BEACON ENVIRONMENTAL

GUIDING SOLUTIONS IN THE NATURAL ENVIRONMENT

Natural Heritage Assessment and Environmental Impact Study Nanticoke Solar Project

Prepared For:

Nanticoke Solar LP

Prepared By:

Beacon Environmental Limited

Date: *Project:*

February 28, 2017 **214350**

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Executive Summary

Nanticoke Solar LP is proposing to design, build and operate approximately up to a 44 megawatts alternating current (MWAC) solar electricity generation facility on and near the existing OPG Nanticoke Generating Station (G.S.) site in Haldimand County, Ontario. The Project will include the installation of solar panel fields, access roads, an electrical collector system, and electrical substation, and a 230kV AC collection lines/wires.

Beacon Environmental Limited (Beacon) was retained by Nanticoke Solar LP to prepare a Natural Heritage Assessment (NHA) for the Project to fulfil the requirement under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O. Reg. 359/09). The NHA report is provided to the Ministry of Natural Resources and Forestry (MNRF) for review and confirmation as part of the Renewable Energy Approval (REA) application to the Ministry of Environment and Climate Change (MOECC).

In this NHA, which includes a Records Review, Evaluation of Significance, and Environmental Impact Study (EIS) any natural features within the Project Location, and the lands within 50 m of the Project Location were identified. The following natural heritage features were identified as being in or within 50 m of the Project Location during the background review, consultation with agencies, and field investigation, and were therefore carried forward to the EIS.

- Four wetlands (WET-02, WET-04, WET-05, and WET-08);
- Four woodlands (WOD-01, WOD-03, WOD-04 and WOD-05);
- Planted Tallgrass Prairie (TP-01 and 02);
- Planted Species of Special Concern (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis), which are all associated with the Planted Prairie Feature (TP-01 and 02); and
- Generalized Candidate Significant Wildlife including:
    - Bat Maternity Colonies;
    - Landbird Migratory Stopover Areas;
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
    - Amphibian Breeding Habitat (Woodland)
    - Woodland Area - Sensitive Bird Breeding Habitat;
    - Marsh Bird Breeding Habitat
    - Terrestrial Crayfish Habitat
    - Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
    - Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Woodthrush);
    - Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
    - Woodland Vole.

An EIS was prepared to identify any potential negative environmental effects during construction, operation and decommissioning, and how they will be addressed during mitigation and monitoring.

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1. Introduction

1.1 Project Overview

Nanticoke Solar LP is proposing to design, build and operate approximately 44 megawatts alternating current (MWAC) solar electricity generation facility on and near the existing OPG Nanticoke Generating Station (G.S.) site in Haldimand County, Ontario (**Figure 1**). The proposed project will be known as the Nanticoke Solar Project ("the Project") and will be owned and as a partnership Ontario Power Generation (OPG), SunEdison Canadian Construction LP and Six Nations Development Corporation. The proposed Project is classified under the O.Reg. 359/09 Renewable Energy Approval (REA) process as a Class 3 Solar Facility. The facility will convert solar energy into electricity to be fed into the Hydro One transmission grid.

The Project will require approval under Ontario Regulation 359/09 – Renewable Energy Approval (REA) under Part V.0.1. of the *Ontario Environmental Protection Act.* Subject to receiving all approvals, the preliminary schedule anticipates that full commercial operation will be achieved by March 9, 2019. The Project has received a 20-year LRP contract from the IESO to generate electricity and deliver it to the Ontario electricity grid. As such, the project is anticipated to operate until at least 2039, at which time it may continue to generate electricity or be decommissioned.

Beacon Environmental Limited (Beacon) has been retained by Nanticoke Solar to prepare a NHA and, if required, an EIS for the proposed Project, in accordance with the REA process including the *NHA Guide for Renewable Energy Project*s (OMNR 2012).

1.2 Project Location

The Project is located on four (4) parcels of property in Haldimand County, Ontario including the former Nanticoke G.S. site and three parcels of agricultural lands. The four parcels of the Project land are privately owned. Rights to use the lands have been acquired by Nanticoke Solar LP through lease agreements with private landowners.

The Project Location is generally bounded by Rainham Road to the north, Sandusk Road to the east and by South Coast Drive to the south (**Figure 2**). The defined project, is approximately 157.9 ha hectares (ha) in area. The Project Location is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

The Project Location was defined early in the planning process for the proposed solar facility based on the approximate area required for the proposed project and connect to the electrical grid.

It has an approximate centroid at the following geographic coordinates (**Table 1**).

Table 1. UTM Coordinates (NAD 83, Zone 17T)

Easting	Northing
579506	4740514

The Project Location is defined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012) as:

"*part of land and all or part of any building or structure in, on or over