations and decommissioning of a wind project include direct effects on wetland vegetation and habitat and indirect effects on this same vegetation and habitat, as well as surface and ground water quality and quantity. Direct effects have been mitigated through avoiding placement of infrastructure or creating disturbance within these features. Mitigation measures to eliminate potential indirect effects include ensuring that development does not affect local drainage patterns that could alter water levels or result in contamination of surface or groundwater as a result of runoff from the Project Location and disturbance area. As discussed in the Design and Operations Report, it is anticipated that the rate of runoff will not be substantially altered as a result of the Project. When undertaking construction of roads and underground or overhead cable, Mitigation measures and BMPs will be implemented to ensure the likelihood of spills of petroleum or other contaminants is low, and that the effects of erosion on wetlands are negligible. During the Construction phase, machine work exclusion areas, and vegetated buffer zones of up to 10m between the disturbance area and the feature boundary will be retained where the work area is <10m from the Project location to prevent damage to the vegetation cover or disturbance of soils adjacent to the significant wetlands. Storm water and sediment management control measures consistent with industry standards (e.g. silt fencing, cross-ditching) will be implemented. No tree removal is planned in or within the machine exclusion area/ buffer distance from any significant wetland. In several locations, horizontal directional drilling has been selected rather than utilizing open trench methods in order to avoid surface disturbances adjacent to wetland features, and the entry and exit point of the bore and work areas have been located a minimum of 10m from the feature boundary. Directional drilling is a trenchless technology that generally involves a boring head and a spoil removal system. The head contains a transmitter which enables the user to know the location, depth, and attitude of the steering head. This information is used to steer the head by a variety of techniques (e.g., rod pushing, hydro-jet drilling, and pneumatic/rotary air drilling). This method relies on very sophisticated downhole instrumentation to continuously monitor the position and orientation of the steering head. Monitoring of the drilling operations, including assessment of potential frac-outs of drilling muds (if these are suspected), will be conducted. The implementation of directional drilling (or punch and bore crossings) will generally follow industry practices, using approaches outlined in the reference Guideline Planning Horizontal Directional Drilling for Pipeline Construction (September 2004) which is available from the Canadian Petroleum Producers Association.

If any topographic changes (grading) will be required within the Regulation Limit, the modifications to the topography and subsequent restoration of the grade will have to comply with O. Reg. 178/06 Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. The protection afforded under O.Reg. 178/06 will serve to limit the extent of grade changes to only what is required and acceptable.

Mitigation in the form of preventative measures will include surveying and establishing the work exclusion and buffer zone areas prior to construction, communicating with the construction contractor about the expected environmental protection measures and expectations, conducting a preconstruction site meeting and undertaking site monitoring using a qualified environmental monitor during the construction and decommissioning phases. Where vegetation or soils outside of the buffer areas are disturbed

During operations the activity on access roads adjacent to wetlands will occur during scheduled maintenance of the turbines beginning approximately 500 hours after commissioning, and then routine preventative maintenance activities will be scheduled at approximately 6-month intervals thereafter. This is less frequent activity than from agricultural vehicles currently traveling the same areas. No significant residual negative effects on the wetland areas are expected as a result of any of the Project phases.

Table 23: Significant wetlands within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
38	3c	58	T58 and associated underground cable and access road adjacent to natural feature	24.632ha	This is a 10.3 ha community that is mature swamp, has interior habitat and is connected to other large natural features along the Stoney Creek. Canopy cover is patchy, and there are a diversity of microhabitats along this riparian zone. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the Stoney Creek. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.
93a	3d	19	Access road, underground cable within 120	2.083ha	This 2.1 ha deciduous swamp is part of the interior of a larger complex, where there is evidence of timber harvest. There are a diversity of habitat types some and pooling (which could be evidence of springs or seeps, though none were actually found.
96b	3f, 4-7b	33	T33 and associated underground cable and access road is within 120 m	8.209ha	This is an 8.2 ha swamp with interior habitat, which has both wet pockets and dry areas along a gradient of various microhabitat types. Several mature trees exist which may provide nuts for forage and roosting locations, although there were few large snags or cavities. The wet areas contain several small pools and some open areas which may act as nesting areas for wood duck.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
161b	3a	5	Overhead cable and underground cable within 120 m	8.371ha	No unique species or communities observed in this 8.371 ha feature. High disturbance as indicated by abundance of exotic plant species. No unique species or communities observed.
185c	3d	27	Underground cable directionally drilled adjacent to natural feature in road right-of-way at two locations and Overhead cable within 120m	27.099ha	This large (27.099 ha) feature is part of a larger complex which includes a mix of aquatic, forested upland and open agriculture. This feature provides cover at bank of Stoney Creek and is suitable as a small wildlife corridor for various terrestrial and aquatic species. Feature is characterized by prevalence of non-native species and low diversity. No unique species or communities observed. Provides no suitable open banks with substrate suitable for turtle nesting and lacks suitable conifer cover for mink.
266	3d, 4-7a, 4-8a	10	T10 is within 120 m	6.174ha	This (6.174 ha) forest contains an abundance of wildlife habitat including standing snags, deadfall and several cavities. Swamp characteristics and large amounts of downed woody debris may support some amphibian life processes. Feature contains several large trees over 40 cm dbh, with some tress over 50 cm dbh. Size of trees, woodland and adjacent to open agriculture may provide suitable habitat for woodland raptor nesting, but no nests were found. Evidence of disturbance is present. Soils varying from dry to wet support a wider range of vegetation species. No unique communities or species observed.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
444	b	61	Transmission line is within 120m	16.0	Riparian woodland with some upland and wetland species. Adjacent Sandusk Creek infiltrates soils, providing sufficient wet soils to promote growth of wetland plants, though they drain rapidly.

5.3.2 Environmental Impact Study for Significant Valleylands

Nine natural features were evaluated as significant valleylands (Table 27). Any topographical changes and potential hydrological effects from access road installation that may alter valleyland vegetation will be subject to approval by the LPRCA under O. Reg. 178/06 Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Overhead or underground cable crossings, as applicable to the specific valleyland feature, will be conducted. Where access roads will cross water bodies the appropriate DFO Operational Statements will be followed (DFO, 2009) or a Letter of Advice or Authorization will be obtained through consultation with DFO and Long Point Region Conservation Authority (LPRCA). Access roads and collector system cables will cross approximately 24 water bodies. Proposed water crossings are summarized in the Water Assessment Report. Where cables cross water bodies (including valleylands, the appropriate DFO Operational Statements will be followed (DFO, 2009) or a Letter of Advice or Authorization will be obtained through consultation with DFO and LPRCA. These regulatory requirements will afford further protection of the identified significant valleyland features.

During construction Best Management Practices (BMPs) such as limiting the amount of fugitive dust emissions from construction vehicles, limiting vegetation removal to only that which is absolutely necessary and restricting the disturbance to the smallest possible area will also be practiced. Sizing of culverts will ensure that surface water and groundwater flows where present do not interfere with the valleyland proper functioning condition or increase risk that may be associated with other natural hazards present. This will also afford protection of the valleyland feature, function and attributes identified in the EOS.

Table 24: Significant valleylands within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
7a	3a, 3b	13, 14	Underground cable crosses feature in 3 locations and access road crosses in two locations.	11.398	Part of the Sundusk Creek System, this valley contains agricultural cropland.
70	3a, 3b	59	At T59, turbine, access road, underground cable are within natural feature, and at Concession 6, directionally	23.758 ha	Part of the Sandusk Creek system, it partially contains the Sandusk Creek Floodplain Woods. It runs through agricultural cropland and receives runoff from these fields. Good riparian conditions and some instream cover provides habitat for some warm water fish.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
			drilled cable is in natural feature and overhead cable is within 120m		
161a	3a	59	Underground cable directionally drilled.	4.379 ha	Permanent tributary of Sandusk Creek. Meandering valley, creek has stable banks and fair riparian.
184c	3d	26	Underground cable directionally drilled adjacent to natural feature	3.838 ha	Part of the Stoney Creek system, stream with permanent flow, good riparian, some instream cover. Pasture land and agricultural cropland surround the creek riparian.
185b	3d	27	Underground cable directionally drilled adjacent to natural feature	6.126 ha	Part of the Stoney Creek system. Intermittent flow of meandering to straightened field swale. Poor riparian dominated by non-native vegetation. This valley is dominated by a large soy field which is bisected by the field swale.
216	3e	31, 32	crossed by directionally drilled underground cable	10.120 ha	Contains part of Hemlock Creek, which flows into Stoney Creek. Meandering and fed by field swales.
296	3a	4	Turbine is within 120 m of natural features	2.246 ha	Contains a tributary that flows towards Sandusk Creek, this valley land is dominated by agricultural fields.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
304	3b	62	Transmission line crosses natural feature in two locations and is adjacent to valleyland in another location.	10.217 ha	Part of the Stoney Creek System. Feb by many field swales. Meandering and permanent, with poor riparian. Creek is surrounded by heavily grazed pasture land.
330	3d, 3e	30, 62	62 is within 120m and directionally drilled underground cable is in this natural feature and overhead cable is within 120m	4.926 ha	Part of the Stoney Creek System. Permanent creek fed by many field swales. Contains pasture land and some areas of exposed flat bedrock.

5.3.3 Environmental Impact Study for Significant Woodlands

Sixty-two natural features were evaluated as significant woodlands. The locations and descriptions for these woodlands are provided in Table 28. There will be no project components located within any of these woodlands; however, there will be cases of roads adjacent to significant woodlands with associated cable and with cable lines only and cases where the turbine and turnaround is also located within 120 m of the feature. Although it was desirable to site roads and cable lines farther from woodland boundaries, this substantially increases the associated loss of arable land which can occur if the turning radius of the farm machinery is affected. In many cases landowners already have farm lanes immediately adjacent to the woodlands which are used for farm equipment and the access road represents a minimal long term effect relative to the present condition.

During construction there is expected to be minimal direct physical effects (pruning of trees only) in cases where the installation of overhead cable applies, with negligible effects on wildlife other than noise disturbance during cable installation. Effective mitigation measures include a work exclusion zone not smaller than the outer drip line of the trees, silt fencing where required, and ensuring equipment being used to install the cable or construct the road does not break or damage the branches or interfere with their root systems.

No additional mitigation measures or BMPs will be required. No negative effects on the woodlands are expected as a result of any of the Project phases (construction, operation or decommissioning).

There are no predicted effects related to the topography or hydrology. We anticipate that no vegetation will be cleared. Best Management Practices (BMPs) such as limiting the amount of airborne particulates from

construction vehicles, removing as little vegetation as necessary and restricting the disturbance area to the smallest possible area will also be used. Any Project disturbance area in the vegetated regions of the woodlands will be small and localized. As such, mitigation will be comprised of site monitoring during construction to ensure that these caveats are upheld. No follow-up monitoring is proposed for any woodland.

Table 25: Significant woodlands within 120 m of Project Location receiving an Environmental Impact Study (EIS)

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
7b	3a, 3b	13 and 14	Access road, underground cable within 120m of woodland feature	1.664ha	This is a 1.66 ha community that is very young with patchy canopy cover and no interior habitat. It is connected to other natural features only by a small stream and has no unique or uncommon characteristics
7c	3a, 3b	13 and 14	Underground cable directionally drilled within 120 m	1.664 ha	This is a 1.66 ha community that is partly open with patchy canopy cover, no interior habitat and very disturbed by farming activities. It is a riparian forest, but not a wetland and is connected to other natural features only by a small, intermittent stream. No uncommon characteristics were revealed during site investigations.
26a	3c	7 and 8	Access road, underground cable within 120 m	2.561 ha	This is a 2.56 ha community that is semi-mature deciduous forest, has no interior habitat and is connected to other natural features only by small hedgerows. It is otherwise surrounded and disturbed by agricultural activity. No uncommon characteristics were revealed during site investigations.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
31	3c	57	Access road, underground cable within 120 m	2.792ha	This is a 2.8 ha community that is mature, has a small amount of interior habitat and is connected to other natural features only by small hedgerows. It is otherwise surrounded and disturbed by agricultural activity. There were some wet indicator species, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland.
37	3c	58	T58 and associated access road and underground cable are within 120 m	33.179ha	This is a 33.2 ha community that is mature, has interior habitat and is connected to other large natural features outside of 120 m from infrastructure. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the Stoney Creek. There were some wet indicator species, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.
38	3c	58	T58 and associated underground cable and access road adjacent to natural feature	24.632ha	This is a 10.3 ha community that is mature swamp, has interior habitat and is connected to other large natural features along the Stoney Creek. Canopy cover is patchy, and there is a diversity of microhabitats along this riparian zone. It is surrounded and disturbed by agricultural activity, but is near the upper reaches of the

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					Stoney Creek. During an open house, a landowner indicated that there is often a flock of wild turkey seen around this feature.
42	3d	27	Access Road, underground cable within 120 m	10.44ha	The wetland within this feature is one of four parts that comprise the SAC 10 wetland complex. This portion is surrounded by cultural plantation and agricultural fields. There are no visible surface water connections directly from this wetland to the other wetlands in the complex or elsewhere, but it is within 150m of the Stoney Creek. No uncommon characteristics were revealed during site investigations.
47	3c	24	Access Road, underground cable within 120 m	5.388ha	This is a 5.8 ha community that is mature, has a small amount of interior habitat. It is isolated, and surrounded by agricultural activity. There are some wet indicator species in small localized areas, and evidence of possible ephemeral pooling, but not enough that this community would be classified as a wetland. Carolina Wren and Red-breasted nuthatch are interior Carolinian species that are area sensitive, found in this natural feature.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
63b	3b	20	T20, access road and underground cable is within 120 m	4.912ha	This 4.9 ha thicket is a recent re-vegetation of an abandoned agricultural field. Although it is primarily upland, some small wet pockets may serve as amphibian or waterfowl breeding habitat, but they are not substantial in size.
63c	3b	20	T20 and associated access road and underground cable are within 120 m	21.273ha	This 21.3 ha large mixed forest is primarily comprised of upland species, with some slough forest characteristics and hemlock intermixed with deciduous trees. Several small ephemeral pools exist in this feature and a great blue heron rookery is located at the southeastern corner, approximately 800m from turbine 20. The ephemeral pools may function as small habitat pockets for breeding amphibians and/or wood duck, but they appear to be unlikely to persist into July. Property access restricted extensive research within the interior of this feature. Although this feature is large, it is isolated and surrounded by agricultural activity.
66	3a, 3b, 4-2b	21, 16	Access road, underground cable, overhead cable, T21 and T16 within120 m	6.430ha	This 6.4 ha deciduous forest is located along the Sandusk creek and is part of the Sandusk Creek Floodplain Woods, designated by Haldimand County and has some interior habitat. It is upslope from the riparian forest community, but connected to these larger forest blocks. An old building foundation and pile of waste rocks is located in

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					this feature which may serve as a reptile hibernacula, but the hibernacula is located within the interior of this natural feature, and greater than 120m from the project location.
69	3a, 3b, 4-2b	21, 16	T59 and associated underground cable and access road are within 120 m	7.5 ha	This 7.5 ha community is located along the Sandusk creek, adjacent to the Sandsusk Creek Floodplain woods, has some interior habitat and is along a riparian slope with a diversity of microhabitat types. Some monarch were observed in the field and remnants of turtle nesting (sp. unknown) in the agricultural field.
72	3a, 3b	59	T59 and associated access road and underground cable are within 120 m	3.686ha	This 3.7 ha community is also linked with Feature ID 66 and 69, along the Sandusk Creek. This is a relatively open and young community with some interior habitat. Wild turkey and turkey vulture were observed.
84d	3d, 4-3a, 4-6e, 4-8b	62	T62 and associated access road and underground cable is within 120 m	53.653ha	This 7.2 ha community is part of a much larger community containing a diversity of habitats and interior forest types. The trees are very mature and several cavity trees and wildlife trees were present, which could provide habitat for bat maternity roosting, various bird habitats and reptile and amphibian breeding although ephemeral pools were not visible from the area that

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					was accessible.
84e	3d, 4-3a, 4-5a, 4-6e, 4-8b	62	T62 and associated access road and underground cable is within 120 m	53.653ha	This 1.8 ha walnut dominated riparian community is small, but connected to a much larger forest patch along with 84d. The remaining snags of very large old sugar maples have several cavities which provide likely maternity roost and cavity nesting habitat, evidenced by the discovery of scat/guano. The soil is shallow in some locations where small exposed fissures in the rock were observed, which may provide reptile hibernacula locations, but are not large enough for bat colonies. Adjacent to the Stoney Creek with several tributaries and an active hayfield and pasture.
85	3d	62	Access road, underground cable within 120 m	1.216ha	This 1.2 ha forest is heavily disturbed and very young. There is no interior habitat and it is surrounded by agricultural crops. No uncommon or distinctive characteristics were part of this natural feature.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
92b	3d	19	Access road, underground cable and T19 within 120 m	15.4ha	This 15.3 ha sugar maple forest contains interior habitat and is part of a string of woodland communities. It appears to have been managed as a sugar bush, but has some mature wildlife trees which could provide habitat for nesting raptors. Although no springs or seeps were observed in the field, this feature is at the headwaters of some first order tributaries through agricultural fields.
93a	3d	19	Access road, underground cable within 120	2.083ha	This 2.1 ha deciduous swamp is part of the interior of a larger complex, where there is evidence of timber harvest. There are a diversity of habitat types some and pooling (which could be evidence of springs or seeps, though none were actually found.
93b	3d	19	Access road, underground cable within 120 m	8.969ha	This 9.0 ha forest is part of the complex patch including 93a, contains interior habitat, and appears to have been heavily managed. Several mature trees may provide nut mast for foraging, and possible amphibian breeding ponds.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
95	3d	28	Access road and T28 within 120 m	10.798ha	This 10.8 ha forest contains interior habitat and mature trees. Monarch butterfly and tiger swallowtail were observed, but not in large numbers. Property access prevented assessment of the interior of this natural feature; observations were made primarily from the edge.
96b	3f, 4-7b	33	T33 and associated underground cable and access road is within 120 m	8.209ha	This is an 8.2 ha swamp with interior habitat, which has both wet pockets and dry areas along a gradient of various microhabitat types. Several mature trees exist which may provide nuts for forage and roosting locations, although there were few large snags or cavities. The wet areas contain several small pools and some open areas which may act as nesting areas for wood duck. .
97c	3d	32	T32 and associated underground cable and access road is within 120 m	4.110ha	This feature is 4.1 ha with a small area of interior habitat and a small wet pocket at the southeast corner which may provide amphibian breeding habitat. This feature is connected by a very small hedgerow to a larger woodland patch, but is otherwise surrounded by agriculture. No rare or unique features were found during the site investigation.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
103c	3e	35	Access road, underground cable and T35 are within 120 m	20.631ha	This 20.6 ha forest has interior habitat, but a sparse canopy cover and more dense sub-canopy. There are several mature trees which may provide forage and roosting locations. It is along a string of forests and plantations to the east.
104 b	3e	36	Access road, underground cable and T36 within 120 m	20.631ha	This 20.6 ha forest has interior habitat and is connected with ID # 103c, which has very similar characteristics. Although there are large mature trees, no cavities and few snags were found. There was no evidence of pooling, but American toad and leopard frog were heard calling from this feature. A small vacant stick nest was observed, but no raptors were found during the site investigation and it was not adjacent to a large undisturbed field.
105a	3e	37	T37 and associated access road and underground cable are within 120 m	8.209ha	This 8.2 ha forest contains interior habitat and is located along a string of other forest features. It has mature trees and evidence of ephemeral pools. A red-tailed hawk was observed, but there was no indication of raptor nesting activity. It is adjacent to a white pine cultural plantation which may provide winter cover for white-tailed deer and wild turkey.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
105b	3e	37	T37 and associated access road and underground cable are within 120 m	4.924ha	This 4.9 ha forest does not have interior habitat, and is surrounded by agricultural crops. The forest appears to have been managed for timber and/or firewood and is mostly young trees. No rare or unique features were found during the site investigation.
106	3e	38	Access road, underground cable within 120 m	26.5ha	This 26.5 ha feature is relatively young and had only a few larger trees with cavities. Some ephemeral pooling is present which may provide habitat for amphibian breeding, but it is unlikely that these pools would persist into July.
107	3e, 3f, 3g	39	Access road, underground cable within 120 m	14.778ha	This 14.8 ha feature is large, with interior habitat, but young. There were tracks of wild turkey observed and ephemeral pooling is present, but it is unlikely that these pools would persist into July.
108	3g	39, 40	Access road, underground cable within 120 m	17.794ha	This 17.8 ha feature contains mature interior forest and a diversity of microhabitat types. Ephemeral pooling is present, which may provide amphibian breeding habitat, but the water did not persist into July. Monarch and leopard frog were observed, but not in large numbers.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
111	3f	43	Underground cable and T43 are within 120 m	2.397ha	This 2.4 ha feature has a low degree of connectivity other than small stream to west; otherwise surrounded by agriculture. Ephemeral pools and moist soils suitable for amphibians are present but in very small quantity. Evidence of historical dumping of waste and wood harvesting. High amount of disturbance contributes to low habitat quality and diversity. No unique communities or species observed.
113	3f, 4-1a, 4-6a	44	Access road and underground cable are within 120 m	38.455ha	This large 38.5 ha forest contains interior habitat, but is relatively isolated. A small stream goes through this feature, but it is predominantly very dry. It has mature trees which may provide forage and habitat for bird roosting and stopover.
114	3f	45	T45 and associated access road and underground cable are within 120 m	2.411ha	This is a 2.6 ha fragmented feature that is isolated from other natural features by agriculture. It contains some mature trees which could provide forage and roosting habitat, but is otherwise littered with farming debris and heavily disturbed. Three monarch were observed passing through.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
116b	3f	47	T47 and associated access road and underground cable are within 120 m	19.644ha	The soil of this 19.6 ha forest is mostly dry organic soil. This feature is a young regrowth and has interior habitat. The small tree size suggests that it is unlikely to support raptor nesting or roosting.
117	3f	47,46	Access road and underground cable within 120 m	8.364ha	Small (8.364 ha) sized deciduous complex surrounded by open agriculture. Size and maturity of complex suitable for woodland raptor nesting, but is not adjacent to large natural fields. Has potential for osprey and bald eagle habitat given mature habitat and proximity to Lake Erie but neither of these species or evidence of use by them observed.
118a	3f	46	Access road within 120 m	8.364ha	Small woodland part of medium (8.364 ha) sized deciduous complex surrounded by open agriculture. Young, disturbed stand with some small downed woody debris and very few wildlife trees. Very low species diversity observed. No structures within feature suitable for reptile hibernacula. Dominance of American beech supplemented with shagbark hickory. No unique species or communities observed.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
118b	3f	46	Access road within 120 m	8.364ha	Small woodland part of medium (8.364 ha) sized deciduous complex. Feature contains small woody debris with few large woody cover or wildlife trees. This feature may be suitable for woodland raptor nesting but no nests were observed. No unique communities or species observed.
120b	3e, 4-3b	50	T50 and associated access road and underground cable within 120 m and SMT04 met tower is within 120m	6.488ha	Small woodland (6.488) isolated by vast open agricultural land with small Lake Erie tributary ending at the most southern edge. Woodland exhibits high diversity of habitat, with several trees over 40cm dbh and a few over 100cm dbh, wildlife trees, cavities and deadfall. Due to proximity to Lake Erie, habitat may be suitable for osprey and bald eagle although no evidence of either species was observed. Although feature appears to have tributary end at feature's southern edge, only one seep/spring was. Composition and structure of woodland has potential for bat roost and maternal colonies.
126	3e, 4-1b, 4-6b	48	Overhead cable adjacent, within road right-of-way	54.754ha	Very large (54.75 ha) woodland connected with 241 and 242. The feature is a large area within 5 km of Lake Erie, forested with mature trees and adjacent to open agriculture. It may support habitat for migratory stopover of landbirds. Habitat may support osprey or bald eagles although none were

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					observed. Vegetation inventory indicates a moderate level of species diversity dominated by mature hickory trees which may provide abundant nuts. One monarch was observed, as well as a northern harrier, and a red-tailed hawk.
130	3e, 3g	51	T51 and associated access road and underground cable are within 120 m	17.674ha	Medium sized (17.67 Ha), mature woodland. One brown snake was observed at edge of feature and agricultural field but no evidence of suitable cover was found. One green frog was observed in the vicinity. On route to field survey, one juvenile bald eagle was observed flying low above the woodland canopy. Given proximity to Lake Erie and the presence of suitable roosting habitat, this feature may be suitable for raptors such as bald eagle and osprey, but no nest was observed.
135	3g	52, 53	T52, access road, underground cable within 120 m	20.687ha	This 21.8 ha natural feature contains very few large trees providing cavities and gaps. Woodland raptor nesting may also be supported by this habitat, but no nests were observed. This feature is not relatively high in species diversity and no species or communities unique to area observed. Evidence of ephemeral pools combined with high abundance of small deadfall but the pools did not persist into July.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
138	3g, 4-1c, 4-3c, 4-6c	53	Access road, underground cable and T53 within 120 m	48.561ha	Very large (48.561 ha) woodland. Several wildlife trees observed with abundant cavities may provide habitat for tree roosting bats, and birds, especially cavity nesters. Ephemeral pools with moderate level of woody debris may provide habitat for aquatic species life processes, but they did not persist into July. Large size of woodland adjacent to open areas <5km of Lake Erie may support migratory stopover of landbirds and habitat for raptors such as osprey and bald eagle, though none were observed.
147b	3g, 4-1d, 4-4a, 4-6d	55	Access road, underground cable within 120 m	36.563ha	Very large (36.563 ha) woodland. Feature supports a diversity of species due to an abundance of both upland and lowland vegetation. Area sensitive species observed include black-throated green warbler. A Raptor (buteo sp.) skeleton was found in an interior portion of forest with mature hardwoods suitable for nesting/roosting. This feature may support nesting woodland raptors due to size, composition and proximity to Lake Erie, but no evidence of raptors, including bald eagle or osprey were observed.
162a	3a	5,16	Directionally drilled underground cable adjacent to natural feature	18.008ha	This feature contained no vernal pools, and downed woody debris is restricted to smaller materials. Some buttonbush was observed but not dominant in the habitat. Riparian area does not exhibit enough open shoreline to support

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					an abundance of shorebirds. Aquatic wildlife such as warm water fish (observed) likely benefit from heavy riparian cover.
175b	3b, 3c	61	T61 and overhead transmission line within 120 m	6.910ha	This (6.910 ha) feature supports a combination of shagbark hickory, oak and beech. Some trees within this feature contain cavities but not in high abundance. One vacant stick nest was observed and site composition (size and tree maturity) is suitable for nesting woodland raptors, but it is not adjacent to a suitable natural feeding field. Ephemeral pools may support breeding amphibians, but they did not persist into July. No unique species or communities observed.
177c	3b	22	transmission line within 120 m	0.951ha	High disturbance level and a high proportion of non-native species contribute to the low biodiversity of this Small (.951 ha) feature. This Feature is linked to Dry Creek by a very small disturbed drainage feature; it is otherwise isolated from other features. No unique species or communities observed.
185c	3d	27	Underground cable directionally drilled adjacent to natural feature in road right-of-way at two locations and Overhead cable within 120m	27.099ha	This large (27.099 ha) feature is part of a larger complex which includes a mix of aquatic, forested upland and open agriculture. This feature provides cover at bank of Stoney Creek and is suitable as a small wildlife corridor for various terrestrial and aquatic species. Feature is characterized by prevalence of non-native species and low diversity. No unique

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					species or communities observed. Provides no suitable open banks with substrate suitable for turtle nesting and lacks suitable conifer cover for mink .
198a	3d	31	Overhead and directionally drilled underground cable within 120 m of Concession 4, Rainham	4.397ha	This (4.397 ha) feature's canopy is dominated by hickory and beech and may support abundant nut forage. Monarch butterfly was observed. Downy woodpecker, an area sensitive species was observed, however woodland is not large enough to support abundance of area sensitive bird habitat (e.g. no 100m buffer at edge). Habitat characteristics and proximity to Lake Erie indicate that this feature may support migrating landbird species, but only to a small extent.
202d	3e, 3f	39	Overhead cable within 120 m on concession 3	14.778ha	(14.778 ha) Feature dominated by mature mast producing species and may provide abundant forage. Size and proximity to Lake Erie may provide suitable landbird and butterfly migratory stopover habitat. No unique species or communities observed.
220	3e	37,38	Overhead cable within 120 m of Fisherville Road	26.540ha	Woodland size (26.54 ha) and tree composition may provide suitable nesting for some raptor species. No suitable structures for snake hibernacula observed. Some wildlife trees are present, otherwise no unique species or communities observed. One garter snake observed.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
241	3e, 4-1b, 4-6b	48,51	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	54.754ha	Large (54.754 ha) woodland containing mature hardwoods is adjacent to open agriculture. It may provide suitable habitat for raptors, including osprey and bald eagle due to its proximity to Lake Erie, though none were found. The habitat and proximity to Lake Erie may also provide a suitable landbird migratory stopover area. Low species diversity is present in canopy likely due to historical disturbance. An increase in successional species diversity and evidence of ephemeral flooding indicates an increasing state of naturalization.
242	3e, 4-1b, 4-6b	48,51	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	13.796ha	Woodland (13.796 ha), connected with 241, dominated by hickory and beech in the canopy may provide abundant nut forage. Ephemeral pools may provide minimal support for portion of some life processes. Woodland size, composition and proximity to Lake Erie may provide conditions suitable for stopover of migrating landbirds, and habitat for woodland raptor nesting, though no large natural field for feeding was nearby. Low species diversity and evidence of historical disturbance including dumping and trails. No evidence of past or present osprey or bald eagle use (no nests or species) observed. No unique species or communities observed.
254	3a	4	T4 and associated	3.914ha	This (3.914 ha) woodland with a canopy dominated by hickories and

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
			access road and underground cable are within 120 m		oak may provide abundant nut forage. Ephemeral pools were present, but would not persist into July and may support some wetland species life processes. Overall habitat quality low. Evidence of disturbance is visible and feature is isolated from other natural features. White-breasted nuthatch were observed. Monarch butterflies observed.
266	3d, 4-7a, 4-8a	10	T10 and associated access road and underground cable are within 120 m	6.174ha	This (6.174 ha) forest contains an abundance of wildlife habitat including standing snags, deadfall and several cavities. Swamp characteristics and large amounts of downed woody debris may support some amphibian life processes. Feature contains several large trees over 40 cm dbh, with some tress over 50 cm dbh. Size of trees, woodland and adjacent to open agriculture may provide suitable habitat for woodland raptor nesting, but no nests were found. Evidence of disturbance is present. Soils varying from dry to wet support a wider range of vegetation species. No unique communities or species observed.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
267	3d, 4-8a	10	T10 and associated access road and underground cable are within 120 m	4.550ha	Feature is 4.55 ha in area and contains a high diversity of species compared to other features assessed in the area. Ephemeral pools, abundant cavities in mature trees, deadfall and standing snags, and cover suitable for several species of wildlife are present. Incidental observations of the area sensitive species white-breasted nuthatch and amphibians such as leopard frog and green frog were made. This feature is connected to separate woodland differing in ecology. No species or communities unique to area observed other than one monarch butterfly but in no high abundance and no associated suitable habitat observed.
268	3d	11	T11 and associated access road and underground cable are within 120 m	11.609ha	Large (11.609 ha) feature contains woody debris, few wildlife trees and mature hickory and beech. Some monarch butterfly larvae and species observed. Feature is separated from Stoney Creek headwaters by open agriculture to the west. No other unique species or communities observed.
288	3d	28	T28 and associated access road and underground cable are within 120 m	2.855ha	Natural feature is lower in elevation and serves as drainage between two features. It provides small pockets of habitat for hydrophytic species, but is dominated by upland plants. Despite high disturbance, this feature serves as a connection between deciduous woodlands and Hemlock Creek as part of a larger

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					complex.
290	3e	30	Access road and underground cable within 120 m	4.178ha	This (4.178 ha) feature is connected to the Stoney Creek riparian corridor. It has low habitat value, high disturbance, and no species or communities unique for area.
312	3d	27	Overhead cable within 120 m of Concession 4, Rainham	5.474 ha	This (5.474 ha) evaluated wetland feature has been designated as Non-Provincially Significant Wetland and is largely isolated from other terrestrial natural features other than by small, highly disturbed drainage to south and north. Wetland character and thick cover may have potential for woodland amphibian life processes but not for many waterfowl species. No open water, no high abundance of wildlife habitat or unique species and communities observed.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
342	3f	13	Underground cable within 120 m	4.291ha	Small (4.291 ha), young stand surrounded by agricultural land with small stream running through the western portion, and within 5 km of Lake Erie. Evidence of historical dumping of waste and wood harvesting. Ephemeral pools and moist soils suitable for amphibians, but did not persist into July. Low amount of suitable wildlife habitat such as mature trees or downed woody debris and no interior habitat. No unique communities or species observed.
353	3g	55	Access road and underground cable within 120 m	3.611 ha	Small woodland (3.611 ha), within 5 km of Lake Erie. Connected to smaller treed feature to the east but otherwise isolated by surrounding open agriculture. Small disturbed tributary to west leading to Gate's Greek but separated by open agricultural land. Canopy dominance of shagbark hickory may provide abundant nut production for wildlife. Low species diversity and no unique communities or species observed.
354	3g	55	Access road and underground cable within 120 m	0.937 ha	Other than disconnected small woodland feature to west, this 0.9 ha feature is enclosed by open agriculture. Low degree of connectivity to other woodlands and aquatic features as divided by roads and residential area which also contributes to high disturbance indicated by stand thinning from historical wood harvest and low species diversity. Patchiness of

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
					canopy cover and young age of trees indicates low habitat suitability for wildlife. Small size, relative to adjacent features indicated that it is not likely as suitable for raptors. No unique communities or species observed.
444	B	61	Transmission line passes adjacent to natural feature	16.0 ha	This floodplain woodland is heavily impacted by local farming activity and the adjacent road. Although it is low, it is comprised of porous soil, and drains rapidly into the Sandusk Creek, therefore not presenting many wetland characteristics. It is a significant woodland, The Transmission Line proposed to pass adjacent to this natural feature will not include any poles in the natural feature, and the cable itself will be directed just north of this feature, so as not to require any clearing of the habitat.
445	B	61	Transmission line passes adjacent to natural feature	0.76	This 0.8 ha natural feature is a riparian woodland on the steep bank of the Sandusk Creek. It is connected to the Sandusk Creek Floodplain Woods ESA, and strongly impacted by adjacent farming activities

5.3.4 Environmental Impact Study for Significant Wildlife Habitat

The type of SWH present at each natural feature has been presented in Table 25. Bird data from area based surveys at a landscape scale allowed for interpretation of the predicted likelihood of effects based on overall use, species observed and flight elevations relate to the windswept area of the turbine blades.

5.3.4.1 Environmental Impact Study for Seasonal Concentration Habitats

5.3.4.1.1 Landbird Migratory Stopover Areas

Four landbird migratory stopover habitat features, 113, 138, 147b and 126 / 241 / 242 were carried forward to the EIS. These features were conservatively assumed to be significant, based on habitat characteristics, in consultation with OMNR (OMNR, 2011d).

One of these, feature 113 is within 120m of access road and underground cable but not the turbine; the road and underground cable are not expected to result in negative effects to landbird migration and no further mitigation or pre or post construction monitoring is required. Based on consultation with the MNR (OMNR, 2011d), additional studies to further assess utilization by landbird species pre and post construction for this type of habitat has been agreed to by NextEra Energy Canada in instances where the outermost extent of the turbine, including to the tip of the blade, is within 120m of the landbird migratory stopover habitat feature (features 138, 147b and 126/241/242).

To build on previous avian studies conducted and develop a baseline for the utilization of these habitats by landbirds during the migration season, area searches will be conducted in the Fall of 2011 and spring of 2012 prior to construction activities occurring within 120 metres of the features. These area searches will be conducted in accordance with the following methods:

- Routes will be selected to incorporate all microhabitats within the natural feature where accessible;
- Each transect will be up to 500m long;
- Transects will be walked twice per week during the first 4 hours of daylight;
- The Fall season will include 10 weeks from mid August to end of October;
- The Spring season will include 10 weeks from late March to end of May; and
- Observers will record the total number of birds by species.

These methods will be repeated as part of the post-construction follow-up monitoring in conjunction with the carcass searching and the EEMP. This information will be used to determine the effects of the project on bird habitat use. Annual reports will be prepared to present this data to the MNR for at least three years.

Since no infrastructure will be developed within these natural features and no vegetation removal will be required, no impact from the construction and decommissioning is anticipated. BMP's will be adhered to at these locations to minimize any sensory disturbance or unanticipated effects.

Table 26: Significant landbird migratory stopover areas within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
126/ 241/ 242	4-1b	48	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	54.754ha	<5km of Lake Erie. Very large woodland. Some disturbance from road and church building to the east, otherwise not highly disturbed.
138	4-1c	53	Access road, underground cable and T53 within 120 m	48.561ha	<5km of Lake Erie. Very large (>30 ha) and very close to Lake Erie. Adjacent to another very large woodland. Some disturbance from a few residences within eastern portion of feature. Surrounded by annual row crop dominated field.
147b	4-1d	55	Access road, underground cable within 120 m	36.563ha	<5km of Lake Erie. Very large (>30 ha) and diverse. Little disturbance from development but surrounded by annual row crop dominated fields. Very close to Lake Erie.

5.3.4.1.2 Reptile Hibernacula

One significant reptile hibernaculum (within feature 84e) was carried forward from the Evaluation of Significance. This natural feature and its 30 m buffer are at the outer edge of the 120 m distance from turbine 62 and its associated disturbance areas. No impact is anticipated to this natural feature from the construction, decommissioning or operations of the Project. BMPs will be used, similar to all other development areas, but no additional mitigation and no follow-up monitoring will be required.

5.3.4.1.3 Bat Maternity Roosting Habitat

No specific maternity roost cavities were identified, however three significant bat maternity roost natural features (which may contain these cavities although they were not identified) were identified in the Evaluation of Significance. As there is no tree removal planned for any of the woodlands containing significant bat habitat, there will be no direct removal of maternity roost sites. Injury or mortality of bats flying to or from the identified

significant bat maternity roosts from collisions with the turbine blades or barotraumas is plausible, but the potential for bat mortality during operations will be addressed through three years of follow-up post-construction monitoring of bat mortality required for all Class 3 and 4 wind farms (MNR, 2010b). If the threshold level of bat mortality which is ultimately agreed to by MNR is reached (presently 10 bats per turbine, per year averaged over the entire project), operational mitigation through modifying the wind turbine cut-in speed to 5.5 m/sec will occur and additional monitoring may be required, based on further consultation with MNR.

Though no actual maternity roosts were discovered during the Site Investigations, construction activities within 120 m of significant bat habitats will be minimized to the extent possible to avoid the maternity roosting season during the month of June. The Project Location infrastructure has been sited during the design process such that removal of cavity trees that may presently provide maternity roosts will be avoided. As such, direct disturbance to bat SWH during the construction and decommissioning phases of the development will be avoided. Also, construction activities will occur primarily during the daylight hours, when bats are inactive. As a result, residual effects to bat SWH from construction and decommissioning are predicted to be minimal.

Therefore, plausible negative effects would be limited to potential sensory disturbance to the maternity roosting areas and adults or young. The effects of this disturbance are not supported in the literature, so it is the intent of the repetition of the methods employed here will help to suggest any potential avoidance or attraction effects.

Significant bat maternity roost habitats are located in three significant woodlands within 120 m of turbines (84d/84e, 120b, 138). These features are associated with Turbines 62, 48 and 53, respectively. These woodlands contained several mature trees of large diameter (up to 100 cm DBH) with visible cavities. As no project activities are to occur within these woodlands during operations and maintenance none of these bat SWH are predicted to have significant residual effects to bats.

As it pertains to migratory bats, bat mortality had been recorded at many wind power developments across North America. The potential for mortality during operations will be addressed through three years of post-construction follow-up monitoring of bat mortality required for all Class 3 and 4 wind farms (MNR, 2010b). If the threshold level of bat mortality agreed to by MNR is exceeded (presently 10 bats per turbine, per year), operational mitigation and monitoring may be required after consultation with MNR.

At the three locations described here, where two visits were conducted to determine a measure of bat activity, these surveys will be repeated using identical methods twice in June each year as part of the EEMP. This will continue in conjunction with the carcass searching, which will be targeted at these turbines and until the carcass searching is no longer required (at least 3 years)

Table 27: Significant bat maternity roosting habitat within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
84d/e	4-3b	62	T62 and associated access road and underground cable is within 120 m	53.653ha	This feature has a mixed dominance of several deciduous tree species, including shagbark hickory, red oak, sugar maple and American beech. The understory was comprised of many seedlings of these species, blue beech, jewelweed and wild geranium.
120b	4-3b	50	T50 and associated access road and underground cable within 120 m and SMT04 met tower is within 120m	6.488ha	Shagbark hickory, red oak and green ash dominate the canopy with blue beech, American beech, gray dogwood and multi-flora rose in the successional layers. Ground cover dominated with jewelweed and wild geranium. High percentage of exotic species throughout. Several wildlife trees such as those exhibiting one to several cavities. Evidence of ephemeral pools.
138	4-3c	53	Access road, underground cable and T53 within 120 m	48.561ha	Feature well within 5 km of Lake Erie and isolated by open agriculture other than to smaller woodland to the east by small hedgerow. Feature contains mature sugar maple, red oak and shagbark hickory dominates canopy with blue beech in the understory. Species such as enchanter's nightshade, jewelweed, wild geranium and avens dominate the interior portion of the woodland groundcover. Evidence of ephemeral pools.

5.3.4.2 Significant Habitats of Species of Conservation Concern

No significant habitats of species of conservation concern were carried forward to the EIS.

5.3.4.3 Environmental Impact Study for Rare Vegetation Communities and Specialized Wildlife Habitat

5.3.4.3.1 Rare Vegetation Communities

One rare vegetation community, 84e was carried forward from the Evaluation of Significance (Table 31).

Natural feature 84e is a black walnut riparian forest with large sugar maple snags in the understory. This feature is located approximately 35 m from the edge of the disturbance area of Turbine 62. This community type is considered rare in Appendix M of the SWHTG. Because no clearing of habitat, changes to hydrological or topographical attributes or activities directly within this woodland are proposed, no impact is anticipated. There are no known aspects of construction disturbance, operations or decommissioning that would result in direct or indirect affects in this community. Therefore, no mitigation is required for this rare vegetation community and no follow-up monitoring will be necessary.

Table 28: Significant rare vegetation communities within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
84e	4-5a	62	T62 and associated access road and underground cable is within 120 m	53.653ha	This 1.8 ha walnut dominated riparian community is small, but connected to a much larger forest patch along with 84d. The remaining snags of very large old sugar maples have several cavities which provide likely maternity roost and cavity nesting habitat, evidenced by the discovery of scat and guano. The soil is shallow in some locations where small exposed fissures in the rock were observed, but these are not deep enough to provide likely hibernacula locations. Adjacent to the Stoney Creek with several tributaries and an active hayfield and pasture.

5.3.4.3.2 Sites Supporting Area Sensitive Species

Five significant sites supporting area sensitive species (84d/e, 113, 138, 147b and 126/241/242) were carried forward from the Evaluation of Significance, based on consultation with OMNR regarding conservative assumptions of significance (Table 32). The species which use these sites typically reside in the interior (i.e., greater than 100m from the edge) of the habitat. Therefore, since no removal of habitat will be conducted and no indirect effects from project components into the interior are predicted, no impact to these habitats or the species within them are anticipated. Therefore, no mitigation is required for this rare vegetation community and no follow-up monitoring will be necessary.

Table 29: Significant sites supporting area sensitive species within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
84d/e	4-6e	62	T62 and associated access road and underground cable is within 120 m	53.653ha	This 7.2 ha community is part of a much larger community containing a diversity of habitats and interior forest types. The trees are very mature and several cavity trees and wildlife trees were present, which could provide habitat for bat maternity roosting, various bird habitats and reptile and amphibian breeding although ephemeral pools were not visible from the area that was accessible.
113	4-6a	44	Access road and underground cable are within 120 m	38.455ha	This large 38.5 ha forest contains interior habitat, but is relatively isolated. A small stream goes through this feature, but it is predominantly very dry. It has mature trees which may provide forage and habitat for bird roosting and stopover.
126/ 241/ 242	4-6b	48	Directionally drilled underground cable adjacent to feature, within road right-of-way and overhead cable within 120m	54.754ha	Very large (54.75 ha) woodland connected with 241 and 242. The feature is a large area within 5 km of Lake Erie forested with mature trees and adjacent to open agriculture. It may support habitat for migratory stopover of landbirds. Habitat may support osprey or bald eagles although none were observed. Vegetation inventory indicates a moderate level of species diversity dominated by mature hickory trees which may provide abundant nuts. One monarch was observed, as well as a northern harrier (open area sensitive), and a red-tailed hawk.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
138	3g, 4-1c, 4-3c, 4-6c	53	Access road, underground cable and T53 within 120 m	48.561ha	Very large (48.561 ha) woodland. Several wildlife trees observed with abundant cavities may provide habitat for tree roosting bats, and birds, especially cavity nesters. Ephemeral pools with moderate level of woody debris may provide habitat for aquatic species life processes, but they did not persist into July. Large size of woodland adjacent to open areas 5km of Lake Erie may support migratory stopover of landbirds and butterflies and habitat for raptors such as osprey and bald eagle, though none were observed.
147b	4-6d	55	Access road, underground cable within 120 m	36.563ha	Very large (36.563 ha) woodland. Feature supports a diversity of species due to an abundance of both upland and lowland vegetation. Site linkage to Gate's Creek provides a protected corridor as evidenced by observations of chimney crayfish along wet edges of dissecting drainage. Area sensitive species observed include black-throated green warbler. A Raptor (buteo sp.) skeleton was found in an interior portion of forest with mature hardwoods suitable for nesting/roosting. This feature may support nesting woodland raptors due to size, composition and proximity to Lake Erie, but no evidence of raptors, including bald eagle or osprey was observed.

5.3.4.3.3 Woodlands Supporting Amphibian Breeding

Natural features 96b and 266 were evaluated to be significant woodland amphibian breeding ponds (Table 33). At both of these locations, a turbine is proposed within 120 m, but not within the natural feature itself. Because no clearing of habitat, changes to hydrological or topographical attributes or activities directly or indirectly within this woodland are proposed, no impact is anticipated. No direct or indirect activity associated with the construction or operation of windfarm components are predicted to affect amphibian breeding behaviour or habitat use patterns. Potential effects for development on adjacent lands can affect the function of amphibian

breeding ponds if development alters ground or surface water flow. If woodland ponds containing eggs and larvae dry out prior to the metamorphosis from aquatic larval to adult form occurs, these sites become unsuitable for reproduction. Road construction on adjacent lands can result in road mortality as adults move to and from breeding ponds. This effect is highest in spring.

The general mitigation measures and BMPs to ensure negligible effects on adjacent amphibian breeding habitat, in addition to those described for significant wetlands above, include:

- Majority of work during day – avoid active calling period (dusk to after dark);
- Silt fences installed around the construction disturbance areas to avoid damage to existing habitat and to preclude amphibians from entering construction area; and

The effects will be short-term, extremely localized and fully reversible (i.e., any amphibians that become startled will likely return once the truck installing the cabling or constructing the road has moved to the next location). As a result, there are no significant residual negative effects of the installation of cable, construction of access roads and installation of turbines on the woodlands supporting amphibian breeding habitat.

During the Operations phase, it is expected that there will be no effects on the wetlands with amphibian habitat.

Therefore, no mitigation is required for this rare vegetation community and no follow-up monitoring will be necessary.

Table 30: Significant woodlands supporting amphibian breeding ponds within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
96b	4-7b	33	T33 and associated underground cable and access road is within 120 m	8.209ha	This is an 8.2 ha swamp with interior habitat, which has both wet pockets and dry areas along a gradient of various microhabitat types. Several mature trees exist which may provide nuts for forage and roosting locations, although there were few large snags or cavities. The wet areas contain several small pools and some open areas which may act as nesting areas for wood duck. Although the community is not listed as rare provincially, it seemed unique to the study area.

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
266	4-7a	10	T10 is within 120 m	6.174ha	This (6.174 ha) forest contains an abundance of wildlife habitat including standing snags, deadfall and several cavities. Swamp characteristics and large amounts of downed woody debris may support some amphibian life processes. Feature contains several large trees over 40 cm dbh, with some tress over 50 cm dbh. Size of trees, woodland and adjacent to open agriculture may provide suitable habitat for woodland raptor nesting, but no nests were found. Evidence of disturbance is present. Soils varying from dry to wet support a wider range of vegetation species. No unique communities or species observed.

5.3.4.3.4 Areas of High Diversity

Two significant areas of high diversity, 84d/e and 266/267, were carried forward to the EIS (Table 32). At both of these natural features, there will be no development or disturbance within the natural feature. Underground cable and access road encroach on the southwest corner of 84d and at this location silt fence and a work exclusion area will be established to prevent habitat nibbling. No topographical or hydrological changes and no vegetation removal will impact these natural features. General mitigation measures, BMPs and construction environmental monitoring will be conducted at the infrastructure within 120 m of these natural features. During operations, periodic turbine maintenance and associated vehicle access will have no significant residual effects. No additional monitoring will be conducted and no mitigation will be necessary. No follow-up monitoring will be required at these natural features.

Two significant areas of high diversity, 84d/e and 266/267, were carried forward to the EIS. No topographical or hydrological changes and no vegetation removal are predicted to affect these natural features. No follow-up monitoring is proposed at these natural features.

Table 31: Significant areas of high diversity within 120 m of Project Location receiving an environmental impact study

Location ID	Figure reference	Nearest Turbine	Project Component Within 120 m of Natural Feature	Area (Ha)	Description summary
84d	4-8b	62	T62 and associated access road and underground cable is within 120 m	53.653ha	High relative abundance of cavities observed in large mature cavity trees, heterogeneous stand structure and composition
266/267	4-8a	10	T10 is within 120 m	6.174ha	Vegetation and wildlife in relatively high biodiversity. Some disturbance (selective wood harvesting) observed. Relatively abundant cavities in mature trees, deadfall, standing snags and heterogeneous stand structure and composition

5.3.5 EIS for Birds at a Landscape Level

5.3.5.1 Construction and Decommissioning

Landscape level avian surveys which were initiated under the requirements of O. Reg. 116 provide observational data to assess predictable negative effects of the Project on birds. This interpretation is not required under O. Reg. 359/09, but Golder has included it as an additional assessment of the potential negative effects to birds from the operation of the Project and to complement the evaluation of significance for SWH types associated with avian habitats.

The activities associated with the construction and decommissioning phases have the potential to affect avian species richness and abundance by loss, degradation, fragmentation, or sensory disturbance of bird habitat or through direct mortality to individuals or their eggs. Siting of wind turbines and new access roads during the planning of the Project sought to limit negative residual effects to birds and/or their habitats by siting the turbines in agricultural areas, outside of bird SWH.

Under exceptional circumstances, construction and decommissioning activities could result in habitat alienation, displacement, or nest desertion. Forman and Hersperger (1996) suggest that noise associated with traffic can affect bird populations by disrupting vocal communication required for mate selection, mate location, foraging communication, predator detection and avoidance, and parent-nestling communication. However, the intermittent noise associated with heavy machinery and construction activities is not expected to be dissimilar from the noise of farm machinery that regularly operates within the Project Area. Moreover, potential sensory disturbance is expected to be mitigated by restricting activities that remove or alter vegetation in the breeding season for most bird species (May until August). As required under the *Migratory Bird Conventions Act* (Department of Justice, 1994) or *Fish and Wildlife Conservation Act* (Service Ontario, 1997), should any construction operations at the Project Location be required during the breeding season (e.g., raptors breed in April), avian nest surveys will be undertaken in the specific areas where negative interactions may be predicted

(i.e. inside significant woodlot boundaries where an access road is to be constructed) to identify the presence of mating or nesting birds and appropriate species-specific setbacks. Changes to the construction sequencing in the immediate area will be created in consultation with Environment Canada/Canadian Wildlife Service (EC/CWS) and MNR and exclusion zones flagged from the work area(s). Nonetheless, localized residual sensory disturbance effects for some early-nesting area-sensitive and forest interior species (e.g., pileated woodpecker (*Dryocopus pileatus*) and red-breasted nuthatch (*Sitta canadensis*) may occur temporarily where the timing of construction and decommissioning activities occur in breeding or nesting areas.

Although bird-vehicle collisions may result in the mortality of some individuals during the construction and decommissioning phases of the Project, particularly during the transport of equipment, the number of collisions is expected to be lower than that caused by other vehicle traffic because most vehicles will be traveling at speeds slower than the posted limit. Therefore, this activity does not warrant specific mitigation measures and no significant residual effects are predicted.

5.3.5.2 Operation and Maintenance

The most prevalent consideration in the analyses of potential effects of wind farm operation on significant wildlife habitats is the effect of mortality due to collisions with turbine blades and sensory disturbance to birds using adjacent significant features that are sites within 120 m of the Project location. Sensory disturbance effects and behavioural change as a result of turbine operation are generally considered to be more likely than direct mortality (Kingsley and Whittam, 2007). In extreme circumstances, turbine operations may displace birds, cause nest abandonment and stress, obstruct avian flight paths, and result in reduced breeding success within localized areas of the Project. Studies in the Netherlands suggest that landbird, and in particular woodland songbird, population densities begin to decline at an average noise level of 42 dB (Reijnen *et al.,* 1996). Although the noise and movement associated with turbines may cause less disturbance than the noise and movement of farm machinery that periodically operates within the Project Area, or local traffic, the temporal duration of the turbine noise is expected to be substantially increased. As such, it is anticipated that some residual effects associated with sensory disturbance will persist, especially for area-sensitive and forest interior species that are more sensitive to such effects. However, noise levels within forested communities are expected to decrease rapidly with distance as sound is attenuated by natural acoustic obstructions in the form of forest vegetation. The attenuation effect will be lessened during winter condition due to the reduction in foliage, but bird use during these periods is also substantially reduced relative to what is predicted at other times of the year.

Bird mortality has been documented at operational wind development projects in North America and in southwestern Ontario. At a wind park along the Lake Erie shoreline in southwestern Ontario, bird mortalities ranged from 0-4 birds/turbine/year, with the highest rate of collision occurring at a turbine sited within 250 m of the shoreline (James, 2008). The mortalities have often been attributed to in-flight collisions with wind turbine blades and/or the tower structures. The hazard that wind turbines pose to birds varies by season and by species, with spring and fall migration typically being of the highest risk periods. Contrary to previous suggestions, a recent literature review indicates that there is no evidence of a transportation-lighting effect on the collision rates of nocturnally migrating birds at wind turbines (Arnett *et al.,* 2007; Kunz *et al.,* 2007).

The MNR has released a guidance document (MNR, 2010e) which outlines thresholds for bird mortalities at wind farms. This guidance document also lists MNR expectations for post-construction mortality monitoring. The post construction monitoring season required will extend from May 1 to late October, with possible additional survey windows for specific seasons when migratory or over-wintering birds may be at risk. This monitoring plan will be required by MNR to continue for three years assuming thresholds have not been exceeded. If a threshold is exceeded, operational mitigation must be employed for the life of the Project, and additional monitoring would likely be required pending further consultation with the MNR.

5.4 Summary of Post Construction Environmental Effects Monitoring

Environmental effects monitoring during construction and decommissioning will be undertaken by a third party Environmental Compliance Monitor to observe that mitigation measures and BMP's identified in the collective REA Application documents are implemented by NextEra Energy Canada and the selected contractors and that these achieve the desired performance objectives(e.g., watercourse crossings). During Operations, monitoring will focus on post-construction bird and bat mortality, to be undertaken by qualified third party experts retained by NextEra Energy Canada. The outcomes of environmental effects monitoring for birds and bats will be reported annually to MNR. Construction and decommissioning monitoring outcomes will be assessed via the third party Environmental Compliance Monitor with reports provided to the Contractor, NextEra Energy Canada, and to responsible authorities where required as a condition of the Renewable Energy Approval or other associated permits and approvals. More detailed specifics of the environmental Effects Monitoring Plan for birds and bats will be developed and communicated to MNR.

6.0 CONFIRMATION FROM MINISTRY OF NATURAL RESOURCES

A requirement of O. Reg. 359/09 is that the proponent of a wind facility Project obtains confirmation from the MNR that the appropriate Natural Heritage Assessment procedures were followed for the Project (as per Section 28(2). Following their final review and approval of the Report, a letter confirming the appropriate Natural Heritage Assessment procedures will be provided and included in the REA submission to MOE.

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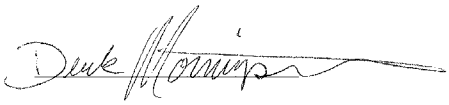

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FIGURE 1

Project Area with Map Index

FIGURE 2A TO 2G

Records Review and Site Investigations Figures

FIGURE 3A TO 3G

Evaluation of Significance of Woodlands, Wetlands and Valleylands

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FIGURE 4-1A TO 4-8F

Evaluation of Significance of Wildlife Habitat

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APPENDIX A

Site Investigation and Evaluation of Significance Field Notes For Natural Features Within 120m of Project Location (included on CD)

APPENDIX B

Golder Area-Based Avian Use Survey Results

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TABLES

1.0 INTRODUCTION

During 2008, Golder Associates Ltd. (Golder) was retained by NextEra Energy Canada, ULC (NextEra Energy Canada) to undertake a bird monitoring program for a proposed wind power project located in the vicinity of Nanticoke, Haldimand County, Ontario (Figure 1), called the Summerhaven Wind Energy Centre (the Project). The purpose of this field program was to collect data on bird use of the Avian Study Area during the summer and fall of 2008, and winter and spring of 2009. Surveys were initiated prior to final determination of project layout, but survey plots were selected to sample the overall Avian Study Area from a landscape perspective. As a result, a protocol for collecting these data was developed to meet the expectations of Environment Canada (EC) and MNR, based on previous discussions with these agencies and a review of guidelines and draft guidelines (e.g., Kingsley and Whittam 2007; OMNR 2010). Specifically, Golder undertook avian use surveys (AUS) to assess the distribution, abundance, and flight behaviour of the avifauna in the Avian Study Area.

This report (Appendix C: The Avian Use Monitoring Report) is supplement to the Summerhaven Natural Heritage Assessment Report (NHA) of a Renewable Energy Approval (REA) submission, Version 4, and should be interpreted as such.

1.1 Background

Observed effects of wind energy projects on birds are either direct, as in the case of mortality arising from collisions with wind turbines, or indirect, as in the case of habitat loss for infrastructure or disturbance of habitat through changes in existing activity levels or sensory disturbance. In fact, indirect effects may be more substantive than direct mortality. In general, public perception tends to considerably inflate the actual avian mortality attributable to wind energy projects (EC 2007). The actual avian mortality depends on a number of site-specific factors, including bird densities and the types of species and habitats present, as well as the wind farm design features that may either individually, or in combination with each other, influence avian mortality rates. The scope of the study described herein did not account for these details, or specific habitats within 120 m of the Project Location, since they were not known at the time these studies were conducted and will be further outlined within the NHA. Some of these factors include:

- Topography;
- Scale of the facility;
- Tower dimension and design;
- Turbine lighting;
- Blade speed;
- Habitat type;
- Transmission line design and location; and
- Facility configuration.

A large number of studies have been undertaken to investigate concerns related to avian mortality resulting from wind farms (e.g., Osborn *et al*., 2000; Johnson *et al*., 2003; Barrios and Rodríguez 2004; Echotrack 2005;

Drewitt and Langston 2006). These findings indicate that overall, bird deaths due to wind turbines are low, especially when compared to other anthropogenic structures. In one particular study of avian mortality (Erickson *et al*., 2001), an extensive literature review was conducted and a comparison of annual avian mortality in the U.S. was presented. This same study indicated that the annual average number of birds killed in the USA is estimated at 2.19 birds per turbine per year.

Table 1: Predicted Annual Avian Mortality Rates, USA

Anthropogenic Structure	Bird Deaths/Year
Vehicles	80,000,000
Buildings and Windows	550,000,000
Cats	100,000,000
Power Lines	130,000,000
Communication Towers	4,500,000
Wind Power Parks	28,500

Although avian mortality due to wind turbines is reported to be low in comparison to other anthropogenic structures, when selecting and assessing infrastructure layouts during the environmental screening process, it is important to identify bird breeding, staging, and foraging areas, as well as migration routes, to minimize any potentially adverse environmental effects. This technical report documents the avian community characteristics of the Avian Study Area to assess any potentially adverse environmental effects of the proposed Project. We consider the field program to be appropriate for examining the dynamics of bird movements for the Avian Study Area. The surveys provide a representative cross-section of the diversity, abundance, and behaviour of birds using the Avian Study Area.

2.0 METHODS

2.1 Literature Review

A variety of documents and information sources were reviewed to develop the monitoring protocol, determine important bird-related issues, and to identify site-specific records of natural features, habitats, or species occurrences that were relevant to the proposed Project. Guidance regarding monitoring protocols and report contents was obtained from the following sources:

- Birds and Bird Habitats: Guidelines for Wind Power Projects. (OMNR, October 2010)
- Kingsley, A. and B. Whittam. (2007). Wind Turbines and Birds: A Background Review for Environmental Assessment. Prepared for the Canadian Wildlife Service. Draft April 2, 2007.
- Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds. Prepared by the Canadian Wildlife Service. Final Report, February 2007; and
- Wind Turbines and Birds: A Guidance Document for Environmental Assessment. Final Report (EC, April 2007);

Technical information regarding breeding, resident, wintering and migrant birds, national, provincial, and regional bird status, and species of conservation concern were collected from the following sources:

- Bird Studies Canada. Conservation Priorities for the Birds of Southern Ontario (Couturier 1999)
- Canada *Species at Risk Act* (Species at Risk Act 2002)
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2010)
- Natural Heritage Information Centre (NHIC) database (www.mnr.gov.on.ca/MNR/nhic/nhic.cfm); and
- Ontario *Endangered Species Act* (Endangered Species Act 2007)
- Ontario Partners in Flight. Ontario Landbird Conservation Plan. (Ontario Partners in Flight 2008)

2.2 Avian Use Surveys

Breeding bird surveys from late May to early July began one-half hour before sunrise and were generally completed by 1000 EST. Spring and fall migration surveys began at, or within, one-half hour of sunrise and were generally completed by late morning. Some plots in the open agricultural landscape were sampled in the afternoon during raptor migration. Surveys were conducted when weather conditions (i.e., precipitation and wind) were within the parameters required by monitoring programs such as the Breeding Bird Survey (Droege, 1990) or the Ontario Forest Bird Monitoring Program (Welsh, 1995). During the summer, fall and winter surveys, sampling stations 1 through 30 were surveyed, and all 42 stations were surveyed in the spring (Figure 8). Twelve stations were added due to a shift in Project Location. AUS counts were ten minutes in duration and all species heard or observed in all directions were recorded. Information recorded for each observation included the number of birds (or if in a flock the flock size), species (or bird group if the species was not discernable,

e.g., sparrow), behaviour at the time of observation (perched, soaring, in flight, or flying with a specific direction), relative flight height and flight direction, and distance to individuals or flocks.

Prior to the acquisition of the Project by NextEra Energy Canada from Air Energy TCI Inc, Mr. Dave Martin also conducted bird surveys in 2009 and 2010. Observations from these surveys were used to supplement those of Golder. A summary of Mr. Martin's surveys are provided in Appendix B.

2.3 Spring Tundra Swan/Waterfowl Surveys

Point counts are not suitable for detecting some bird groups such as waterfowl and raptors; therefore, an area search was conducted to document the occurrence of species that are typically not detected during point count surveys. Approximately three hours of area-searching was conducted during each round of surveys.

3.0 RESULTS

Table 2: Birds Observed During Seasonal Avian Surveys Conducted in the Summerhaven Project Area Summer 2008 to Spring 2009

Common name	Scientific Name	Summer 2008			Fall 2008			Winter 2009			Spring 2009			Total		
		Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition
alder Flycatcher	*Empidonax alnorum*	1	0.02	0.00		0.00	0.00		0.00	0.00			0	1	0.008	0.00
American black duck	*Anas rubripes*		0.00	0.00	27	0.15	0.00		0.00	0.00			0	27	0.219	0.00
American crow	*Corvus brachyrhynchos*	14	0.23	0.01	99	0.55	0.01	20	0.22	0.02	90	0.55	0.014	223	1.806	0.01
American goldfinch	*Carduelis tristis*	41	0.68	0.02	312	1.73	0.03	13	0.14	0.01	137	0.84	0.021	503	4.075	0.03
American kestrel	*Falco sparverius*		0.00	0.00	9	0.05	0.00	1	0.01	0.00	1	0.01	2E-04	11	0.089	0.00
American pipit	*Anthus rubescens*		0.00	0.00	21	0.12	0.00		0.00	0.00			0	21	0.17	0.00
American redstart	*Setophaga ruticilla*		0.00	0.00	4	0.02	0.00		0.00	0.00	2	0.01	3E-04	6	0.049	0.00
American robin	*Turdus migratorius*	62	1.03	0.03	61	0.34	0.01	5	0.06	0.00	242	1.48	0.037	370	2.997	0.02
American tree sparrow	*Spizella arborea*		0.00	0.00	8	0.04	0.00	92	1.02	0.07			0	100	0.81	0.00
American wigeon	*Anas Americana*		0.00	0.00	10	0.06	0.00		0.00	0.00			0	10	0.081	0.00
bald eagle	*Haliaeetus leucocephalus*		0.00	0.00	1	0.01	0.00	12	0.13	0.01	4	0.02	6E-04	17	0.138	0.00
Baltimore oriole	*Icterus galbula*	8	0.13	0.00		0.00	0.00		0.00	0.00	23	0.14	0.004	31	0.251	0.00
bank swallow	*Riparia riparia*	4	0.07	0.00	6	0.03	0.00		0.00	0.00			0	10	0.081	0.00
barn swallow	*Hirundo rustica*	44	0.73	0.02	4	0.02	0.00		0.00	0.00	73	0.45	0.011	121	0.98	0.01
belted kingfisher	*Ceryle alcyon*		0.00	0.00	3	0.02	0.00		0.00	0.00	3	0.02	5E-04	6	0.049	0.00
black-billed cuckoo	*Coccyzus erythropthalmus*	1	0.02	0.00		0.00	0.00		0.00	0.00	1	0.01	2E-04	2	0.016	0.00
blackbird species	*Icteridae*		0.00	0.00	610	3.39	0.06		0.00	0.00	34	0.21	0.005	644	5.217	0.03
black-capped chickadee	*Poecile atricapilla*	9	0.15	0.01	75	0.42	0.01	32	0.36	0.02	26	0.16	0.004	142	1.15	0.01
black-throated green warbler	*Dendroica virens*		0.00	0.00	4	0.02	0.00		0.00	0.00			0	4	0.032	0.00
blue jay	*Cyanocitta cristata*	14	0.23	0.01	153	0.85	0.01	16	0.18	0.01	36	0.22	0.006	219	1.774	0.01
blue-headed vireo	*Vireo solitaries*		0.00	0.00	2	0.01	0.00		0.00	0.00	5	0.03	8E-04	7	0.057	0.00

blue-winged teal	*Anas discors*		0.00	0.00	5	0.03	0.00		0.00	0.00			0	5	0.041	0.00
Bobolink	*Dolichonyx oryzivorus*	24	0.40	0.01	2	0.01	0.00		0.00	0.00	40	0.24	0.006	66	0.535	0.00
Bonaparte's gull	*Larus philidelphia*	3	0.05	0.00	120	0.67	0.01		0.00	0.00	704	4.3	0.109	827	6.699	0.04
broad-winged hawk	*Buteo platypterus*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
brown creeper	*Certhia americana*		0.00	0.00	3	0.02	0.00		0.00	0.00			0	3	0.024	0.00
brown thrasher	*Toxostoma rufum*	1	0.02	0.00	2	0.01	0.00		0.00	0.00	9	0.05	0.001	12	0.097	0.00
brown-headed cowbird	*Molothrus ater*	19	0.32	0.01	70	0.39	0.01	11	0.12	0.01	144	0.88	0.022	244	1.977	0.01
Bufflehead	*Bucephala albeola*		0.00	0.00	83	0.46	0.01	41	0.46	0.03	139	0.85	0.022	263	2.13	0.01
Canada goose	*Branta canadensis*	19	0.32	0.01	1613	8.96	0.15	252	2.80	0.20	162	0.99	0.025	2046	16.57	0.10
Carolina wren	*Thryothorus ludovicianus*	1	0.02	0.00		0.00	0.00	1	0.01	0.00	1	0.01	2E-04	3	0.024	0.00
Caspian tern	*Sterna caspia*	5	0.08	0.00	6	0.03	0.00		0.00	0.00	7	0.04	0.001	18	0.146	0.00
cedar waxwing	*Bombycilla cedrorum*	15	0.25	0.01	37	0.21	0.00		0.00	0.00	72	0.44	0.011	124	1.004	0.01
chestnut-sided warbler	*Dendroica pensylvanica*			0.00			0.00			0.00	6	0.04	9E-04	6	0.049	0.00
chipping sparrow	*Spizella passerina*	23	0.38	0.01	10	0.06	0.00		0.00	0.00	27	0.16	0.004	60	0.486	0.00
clay-coloured sparrow	*Spizella pallid*			0.00			0.00			0.00	4	0.02	6E-04	4	0.032	0.00
cliff swallow	*Petrochelidon pyrrhonota*	34	0.57	0.02		0.00	0.00		0.00	0.00	17	0.1	0.003	51	0.413	0.00
common goldeneye	*Bucephala clangula*		0.00	0.00	8	0.04	0.00	22	0.24	0.02	16	0.1	0.002	46	0.373	0.00
common grackle	*Quiscalus quiscula*	139	2.32	0.08	959	5.33	0.09		0.00	0.00	351	2.14	0.054	1449	11.74	0.07
common loon	*Gavia immer*		0.00	0.00	6	0.03	0.00		0.00	0.00	3	0.02	5E-04	9	0.073	0.00
common merganser	*Mergus merganser*		0.00	0.00	2	0.01	0.00	5	0.06	0.00	295	1.8	0.046	302	2.446	0.02
common redpoll	*Carduelis flammea*		0.00	0.00		0.00	0.00	4	0.04	0.00			0	4	0.032	0.00
common tern	*Sterna hirundo*		0.00	0.00	10	0.06	0.00		0.00	0.00	100	0.61	0.015	110	0.891	0.01
common yellowthroat	*Geothlypis trichas*	2	0.03	0.00	1	0.01	0.00		0.00	0.00	9	0.05	0.001	12	0.097	0.00
cooper's hawk	*Accipiter cooperii*		0.00	0.00	2	0.01	0.00		0.00	0.00			0	2	0.016	0.00
dark-eyed junco	*Junco hyemalis*		0.00	0.00	53	0.29	0.01	14	0.16	0.01			0	67	0.543	0.00

double-crested cormorant	*Phalacrocorax auritus*	20	0.33	0.01	118	0.66	0.01		0.00	0.00	26	0.16	0.004	164	1.328	0.01
downy woodpecker	*Picoides pubescens*	3	0.05	0.00	9	0.05	0.00	8	0.09	0.01	7	0.04	0.001	27	0.219	0.00
duck species	*Anatidae*		0.00	0.00	380	2.11	0.04	5	0.06	0.00	22	0.13	0.003	407	3.297	0.02
eastern bluebird	*Sialia sialis*	1	0.02	0.00	13	0.07	0.00	2	0.02	0.00	8	0.05	0.001	24	0.194	0.00
Eastern Kingbird	*Tyrannus tyrannus*	2	0.03	0.00		0.00	0.00		0.00	0.00	7	0.04	0.001	9	0.073	0.00
eastern meadowlark	*Sturnella magna*	4	0.07	0.00		0.00	0.00		0.00	0.00	20	0.12	0.003	24	0.194	0.00
eastern phoebe	*Sayornis phoebe*		0.00	0.00	4	0.02	0.00		0.00	0.00	4	0.02	6E-04	8	0.065	0.00
eastern screech-owl	*Megascops asio*		0.00	0.00		0.00	0.00	1	0.01	0.00			0	1	0.008	0.00
eastern wood-pewee	*Contopus virens*	4	0.07	0.00	2	0.01	0.00		0.00	0.00	3	0.02	5E-04	9	0.073	0.00
European starling	*Sturnus vulgaris*	456	7.60	0.26	2668	14.82	0.25	59	0.66	0.05	240	1.47	0.037	3423	27.73	0.17
field sparrow	*Spizella pusilla*	7	0.12	0.00		0.00	0.00		0.00	0.00	11	0.07	0.002	18	0.146	0.00
forester’s tern	*Sterna forsteri*		0.00	0.00	2	0.01	0.00		0.00	0.00			0	2	0.016	0.00
golden eagle	*Aquila chrysaetos*		0.00	0.00		0.00	0.00	1	0.01	0.00			0	1	0.008	0.00
golden-crowned kinglet	*Regulus satrapa*		0.00	0.00	11	0.06	0.00	1	0.01	0.00	2	0.01	3E-04	14	0.113	0.00
great black-backed gull	*Larus marinus*		0.00	0.00	1	0.01	0.00		0.00	0.00	1	0.01	2E-04	2	0.016	0.00
great blue heron	*Ardea Herodias*	1	0.02	0.00	7	0.04	0.00		0.00	0.00	2	0.01	3E-04	10	0.081	0.00
great crested flycatcher	*Myiarchus crinitus*	8	0.13	0.00		0.00	0.00		0.00	0.00	10	0.06	0.002	18	0.146	0.00
greater scaup	*Aythya marila*		0.00	0.00	51	0.28	0.00		0.00	0.00			0	51	0.413	0.00
greater yellowlegs	*Tringa melanoleuca*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
green heron	*Butorides virescens*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
green-winged teal	*Anas crecca*		0.00	0.00	9	0.05	0.00		0.00	0.00			0	9	0.073	0.00
grey catbird	*Dumetella carolinensis*	8	0.13	0.00	21	0.12	0.00		0.00	0.00	14	0.09	0.002	43	0.348	0.00
Gull Species	*Laridae*	6	0.10	0.00	21	0.12	0.00		0.00	0.00	387	2.36	0.06	414	3.354	0.02
hairy woodpecker	*Picoides villosus*		0.00	0.00	5	0.03	0.00		0.00	0.00	1	0.01	2E-04	6	0.049	0.00
hermit thrush	*Catharus guttatus*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
herring gull	*Larus argentatus*	15	0.25	0.01	10	0.06	0.00	1	0.01	0.00	23	0.14	0.004	49	0.397	0.00
hooded	*Lophodytes*			0.00			0.00			0.00	22	0.13	0.003	22	0.178	0.00

merganser	*cucullatus*															
horned lark	*Eremophila alpestris*	25	0.42	0.01	188	1.04	0.02	26	0.29	0.02	195	1.19	0.03	434	3.516	0.02
house finch	*Carpodacus mexicanus*	4	0.07	0.00	22	0.12	0.00	1	0.01	0.00	5	0.03	8E-04	32	0.259	0.00
house sparrow	*Passer domesticus*	32	0.53	0.02	84	0.47	0.01	9	0.10	0.01	92	0.56	0.014	217	1.758	0.01
house wren	*Troglodytes aedon*	12	0.20	0.01	3	0.02	0.00		0.00	0.00	20	0.12	0.003	35	0.284	0.00
indigo bunting	*Passerina cyanea*	5	0.08	0.00	7	0.04	0.00		0.00	0.00			0	12	0.097	0.00
Killdeer	*Charadrius vociferus*	40	0.67	0.02	41	0.23	0.00		0.00	0.00	119	0.73	0.018	200	1.62	0.01
Lapland longspur	*Calcarius lapponicus*		0.00	0.00	17	0.09	0.00	2	0.02	0.00			0	19	0.154	0.00
least flycatcher	*Empidonax minimus*			0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00
least sandpiper	*Calidris minutilla*			0.00			0.00			0.00	51	0.31	0.008	51	0.413	0.00
lesser scaup	*Aythya affinis*			0.00			0.00			0.00	53	0.32	0.008	53	0.429	0.00
little gull	*Larus minutes*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
long-tailed duck	*Clangula hyemalis*		0.00	0.00		0.00	0.00	1	0.01	0.00			0	1	0.008	0.00
magnolia warbler	*Dendroica magnolia*			0.00			0.00			0.00	2	0.01	3E-04	2	0.016	0.00
Mallard	*Anas platyrhynchos*		0.00	0.00	108	0.60	0.01	39	0.43	0.03	20	0.12	0.003	167	1.353	0.01
Merlin	*Falco columbarius*		0.00	0.00	4	0.02	0.00		0.00	0.00	1	0.01	2E-04	5	0.041	0.00
mourning dove	*Zenaida macroura*	33	0.55	0.02	104	0.58	0.01	1	0.01	0.00	102	0.62	0.016	240	1.944	0.01
Nashville warbler	*Vermivora ruficapilla*		0.00	0.00	2	0.01	0.00		0.00	0.00			0	2	0.016	0.00
northern cardinal	*Cardinalis cardinalis*	7	0.12	0.00	27	0.15	0.00	9	0.10	0.01	33	0.2	0.005	76	0.616	0.00
northern flicker	*Colaptes auratus*	5	0.08	0.00	11	0.06	0.00		0.00	0.00	15	0.09	0.002	31	0.251	0.00
northern goshawk	*Accipiter gentilis*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
northern harrier	*Circus cyaneus*		0.00	0.00	16	0.09	0.00	4	0.04	0.00	3	0.02	5E-04	23	0.186	0.00
northern mockingbird	*Mimus polyglottos*	1	0.02	0.00	2	0.01	0.00		0.00	0.00	4	0.02	6E-04	7	0.057	0.00
northern rough-winged swallow	*Stelgidopteryx serripennis*	1	0.02	0.00	2	0.01	0.00		0.00	0.00	19	0.12	0.003	22	0.178	0.00
northern shrike	*Lanius excubitor*		0.00	0.00	1	0.01	0.00	1	0.01	0.00			0	2	0.016	0.00
northern waterthrush	*Seiurus noveboracensis*			0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00

orange-crowned warbler	*Vermivora celata*		0.00	0.00	2	0.01	0.00		0.00	0.00			0	2	0.016	0.00
pileated woodpecker	*Dryocopus pileatus*		0.00	0.00		0.00	0.00	1	0.01	0.00	1	0.01	2E-04	2	0.016	0.00
pine siskin	*Carduelis pinus*		0.00	0.00	39	0.22	0.00	1	0.01	0.00	1	0.01	2E-04	41	0.332	0.00
purple finch	*Carpodacus purpureus*		0.00	0.00	2	0.01	0.00		0.00	0.00	7	0.04	0.001	9	0.073	0.00
purple martin	*Progne subis*	4	0.07	0.00		0.00	0.00		0.00	0.00			0	4	0.032	0.00
purple sandpiper	*Calidris maritima*		0.00	0.00	1	0.01	0.00		0.00	0.00			0	1	0.008	0.00
red-bellied woodpecker	*Melanerpes carolinus*		0.00	0.00	4	0.02	0.00	1	0.01	0.00	3	0.02	5E-04	8	0.065	0.00
red-breasted merganser	*Mergus serrator*		0.00	0.00	569	3.16	0.05		0.00	0.00	38	0.23	0.006	607	4.917	0.03
red-eyed vireo	*Vireo olivaceus*	5	0.08	0.00	5	0.03	0.00		0.00	0.00	4	0.02	6E-04	14	0.113	0.00
red-necked grebe	*Podiceps grisegna*			0.00			0.00			0.00	2	0.01	3E-04	2	0.016	0.00
red-tailed hawk	*Buteo jamaicensis*		0.00	0.00	43	0.24	0.00	19	0.21	0.01	24	0.15	0.004	86	0.697	0.00
red-winged blackbird	*Agelaius phoeniceus*	295	4.92	0.17	454	2.52	0.04		0.00	0.00	1240	7.57	0.192	1989	16.11	0.10
ring-billed gull	*Larus delawarensis*	73	1.22	0.04	399	2.22	0.04	4	0.04	0.00	113	0.69	0.017	589	4.771	0.03
rock pigeon	*Columba livia*	4	0.07	0.00	168	0.32	0.00	136	1.51	0.11	23	0.14	0.004	1	0.008	0.00
rose-breasted grosbeak	*Pheucticus ludovicianus*	2	0.03	0.00	1	0.01	0.00		0.00	0.00	8	0.05	0.001	11	0.089	0.00
rough-legged hawk	*Buteo lagopus*		0.00	0.00	1	0.01	0.00	8	0.09	0.01	3	0.02	5E-04	12	0.097	0.00
ruby-crowned kinglet	*Regulus calendula*		0.00	0.00	4	0.02	0.00		0.00	0.00	1	0.01	2E-04	5	0.041	0.00
rusty blackbird	*Euphagus carolinus*		0.00	0.00	8	0.04	0.00		0.00	0.00			0	8	0.065	0.00
Sanderling	*Calidris alba*		0.00	0.00	32	0.18	0.00		0.00	0.00			0	32	0.259	0.00
sandhill crane	*Grus canadensis*		0.00	0.00	2	0.01	0.00		0.00	0.00	1	0.01	2E-04	3	0.024	0.00
savannah sparrow	*Passerculus sandwichensis*	37	0.62	0.02	24	0.13	0.00		0.00	0.00	93	0.57	0.014	154	1.247	0.01
sharp-shinned hawk	*Accipiter striatus*		0.00	0.00	7	0.04	0.00		0.00	0.00	2	0.01	3E-04	9	0.073	0.00
short-eared owl	*Asio flammeus*		0.00	0.00		0.00	0.00	3	0.03	0.00			0	3	0.024	0.00
snow bunting	*Plectrophenax nivalis*		0.00	0.00	2	0.01	0.00	353	3.92	0.27			0	355	2.876	0.02
solitary sandpiper	*Tringa solitaria*			0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00
song sparrow	*Melospiza melodia*	74	1.23	0.04	115	0.64	0.01		0.00	0.00	221	1.35	0.034	410	3.321	0.02

sparrow species				0.00			0.00			0.00	3	0.02	5E-04	3	0.024	0.00
spotted sandpiper	*Actitis macularia*	7	0.12	0.00	2	0.01	0.00		0.00	0.00	5	0.03	8E-04	14	0.113	0.00
Swainson's thrush	*Catharus ustulatus*			0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00
swallow species				0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00
swamp sparrow	*Melospiza georgiana*	1	0.02	0.00	9	0.05	0.00		0.00	0.00	6	0.04	9E-04	16	0.13	0.00
tree swallow	*Tachycineta bicolor*	24	0.40	0.01	5	0.03	0.00		0.00	0.00	70	0.43	0.011	99	0.802	0.00
tufted titmouse	*Baeolophus bicolor*		0.00	0.00		0.00	0.00	4	0.04	0.00	120	0.73	0.019	124	1.004	0.01
turkey vulture	*Cathartes aura*	2	0.03	0.00	107	0.59	0.01		0.00	0.00			0	109	0.883	0.01
upland sandpiper	*Bartramia longicauda*			0.00			0.00			0.00	2	0.01	3E-04	2	0.016	0.00
Veery	*Catharus fuscescens*			0.00			0.00			0.00	1	0.01	2E-04	1	0.008	0.00
vesper sparrow	*Pooecetes gramineus*	11	0.18	0.01	2	0.01	0.00		0.00	0.00	16	0.1	0.002	29	0.235	0.00
warbling vireo	*Vireo gilvus*	12	0.20	0.01	3	0.02	0.00		0.00	0.00	11	0.07	0.002	26	0.211	0.00
white-breasted nuthatch	*Sitta carolinensis*	1	0.02	0.00	20	0.11	0.00	8	0.09	0.01	4	0.02	6E-04	33	0.267	0.00
white-crowned sparrow	*Zonotrichia leucophrys*		0.00	0.00	33	0.18	0.00	2	0.02	0.00	1	0.01	2E-04	36	0.292	0.00
white-throated sparrow	*Zonotrichia albicollis*		0.00	0.00	81	0.45	0.01	4	0.04	0.00	10	0.06	0.002	95	0.77	0.00
white-winged crossbill	*Loxia leucoptera*		0.00	0.00		0.00	0.00	32	0.36	0.02			0	32	0.259	0.00
white-winged scoter	*Melanitta deglandi*		0.00	0.00	2	0.01	0.00		0.00	0.00			0	2	0.016	0.00
wild turkey	*Meleagris gallopava*	7	0.12	0.00	15	0.08	0.00		0.00	0.00	5	0.03	8E-04	27	0.219	0.00
willow flycatcher	*Empidonax traillii*	8	0.13	0.00		0.00	0.00		0.00	0.00	3	0.02	5E-04	11	0.089	0.00
Wilson’s snipe	*Gallinago delicata*			0.00			0.00			0.00	4	0.02	6E-04	4	0.032	0.00
winter wren	*Troglodytes troglodytes*		0.00	0.00	9	0.05	0.00	1	0.01	0.00			0	10	0.081	0.00
wood duck	*Aix sponsa*		0.00	0.00	2	0.01	0.00		0.00	0.00	1	0.01	2E-04	3	0.024	0.00
wood thrush	*Hylocichla mustelina*	4	0.07	0.00		0.00	0.00		0.00	0.00	2	0.01	3E-04	6	0.049	0.00
yellow warbler	*Dendroica petechia*	31	0.52	0.02	7	0.04	0.00		0.00	0.00	65	0.4	0.01	103	0.834	0.01
yellow-rumped warbler	*Dendroica coronata*		0.00	0.00	17	0.09	0.00		0.00	0.00	14	0.09	0.002	31	0.251	0.00

Grand Total		**1785**	**29.75**	**1.00**	**10574**	**58.74**	**1.00**	**1289**	**14.32**	**1.00**	**6460**	**39.44**	**1**	**20108**	**162.9**	**1.00**
Species Number		**65**			**65**			**49**			**110**			**149**		

Table 3: Number of Birds by Group, Mean Use and Percent Composition of Bird Groups Observed by Golder During the Study Period from Summer 2008 to Spring 2009

Bird Group	Spring			Summer			Fall			Winter			Total		
	Total Number of Individuals	Mean Use	Percent Composition	Total Number of Individuals	Mean Use	Proportional Composition	Total Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition	Number of Individuals	Mean Use	Proportional Composition
Gamebirds	3951	24.12	0.61	7	0.12	0.00	15	0.08	0.00		0.00	0.00	3973	32.18	0.20
Passerines	158	0.96	0.02	1580	26.33	0.89	6688	37.16	0.63	860	9.56	0.67	9286	75.22	0.46
Raptors	1429	8.72	0.22	2	0.03	0.00	192	1.07	0.02	49	0.54	0.04	1672	13.54	0.08
Shorebirds	708	4.32	0.11	47	0.78	0.03	77	0.43	0.01		0.00	0.00	832	6.74	0.04
Waterbirds	182	1.11	0.03	122	2.03	0.07	1273	7.07	0.12	5	0.06	0.00	1582	12.81	0.08
Waterfowl	27	0.16	0.00	19	0.32	0.01	2300	12.78	0.22	365	4.06	0.28	2711	21.96	0.13
Woodpeckers	5	0.03	0.00	8	0.13	0.00	29	0.16	0.00	10	0.11	0.01	52	0.42	0.00
Grand Total	**6460**	**39.44**	**1.00**	**1785**	**29.75**	**1.00**	**10574**	**58.74**	**1.00**	**1289**	**14.32**	**1.00**	**20108**	**162.88**	**1.00**

Table 4: Bird Groups Observed Flying Under, Within and Over the Sweep of the Turbine Blades from Summer 2008 to Spring 2009

Species Common Name	Under 30 m		Within 30-130		Over 130 m		Grand Total
	Number of Individuals	Proportional Composition	Number of Individuals	Proportional Composition	Number of Individuals	Proportional Composition	
Gamebirds	5	0.00		0.00		0.00	5
Passerines	5686	0.52	1057	0.10	15	0.00	6758
Raptors	95	0.01	215	0.02	6	0.00	316
Shorebirds	91	0.01	5	0.00		0.00	96
Waterbirds	985	0.09	190	0.02	4	0.00	1179
Waterfowl	954	0.09	1417	0.13	123	0.01	2494
Woodpeckers	9	0.00	2	0.00		0.00	11
Grand Total	**7825**	**0.72**	**2886**	**0.27**	**148**	**0.01**	**10859**

Table 5: Average Flight Height (m) of Observed Bird Groups from Summer 2008 to Spring 2009.

Bird group	Average Flight Height (m)				
	Spring	Summer	Fall	Winter	Grand Average All Seasons Combined
Gamebirds		1			1
Passerines	12	11	15	14	13
Raptors	46	50	43	30	42
Shorebirds	11	11	12		11
Waterbirds	47	18	25	53	36
Waterfowl	19	40	40	63	41
Woodpeckers	10	5	16		10
Total	**19.48**	**11.79**	**21.80**	**24.18**	**19.3**

Table 6: Bird Groups Observed Flying Under, Within and Over the Sweep of the Turbine Blades from Summer 2008 to Spring 2009.

Species Common Name	Under 30 m		Within 30-130		Over 130 m		Grand Total
	Number of Individuals	Proportional Composition	Number of Individuals	Proportional Composition	Number of Individuals	Proportional Composition	
Gamebirds	5	0.00		0.00		0.00	5
Passerines	5686	0.52	1057	0.10	15	0.00	6758
Raptors	95	0.01	215	0.02	6	0.00	316
Shorebirds	91	0.01	5	0.00		0.00	96
Waterbirds	985	0.09	190	0.02	4	0.00	1179
Waterfowl	954	0.09	1417	0.13	123	0.01	2494
Woodpeckers	9	0.00	2	0.00		0.00	11
Grand Total	**7825**	**0.72**	**2886**	**0.27**	**148**	**0.01**	**10859**

Table 7: Average Flight Height (m) of Observed Bird Groups from Summer 2008 to Spring 2009.

Bird group	Average Flight Height (m)				
	Spring	Summer	Fall	Winter	Grand Average All Seasons Combined
Gamebirds		1			1
Passerines	12	11	15	14	13
Raptors	46	50	43	30	42
Shorebirds	11	11	12		11
Waterbirds	47	18	25	53	36
Waterfowl	19	40	40	63	41
Woodpeckers	10	5	16		10
Total	**19.48**	**11.79**	**21.80**	**24.18**	**19.3**

3.1 Avian Use Surveys

Avian use surveys conducted during the spring migration season, summer breeding season, fall migration and winter identified 20,108 individuals of 149 species during the study period (Table 2). One key focus area for these surveys was along the shore of Lake Erie, predominantly near Peacock Point. Although all features south of Concession 3 Walpole and west of Regional Road 53 are no longer part of the Project due to a shift in Project Location, they have been retained in the analysis because they provide an indication of bird activity in habitats near the shore, which has been considered for turbines situated in the present southeast corner of the Project.

3.1.1 Spring Migration Avian Use Surveys

Spring migration surveys were conducted over five visits between April and May 2009 (Table 2). A total of 6,460 individuals of 110 species were recorded during spring migration. The most common species observed on the Project Area during fall migration were red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*) and common merganser (*Mergus serrator*).

3.1.2 Breeding (Summer) Avian Use Surveys

Summer breeding surveys were conducted over two visits in June and July 2008 (Table 2). A total of 1,785 individuals of 65 species were recorded during the breeding season. The most common species observed on the Site during the breeding season were European starling (*Sturnus vulgaris*), red-winged blackbird and common grackle. These species are all typical of southern Ontario agricultural landscapes.

3.1.3 Fall Migration Avian Use Surveys

Fall migration surveys were conducted over six visits between September and November 2008 (Table 2). A total of 10,574 individuals of 114 species were recorded during fall migration. The most common species observed on the Site during fall migration were European starling (*Sturnus vulgaris*), Canada goose (*Branta canadensis*), and common grackle.

3.1.4 Winter Use Surveys

Three winter use bird surveys were conducted by Golder in January and February, 2009 (Table 2). A total of 1,289 individuals of 49 species were identified during these surveys. The most common species recorded on the Site during the winter use surveys were snow bunting (*Plectrophenax nivalis*), Canada goose and rock pigeon (*Columba livia*).

3.2 Spring Tundra Swan/Waterfowl Surveys

On 21 November 2008, six hours of area searching was conducted to target tundra swans (*Cygnus columbianus*) and other waterfowl that might be using the area. Roads within the Project Area were driven, with observers searching for and noting birds that were flying or feeding in fields. Large fields were also scanned

from the roadside using binoculars. For all waterfowl species observed, location, observed number of individuals, habitat, and behaviours were recorded. A total of 15 tundra swans were observed, all of which were on Lake Erie within 500m from the shore

4.0 SPECIES OF CONSERVATION CONCERN

In this report, Species at Risk (SAR) are those species that are listed under the Federal Governments *Species at Risk Act* (SARA), and the Ontario governments *Endangered Species Act* (ESA).

In addition to Species at Risk (SAR), there are several other groups of species that can be considered to be of conservation concern by the scientific and conservation community in Ontario. This includes species listed as rare or imperiled in Ontario by the NHIC; species that have been identified as at risk by COSEWIC; species identified as conservation priorities by Partners in Flight (PIF); area sensitive species; shorebirds identified as conservation priorities by the Ontario Shorebird Conservation Plan (OSCP); and waterfowl with declining long term population trends as described by the North American Waterfowl Management Plan (NAWMP). Species identified during the 2008 and 2009 surveys within the Avian Study Area are identified whether or not they fall into these categories are found in Table 8.

Table 8: Bird Species Observed by Golder at the Summerhaven Wind Energy Centre and their designations, ranking and status

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]
alder Flycatcher	*Empidonax alnorum*	S5B	Not Listed	Not Listed	No	No	No	No
American black duck	*Anas rubripes*	S4	Not Listed	Not Listed	**Yes**	No	No	**Yes**
American crow	*Corvus brachyrhynchos*	S5B	Not Listed	Not Listed	No	No	No	No
American goldfinch	*Carduelis tristis*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
American kestrel	*Falco sparverius*	S4	Not Listed	Not Listed	**Yes**	**Yes**	No	No
American pipit	*Anthus rubescens*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
American redstart	*Setophaga ruticilla*	S5B	Not Listed	Not Listed	No	No	No	No
American robin	*Turdus migratorius*	S5B	Not Listed	Not Listed	No	No	No	No
American tree sparrow	*Spizella arborea*	S4B	Not Listed	Not Listed	No	No	No	No
American wigeon	*Anas americana*	S4	Not Listed	Not Listed	**Yes**	No	No	No
bald eagle	*Haliaeetus leucocephalus*	**S2N,S4B**	Not at Risk	**Special Concern**	No	**Yes**	No	No
Baltimore oriole	*Icterus galbula*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
bank swallow	*Riparia riparia*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
barn swallow	*Hirundo rustica*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
belted kingfisher	*Ceryle alcyon*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
black-billed cuckoo	*Coccyzus erythropthalmus*	S5B	Not Listed	Not Listed	No	**Yes**	No	No
blackbird species	*Icteridae*							
black-capped chickadee	*Poecile atricapilla*	S5	Not Listed	Not Listed	No		No	No
black-throated green warbler	*Dendroica virens*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
blue jay	*Cyanocitta cristata*	S5	Not Listed	Not Listed	No	No	No	No
blue-headed vireo	*Vireo solitarius*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
blue-winged teal	*Anas discors*	S4	Not Listed	Not Listed	**Yes**	No	No	No
Bobolink	*Dolichonyx oryzivorus*	S4B	**Threatened**	**Threatened**	**Yes**	**Yes**	No	No
Bonaparte's gull	*Larus philidelphia*	S4B,S4N	Not Listed	Not Listed	No	No	No	No
broad-winged hawk	*Buteo platypterus*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
brown creeper	*Certhia americana*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
brown thrasher	*Toxostoma rufum*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
brown-headed cowbird	*Molothrus ater*	S4B	Not Listed	Not Listed	No	No	No	No
Bufflehead	*Bucephala albeola*	S4	Not Listed	Not Listed	No	No	No	No

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]
Canada goose	*Branta canadensis*	S5	Not Listed	Not Listed	No	No	No	No
Carolina wren	*Thryothorus ludovicianus*	S4	Not Listed	Not Listed	No	No	No	No
Caspian tern	*Sterna caspia*	S3B	Not at Risk	Not Listed	No	No	No	No
cedar waxwing	*Bombycilla cedrorum*	S5B	Not Listed	Not Listed	No	No	No	No
chestnut-sided warbler	*Dendroica pensylvanica*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
chipping sparrow	*Spizella passerina*	S5B	Not Listed	Not Listed	No	No	No	No
clay-coloured sparrow	*Spizella pallida*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
cliff swallow	*Petrochelidon pyrrhonota*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
common goldeneye	*Bucephala clangula*	S5	Not Listed	Not Listed	No	No	No	No
common grackle	*Quiscalus quiscula*	S5B	Not Listed	Not Listed	No	No	No	No
common loon	*Gavia immer*	S5B,S5N	Not at Risk	Not Listed	**Yes**	No	No	No
common merganser	*Mergus merganser*	S5B,S5N	Not Listed	Not Listed	No	No	No	No
common redpoll	*Carduelis flammea*	S4B	Not Listed	Not Listed	No	No	No	No
common tern	*Sterna hirundo*	S4B	Not at Risk	Not Listed	No	No	No	No
common yellowthroat	*Geothlypis trichas*	S5B	Not at Risk	Not Listed	No	No	No	No
cooper's hawk	*Accipiter cooperii*	S4	Not at Risk	Not Listed	**Yes**	No	No	No
dark-eyed junco	*Junco hyemalis*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
double-crested cormorant	*Phalacrocorax auritus*	S5B	Not at Risk	Not Listed	No	No	No	No
downy woodpecker	*Picoides pubescens*	S5	Not Listed	Not Listed	No	No	No	No
duck species	*Anatidae*							
eastern bluebird	*Sialia sialis*	S5B	Not at Risk	Not Listed	**Yes**	No	No	No
Eastern Kingbird	*Tyrannus tyrannus*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
eastern meadowlark	*Sturnella magna*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
eastern phoebe	*Sayornis phoebe*	S5B	Not Listed	Not Listed	No	No	No	No
eastern screech-owl	*Megascops asio*	S4	Not at Risk	Not Listed	No	No	No	No
eastern wood-pewee	*Contopus virens*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
European starling	*Sturnus vulgaris*	SNA	Not Listed	Not Listed	No	No	No	No
field sparrow	*Spizella pusilla*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
forester’s tern	*Sterna forsteri*	S2B	Data Deficient	Not Listed	No	No	No	No
golden eagle	*Aquila chrysaetos*	S2B	Not Listed	**Endangered**	No	No	No	No
golden-crowned kinglet	*Regulus satrapa*	S5B	Not Listed	Not Listed	**Yes**	No	No	No

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]
great black-backed gull	*Larus marinus*	S2B	Not Listed	Not Listed	No	No	No	No
great blue heron	*Ardea herodias*	S4	Not Listed	Not Listed	No	No	No	No
great crested flycatcher	*Myiarchus crinitus*	S4B	Not Listed	Not Listed	No	No	No	No
greater scaup	*Aythya marila*	S4	Not Listed	Not Listed	No	No	No	No
greater yellowlegs	*Tringa melanoleuca*	S4B,S4N	Not Listed	Not Listed	No	No	No	No
green heron	*Butorides virescens*	S4B	Not Listed	Not Listed	No	No	No	No
green-winged teal	*Anas crecca*	S4	Not Listed	Not Listed	No	No	No	No
grey catbird	*Dumetella carolinensis*	S4B	Not Listed	Not Listed	No	No	No	No
Gull Species	*Laridae*							
hairy woodpecker	*Picoides villosus*	S5	Not at Risk	Not Listed	No	No	No	No
hermit thrush	*Catharus guttatus*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
herring gull	*Larus argentatus*	S5B,S5N	Not Listed	Not Listed	No	No	No	No
hooded merganser	*Lophodytes cucullatus*	S5B,S5N	Not Listed	Not Listed	No	No	No	No
horned lark	*Eremophila alpestris*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
house finch	*Carpodacus mexicanus*	SNA	Not Listed	Not Listed	No	No	No	No
house sparrow	*Passer domesticus*	SNA	Not Listed	Not Listed	No	No	No	No
house wren	*Troglodytes aedon*	S5B	Not Listed	Not Listed	No	No	No	No
indigo bunting	*Passerina cyanea*	S4B	Not Listed	Not Listed	No	No	No	No
Killdeer	*Charadrius vociferus*	S5B,S5N	Not Listed	Not Listed	No	No	No	No
Lapland longspur	*Calcarius lapponicus*	S3B	Not Listed	Not Listed	No	No	No	No
least flycatcher	*Empidonax minimus*	S4B	Not Listed	Not Listed	No	No	No	No
least sandpiper	*Calidris minutilla*	S4B,S5N	Not Listed	Not Listed	No	No	No	No
lesser scaup	*Aythya affinis*	S4	Not Listed	Not Listed	**Yes**	No	No	**Yes**
little gull	*Larus minutus*	S1B	Not Listed	Not Listed	No	No	No	No
long-tailed duck	*Clangula hyemalis*	S3B	Not Listed	Not Listed	No	No	No	No
magnolia warbler	*Dendroica magnolia*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
Mallard	*Anas platyrhynchos*	S5	Not Listed	Not Listed	No	No	No	No
Merlin	*Falco columbarius*	S5B	Not at Risk	Not Listed	No	No	No	No
mourning dove	*Zenaida macroura*	S5	Not Listed	Not Listed	No	No	No	No
Nashville warbler	*Vermivora ruficapilla*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
northern cardinal	*Cardinalis cardinalis*	S5	Not Listed	Not Listed	No	No	No	No

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]
northern flicker	*Colaptes auratus*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
northern goshawk	*Accipiter gentilis*	S4	Not at Risk	Not Listed	**Yes**	No	No	No
northern harrier	*Circus cyaneus*	S4B	Not at Risk	Not Listed	No	**Yes**	No	No
northern mockingbird	*Mimus polyglottos*	S4	Not Listed	Not Listed	**Yes**	No	No	No
northern rough-winged swallow	*Stelgidopteryx serripennis*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
northern shrike	*Lanius excubitor*	SNA	Not Listed	Not Listed	No	No	No	No
northern waterthrush	*Seiurus noveboracensis*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
orange-crowned warbler	*Vermivora celata*	S4B	Not Listed	Not Listed	No	No	No	No
pileated woodpecker	*Dryocopus pileatus*	S5	Not Listed	Not Listed	**Yes**	No	No	No
pine siskin	*Carduelis pinus*	S4B	Not Listed	Not Listed	No	No	No	No
purple finch	*Carpodacus purpureus*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
purple martin	*Progne subis*	S4B	Not Listed	Not Listed	No	No	No	No
purple sandpiper	*Calidris maritima*	SNA	Not Listed	Not Listed	No	No	No	No
red-bellied woodpecker	*Melanerpes carolinus*	S4	Not Listed	Not Listed	**Yes**	No	No	No
red-breasted merganser	*Mergus serrator*	S4B,S5N	Not Listed	Not Listed	No	No	No	No
red-eyed vireo	*Vireo olivaceus*	S5B	Not Listed	Not Listed	No	No	No	No
red-necked grebe	*Podiceps grisegna*	S3B,S4N	Not at Risk	Not Listed	No	No	No	No
red-tailed hawk	*Buteo jamaicensis*	S5	Not at Risk	Not Listed	No	No	No	No
red-winged blackbird	*Agelaius phoeniceus*	S4	Not Listed	Not Listed	No	No	No	No
ring-billed gull	*Larus delawarensis*	S5B,S4N	Not Listed	Not Listed	No	No	No	No
rock pigeon	*Columba livia*	SNA	Not Listed	Not Listed	No	No	No	No
rose-breasted grosbeak	*Pheucticus ludovicianus*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
rough-legged hawk	*Buteo lagopus*	S1B,S4N	Not at Risk	Not Listed	No	No	No	No
ruby-crowned kinglet	*Regulus calendula*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
rusty blackbird	*Euphagus carolinus*	S4B	**Special Concern**	Not Listed	No	No	No	No
Sanderling	*Calidris alba*	S5N	Not Listed	Not Listed	No	No	No	No
sandhill crane	*Grus canadensis*	S5B	Not Listed	Not Listed	No	No	No	No
savannah sparrow	*Passerculus sandwichensis*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
sharp-shinned hawk	*Accipiter striatus*	S5	Not at Risk	Not Listed	**Yes**	No	No	No
short-eared owl	*Asio flammeus*	S2N,S4B	**Special Concern**	**Special Concern**	No	**Yes**	No	No

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]
snow bunting	*Plectrophenax nivalis*	SNA	Not Listed	Not Listed	No	No	No	No
solitary sandpiper	*Tringa solitaria*	S4B	Not Listed	Not Listed	No	No	No	No
song sparrow	*Melospiza melodia*	S5B	Not Listed	Not Listed	No	No	No	No
sparrow species								
spotted sandpiper	*Actitis macularia*	S5	Not Listed	Not Listed	**Yes**	No	No	No
Swainson's thrush	*Catharus ustulatus*	S4B	Not Listed	Not Listed	No	No	No	No
swallow species								
swamp sparrow	*Melospiza georgiana*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
tree swallow	*Tachycineta bicolor*	S4B	Not Listed	Not Listed	No	No	No	No
tufted titmouse	*Baeolophus bicolor*	S4	Not Listed	Not Listed	No	No	No	No
turkey vulture	*Cathartes aura*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
upland sandpiper	*Bartramia longicauda*	S4B	Not Listed	Not Listed	**Yes**	No	**High**	No
Veery	*Catharus fuscescens*	S4B	Not Listed	Not Listed	**Yes**	No	No	No
vesper sparrow	*Pooecetes gramineus*	S4B	Not Listed	Not Listed	**Yes**	**Yes**	No	No
warbling vireo	*Vireo gilvus*	S5B						
white-breasted nuthatch	*Sitta carolinensis*	S5	Not Listed	Not Listed	No	No	No	No
white-crowned sparrow	*Zonotrichia leucophrys*	S4B	Not Listed	Not Listed	No	No	No	No
white-throated sparrow	*Zonotrichia albicollis*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
white-winged crossbill	*Loxia leucoptera*	S5B	Not Listed	Not Listed	No	No	No	No
white-winged scoter	*Melanitta deglandi*	S4B,S4N	Not Listed	Not Listed	No	No	No	**Yes**
wild turkey	*Meleagris gallopava*	S5	Not Listed	Not Listed	No	No	No	No
willow flycatcher	*Empidonax traillii*	S5B	Not Listed	Not Listed	No	No	No	No
Wilson’s snipe	*Gallinago delicata*	S4B	Not Listed	Not Listed	No	No	No	No
winter wren	*Troglodytes troglodytes*	S5B	Not Listed	Not Listed	No	No	No	No
wood duck	*Aix sponsa*	S5	Not Listed	Not Listed	No	No	No	No
wood thrush	*Hylocichla mustelina*	S4B	Not Listed	Not Listed	No	**Yes**	No	No
yellow warbler	*Dendroica petechia*	S5B	Not Listed	Not Listed	No	No	No	No
yellow-rumped warbler	*Dendroica coronata*	S5B	Not Listed	Not Listed	**Yes**	No	No	No
Grand Total		11 (S1-S3)			48	19	0	3

a - S-Ranks in Ontario are listed by the Ontario Ministry of Natural Resources through the Natural Heritage Information Center - available at: http://nhic.mnr.gov.on.ca/MNR/nhic/glossary/srank.cfm

Common name	Scientific Name	Ontario S-Rank[a]	COSEWIC[b]	ESA[d]	Area Sensitive Species in Southern Ontario[e]	Priority Landbird Species BCR13[f]	Priority Shorebird Species for BCR13[g]	Declining Waterfowl Species in North America[h]

b - the Committee for the Status if Endangered Wildlife in Canada

c - The Canada *Species at Risk Act* - Schedule 1 Listings 2002

d - The Ontario *Endangered Species Act 2007*

e - Conservation Priorities for the Birds of Southern Ontario 1999. Bird Studies Canada Report.

f - Ontario Partners in Flight. 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13

g- Ontario Shorebird Conservation Plan. 2003. Environment Canada

h - North American Waterfowl Management Plan. 2004. Environment Canada

5.0 DISCUSSION

Birds use a variety of habitats for various stages of their life cycles. During the SWH assessment stage of the Site Investigations, bird SWH was assessed and these results are provided below. Areas where birds concentrate and where avian Species of Conservation Concern have been recorded are considered significant. The presence of raptor species is noteworthy because of their increased susceptibility to turbine collisions (Kikuchi, 2008) and top predator position in the food web. In addition, grassland birds may use certain agricultural fields as nesting habitat, however the crop rotation cycle may dictate the presence and abundance of desirable agricultural field types within a certain area. Moreover, unless specifically protected by legislation, grassland and old field habitats may be converted back to active agriculture by the landowner at their discretion.
.

Raptors are commonly found in the Project Area, particularly during the fall and winter seasons. Specifically, a short-eared owl preserve has been designated north of Concession 5 Rainham and east of Regional Road 53. Surveys conducted both by Golder and Dave Martin resulted in the confirmation that short-eared owls do use this area during the winter. Turbine 18 has been sited approximately 150 m from the boundary of this preserve and may pose the highest risk of mortality and disturbance to this species.

Bald eagles typically use the forest communities near the shore of Lake Erie and major river systems (i.e., the Grand River) both for nesting and for overwintering, although the only bald eagle observed during the summer by Golder was a juvenile at feature ID 242. Bald eagles were observed during the migration season, although most of these observations were made west of the Project Area. A bald eagle wintering area has been identified close to the town of Nanticoke, Ontario; however it has been documented that the abundance of raptors in this area is likely influenced by the warmer water outflows at the Nanticoke Generating Station which are documented to increase the abundance of certain fish species which may in turn provide prey for bald eagle. Twelve bald eagles and one golden eagle were observed over the avian study area by Golder during the winter surveys. Turbines 48 through 56 may pose a higher risk of mortality or habitat disturbance to bald eagles as compared to other locations due to their proximity to Lake Erie, however no confirmed nest locations were observed near these turbines during the site investigations.

A great-blue heron rookery was identified approximately 800-850 m from turbine 20 in natural feature ID 63c. This natural feature was identified as SWH for colonial nesting birds. Great blue heron concentrate during the breeding season, typically in deciduous swamps, but may forage several kilometres away for food. Great blue heron are not listed as a Species at Risk under the Endangered Species Act and have an S rank of S4 (OMNR advised that species with S-rank S1-S3 may be considered to be species of conservaton concern), but the height at which Great blue heron fly, may put them at increased risk to wind turbine mortality relative to other species which fly above or below the blade swept area. To mitigate these potential impacts, construction of the Project will commence after the nesting season of great blue herons. This is further described in the EIS.

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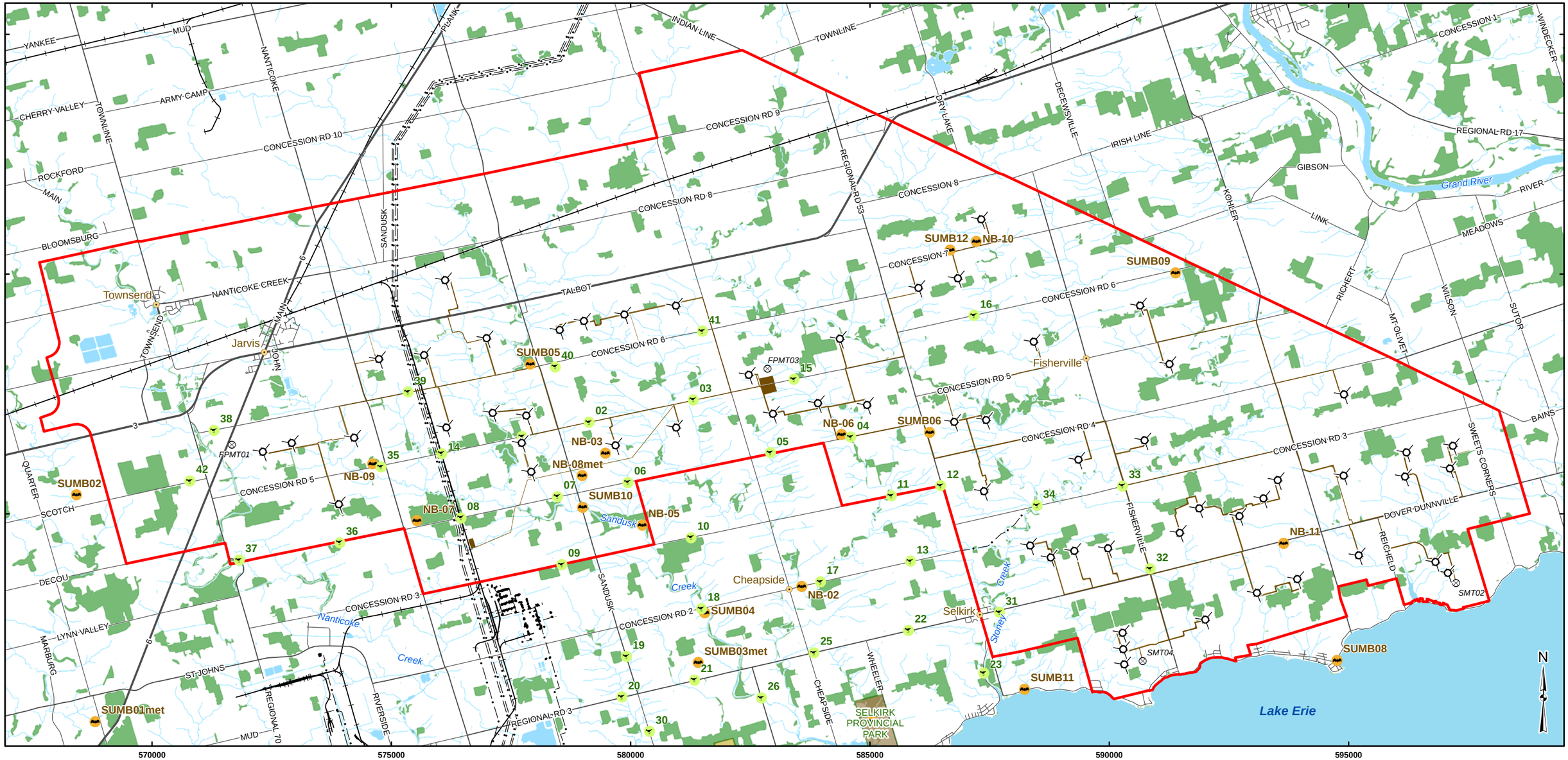


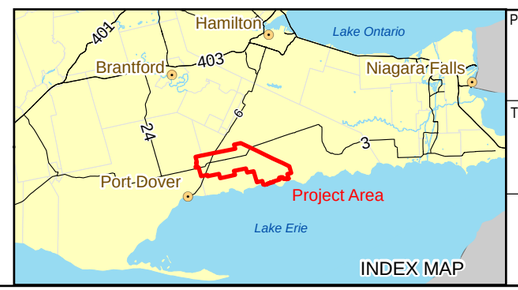
LEGEND

- Turbine and Number
- Meteorological Tower
- Avian Survey Point
- Bat Survey Point
- Highway
- Major Road
- Local Road
- Watercourse
- Hydro One Transmission Line
- Railway
- Project Location
- Project Area
- Waterbody

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2008.4
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2010
Projection: UTM Datum: NAD 83 Coordinate System: UTM Zone 17

0 0.5 1 2 3 4 5
SCALE1:80,000 KILOMETRES



PROJECT
Summerhaven Wind Energy Centre

TITLE
BIRD AND BAT SURVEY POINTS

Golder Associates
Mississauga, Ontario

PROJECT NO. 10-1151-0035			SCALE AS SHOWN	REV.
DESIGN	JR	27 Aug. 2010	FIGURE: B1	
GIS	PP	1 Oct. 2010		
CHECK	PM/DM	1 Oct. 2010		
REVIEW	JW	1 Oct. 2010		

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APPENDIX C

Supplemental Bird Survey Results – Dave Martin

Appendix C: Supplemental data for the proposed NextEra Summerhaven wind farm – Dave Martin

September 10, 2010

1.0 Context

Dave Martin and his crew of five surveyors were contracted by Genivar through NextEra to write a work plan for bird surveys and to carry out the surveys. Bird surveys started in late April 2009 and continued until early March 2010. The study area shifted twice during the course of the surveys from west of Port Dover east towards the Grand River. The final study area for the surveys detailed in this report covered the Lake Erie shoreline from Port Dover in the west to the lake end of Kohler Road in the east and from the lakeshore inland to Highway 3. Because the study area was so large [about 270 km of roads] it was divided into two sub-areas which were labelled as Summer Haven East and Summer Haven Far East for record keeping efficiencies.

For the surveys that targeted spring migration, breeding birds and overwintering raptors, roadside area searches were used. This involved slowly driving the roads with a driver and recorder and recording all birds that were observed. Brief stops from 1 to 5 minutes were made at sites that might have concentrations [e.g. fields with geese, gulls, shorebirds, and snow buntings]; species of interest [e.g. grassland habitats, hedgerows, vegetated stream crossings, woodland edges] or active migration [shorelines with waterbirds or waterfowl]

For this report, only data that was collected from within the current [September 2010] proposed wind farm boundaries have been used.

2.0 Species at Risk

Eight Species at Risk were observed. The following table gives the number of sightings for each Species at Risk for each season and a total for the duration of the survey period. For species with numerous sightings [e.g. Bald Eagle, Bobolink and Short-eared Owl] the number represents the number of sightings and not necessarily the number of different individuals that were using the study area. There are 69 sightings of Bobolink on the spring migration surveys. Undoubtedly some of these are the same birds that were found later during the breeding season surveys. The highest count for Bald Eagles on a single survey was 8 individuals on one of the fall surveys. Likely some of the same individuals were observed on one to several visits.

Table 1.0 Species at Risk by season

Species	Late spring	Breeding season	Fall	Winter	Total
Bald Eagle	2	0	23	5	30
Bobolink	69	121	6	0	196
Chimney Swift	7	0	12	0	19
Unidentified eagle	0	0	1	0	1

Species	Late spring	Breeding season	Fall	Winter	Total
Golden Eagle	0	0	1	0	1
Peregrine Falcon	0	0	2	1	3
Red-headed Woodpecker	0	3	0	0	3
Rusty Blackbird	2	0	21	0	23
Short-eared Owl	0	0	0	27	27

3.0 Late Spring Migration Surveys

Spring migration surveys were carried out in order to determine whether large concentrations of loons, shorebirds, landbirds, waterbirds or waterfowl were using the study area, either as migrants moving through the area or as staging birds using the lake or fields for feeding or loafing. Six surveys were carried out in Summer Haven East on April 23, 27, May 5, 13, 21 and 28, 2009. Four surveys were carried out in Summer Haven Far East on May 10, 11, 19 and 25, 2009 [The study area was shifted to the east in early May, hence only four surveys in the Far East sector].

***Results*:**

No large **concentrations** of birds [e.g. waterfowl, shorebirds or gulls] were found in any of the fields in the study area. No large numbers of migrant ducks, loons, gulls or shorebirds were noted flying through the study area. On lakeside watches concentrations of 100s of Red-breasted Mergansers and Bonaparte's gulls were noted near shore on the lake.

Small numbers of **Species at Risk** were noted in the study area on the spring migration surveys. Two ***Rusty Blackbirds*** were foraging in a small wet woodlot on April 27. Sixty-nine ***Bobolinks*** were noted in various fields or flying over on seven of the ten surveys and ranging in numbers from 4 to 17 individuals per visit. Some of these were likely the same birds that were observed on the breeding season surveys. One to three ***Chimney Swifts*** [total of 7 individuals] were observed flying over the study area on three of the ten surveys. On the May 11 survey two adult ***Bald Eagles*** were perched in a tree along Rainham Road near Kohler Road.

4.0 Breeding Bird Surveys

Breeding bird surveys took place on June 5 and June 24 in the Summer Haven East sector and on June 3 and June 26 in the Far East sector. These surveys were undertaken in order to determine whether large concentrations of species of interest or Species at Risk were breeding in the study area in the fields and along the roadsides. No surveys were done in the interior of the larger woodlots because the final locations of turbines had not been determined at the time of the breeding bird surveys.

Results:

Two ***Red-headed Woodpecker*** territories were found. The first territory was located on the east side of Bluewater Road in open woodland south of the village of Selkirk. The closest turbine is about 3 km to the east of the nest tree. The second sighting involved a single adult foraging along a treed hedgerow just south of a small woodlot on the north side of Concession 5 east of Road 55. If the bird had a nest site in the treed hedgerow or small woodlot, the closest turbine is about 1 km to the east.

A ***Great Blue Heron*** heronry with at least 24 nests is located in the woodlot north west of the intersection of Rd 55 and Conc 5. Based on the current turbine layout, the closest turbine is about 750 metres from the heronry and is on the opposite side of the woodlot from the nests.

Twenty species of Partners in Flight and grassland birds were encountered on the breeding bird surveys. Most species were not found in high densities. For example, given that the average distance driven for the two breeding season surveys was 257 km, the average roadside density for Savannah Sparrows was 1.1 birds per kilometre.

Table 2.0 Partner's in Flight and grassland breeding species in the study area

	Highest Count in East Sector	Highest Count in Far East Sector	Total # individuals / territories
American Kestrel	2	2	4
Baltimore Oriole	23	25	48
Bank Swallow	5	0	5
Black-billed Cuckoo	1	3	4
Bobolink	40	81	121
Brown Thrasher	7	4	11
Eastern Kingbird	32	23	55
Eastern Meadowlark	13	53	66
Eastern Wood-Pewee	5	9	14
Field Sparrow	5	0	5
Grasshopper Sparrow	3	9	12
Horned Lark	23	27	50
Northern Flicker	9	3	12
Northern Harrier	3	4	7
Rose-breasted Grosbeak	16	17	33
Savannah Sparrow	144	139	283
Upland Sandpiper	0	5	5
Vesper Sparrow	13	11	24
Willow Flycatcher	32	12	44
Wood Thrush	8	3	11

5.0 Fall migration surveys

Ten hawk watches were carried out once every 7 to 10 days from September 11 to November 16 to determine whether large numbers of migrating raptors or diurnal passerine migrants were traveling through the study area and whether they were concentrating along any particular flight lines.

Results:

The results show that relatively small numbers of migrants passed through the study area compared to sites along western Lake Erie. A total of 999 raptors and vultures were detected on the 10 surveys. The total number of raptors for all 10 watches is about the same as observed on an average day along western Lake Erie. Turkey Vultures made up 52% and Red-tailed Hawks comprised 25% of the birds sighted. No diurnal passerine migrants were observed in significant numbers. Waterbird migrants such as ducks, geese, gulls or shorebirds were absent or found in very small numbers.

Six **Species at Risk** were observed on the fall migration surveys with most in small numbers. Sightings involved 1 to 2 ***Bobolinks*** on 3 days totaling 6 individuals; 2 to 10 ***Rusty Blackbirds*** on 4 days totaling 21 individuals; 12 ***Chimney Swifts*** on one day; single ***Peregrine Falcons*** on two days and a single ***Golden Eagle***. A total of 23 ***Bald Eagles*** were recorded on 8 of the 10 surveys and ranged in number on days seen from 1 to 8 individuals. Most of the eagles were in the southern third of the study area.

Estimated flight heights for migrants are shown in Tables 5.0 and 6.0 even though flight heights are notoriously difficult to estimate, even for experienced observers.

Table 3.0 Totals for raptors and vultures by visit

Visit #	# 1	# 2	#3	#4	#5	#6	#7	#8	#9	#10	**species totals**
Turkey Vulture	81	25	29	129	45	65	81	55	4	1	**515**
Osprey	2	1	0	0	0	0	0	0	0	0	**3**
Bald Eagle	2	3	0	4	8	2	1	0	2	1	**23**
Northern Harrier	1	3	5	4	2	11	10	9	25	1	**71**
Sharp-shinned Hawk	10	10	0	31	4	7	2	3	0	0	**67**
Cooper's Hawk	2	5	5	0	5	1	3	3	4	0	**28**
Northern Goshawk	0	0	0	0	0	1	0	0	0	0	**1**
Red-tailed Hawk	5	18	7	26	30	62	16	30	37	20	**251**
Broad-winged Hawk	0	1	0	0	0	0	0	0	0	0	**1**
Red-shouldered Hawk	0	0	0	0	0	0	0	3	2	0	**5**
Rough-legged Hawk	0	0	0	0	0	0	0	2	1	1	**4**
Golden Eagle	0	0	0	0	0	0	0	0	0	1	**1**
Am. Kestrel	12	0	1	8	0	1	1	0	2	0	**25**
Merlin	0	0	0	0	1	0	1	0	0	0	**2**
Peregrine Falcon	0	0	1	0	1	0	0	0	0	0	**2**
Daily totals	**115**	**66**	**48**	**202**	**96**	**150**	**115**	**105**	**77**	**25**	**999**

Table 4.0 Totals for other species of interest by visit

Visit #	# 1	# 2	#3	#4	#5	#6	#7	#8	#9	#10	**total**
Common Loon	1	0	1	0	2	0	6	7	1	0	**18**
Tundra Swan	0	0	0	0	0	0	1	0	0	1	**2**

Table 5.0 Summary of flight heights for raptors and vultures

Flight height	**# of birds at each flight height**	**% of birds at each flight height**
Below the blade sweep	131	13.2 %
In the blade sweep	545	54.8 %
Above the blade sweep	319	32.0 %
Total	995	100%

Table 6.0 Summary of flight heights for species other than raptors and vultures

Flight height	**# of birds at each flight height**	**% of birds at each flight height**
Below the blade sweep	4812	48.8 %
In the blade sweep	3361	34.1 %
Above the blade sweep	1679	17.1 %
Total	9852	100 %

6.0 Overwintering raptor surveys

Six roadside area searches were carried out to determine whether the study area provides habitat for high densities of overwintering raptors. Survey dates were December 2 and 17, 2009 and January 7, 20, February 12 and March 1, 2010. The six surveys alternated between morning and afternoon surveys. On the afternoon surveys, the study area was divided into 3 sectors that were labeled as East, Central and Far East with one survey team in each of the 3 sectors. On the afternoon surveys, the three teams of surveyors ended the survey at known or potential roosting sites for Short-eared Owls in order to determine how many were using the study area.

Results:

The surveys showed that there are higher densities of wintering raptors in the study area then this survey team found at 19 other sites in southwestern Ontario. At those 19 sites, the raptor densities ranged from 5 to 33 birds / 100 km. At 16 of those study areas the densities were below 20 birds / 100 km. The mean density for the 19 areas was 12 birds / 100 km. The densities are not as high though as found at sites such as Amherst and Wolfe Islands where the densities were 317 and 214 birds / 100 km respectively.

At Summerhaven, there was an overall density of 51.8 birds / 100 km for the entire study area on the six visits. The range in overall density was 41.5 birds on the January 7 visit to 72.8 birds / 100 km on the March 1 visit.

A closer look at the 3 sectors shows that there was a noticeable difference in density between the East and Central sectors compared to the Far East sector. The overall density for the East sector was 43.5 birds and for the Central sector 41.1 birds / 100 km compared to 79 birds / 100 km in the Far East sector. The difference was consistent over the six visits. Density in the East sector ranged from 28.4 to 51.5 birds / 100 km and in the Central sector from 29 to 52 birds / 100 km. In contrast, the density in the Far East sector

ranged from 48 to 115 birds / 100 km. A closer look at the changes in densities over the course of the winter in the area as a whole and for each sector shows some interesting patterns. The December 2 survey had a fairly high overall density suggesting that there were still some late migrants in the study area. The densities gradually decreased in the East and Central sectors until the March 1 survey which produced the highest density which was likely the result of an influx of spring migrants, mostly Red-tailed Hawks. Over the first 3 visits in the Far East sector, the density gradually decreased but the January 20 and February 12 visit increased in density suggesting that more hawks were finding conditions in that sector to be good for overwintering. And, Rough-legged Hawks peaked noticeably on the last two surveys. The final visit to the Far East sector had a very high density of raptors, this time likely due to an influx of spring migrants, mostly Red-tailed Hawks and Short-eared Owls.

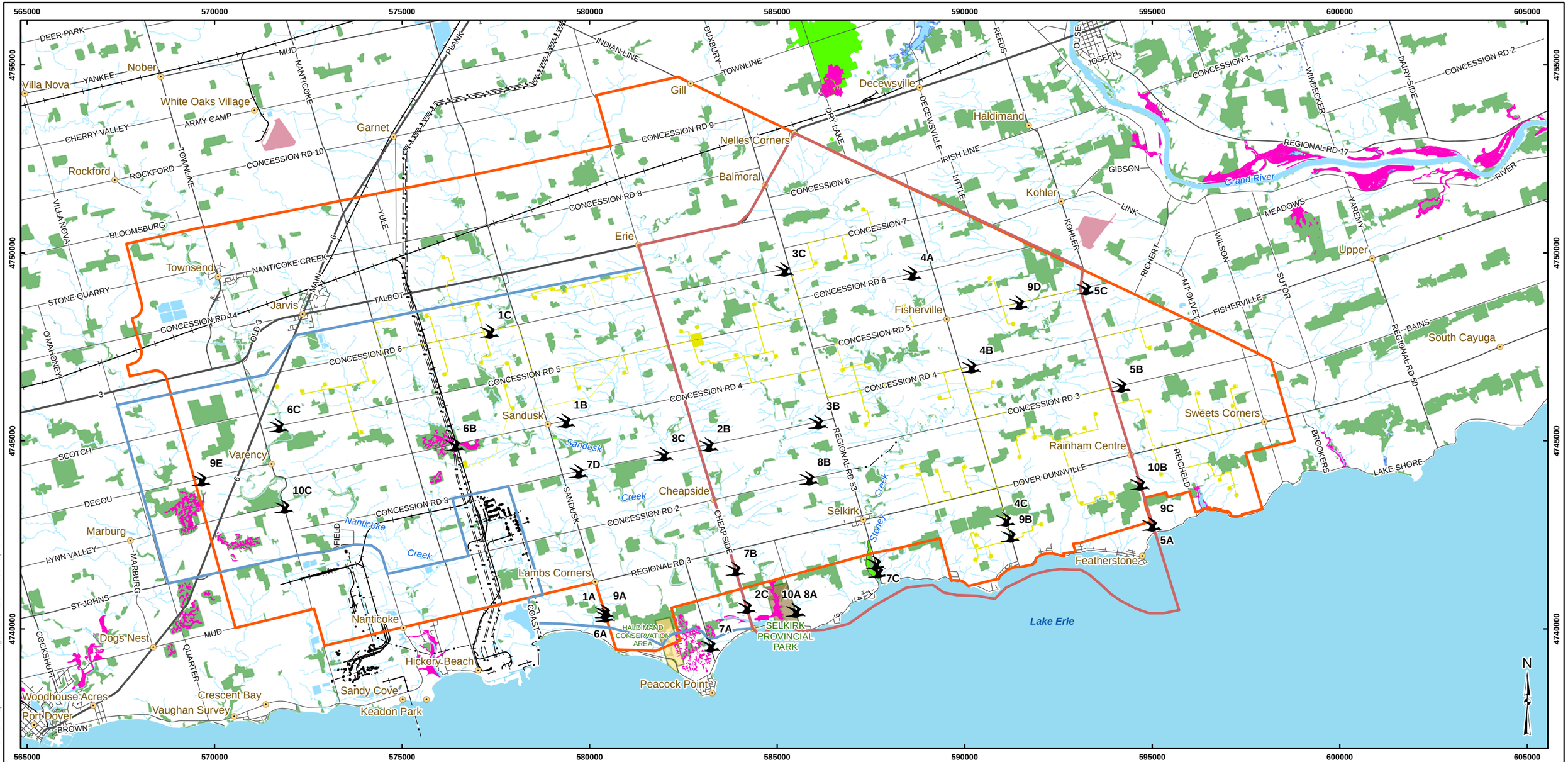
Three **Species at Risk** were found on the six surveys. Single ***Bald Eagles*** were noted on 5 of the 6 surveys. Most were observed circling inland over the study area suggesting that they spend some time inland looking for carcasses to scavenge. Alternately, they may have been moving back and forth from the lake to the Grand River. One ***Peregrine Falcon*** was observed hunting in the East sector on the January 7 survey. ***Short-eared Owls*** were observed on the 4th and 6th surveys: 4 birds on January 20 and 23 birds on March 1. The increase in numbers suggests that a small number of birds may have been overwintering [4 birds on January 20] and an influx of spring migrants arrived around the end of February [23 birds on March 1].

Table 7.0 Overwintering raptors: species and # of individuals per visit

Visit #	# 1	# 2	# 3	# 4	# 5	# 6	**Total individuals**
	Dec 2	Dec 17	Jan 7	Jan 20	Feb 12	Mar 1	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	
Bald Eagle	1	1	1	0	1	1	**5**
Northern Harrier	9	17	16	4	2	15	**63**
Sharp-shinned Hawk	0	0	1	1	0	0	**2**
Cooper's Hawk	2	4	4	1	1	2	**14**
Northern Goshawk	1	0	0	0	0	0	**1**
Red-tailed Hawk	98	89	61	97	92	142	**579**
Rough-legged Hawk	8	6	5	9	22	18	**68**
American Kestrel	20	12	17	6	14	8	**77**
Gyrfalcon	0	1	0	0	0	0	**1**
Peregrine Falcon	0	0	1	0	0	0	**1**
Eastern Screech-Owl	1	0	0	0	0	0	**1**
Great Horned Owl	0	1	0	0	0	0	**1**
Short-eared Owl	0	0	0	4	0	23	**27**
Northern Shrike	2	0	5	0	2	1	**10**
# species (n = 14)	9	8	9	7	7	8	
# individuals	**142**	**131**	**111**	**122**	**134**	**210**	**850**

Table 8.0 Raptor densities for the entire study area and by sector

Visit #	# 1	# 2	# 3	# 4	# 5	# 6	**Totals All visits**
	Dec 2	Dec 17	Jan 7	Jan 20	Feb 12	Mar 1	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	
Entire study area							
# raptors	142	131	111	122	134	210	**850**
# kilometres	264	277	264	270	272	293	**1640**
Raptors / 100 km	53.8	47.3	42.0	45.2	49.3	71.8	**51.8**
Densities by sector							
East sector	40.9	43.5	34.9	28.4	30.7	51.5	**43.5**
Central sector	-	41.5	-	29.0	-	52.0	**41.1**
Far East sector	66.7	58.4	48.0	78.7	68.9	115.0	**79.0**

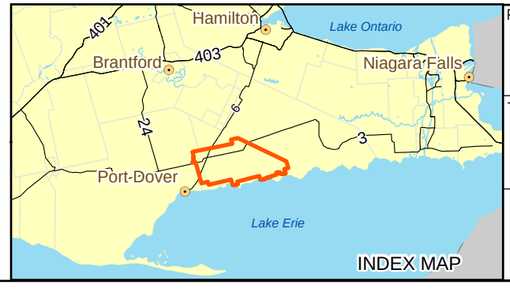


LEGEND

- Dave Martin Bird Survey Points
- Highway
- Major Road
- Local Road
- Watercourse
- Utility Line
- Project Area
- Earth Science ANSI
- Provincially Significant Wetland
- Airport
- Far East Study Area
- East Study Area
- Disturbance

REFERENCE

1. Base Data - MNR NRVIS, obtained 2004, CANMAP v2008.4 2. Natural Features compiled by Golder from NRVIS base data, NHIC Natural Areas and MNR Wetland and ANSI data, obtained 2010
3. Regulation Limits - ABCA, obtained 2010 4. Hawkwatch points depicted here were established by Dave Martin as contracted by Genivar for the Summerhaven Wind Energy Center.
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2010
Projection: UTM Datum: NAD 83 Coordinate System: UTM Zone 17



PROJECT

Summerhaven Wind Energy Centre

TITLE

DAVE MARTIN BIRD SURVEY POINTS

Golder Associates
Mississauga, Ontario

PROJECT NO. 10-1151-0035			SCALE AS SHOWN	REV.
DESIGN	JR	27 Aug. 2010		
GIS	ME	17 Sep. 2010		
CHECK	PP	17 Sep. 2010		
REVIEW				

FIGURE: C1

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APPENDIX D

Detailed design drawings of selected areas where Project Location is in close proximity to natural features

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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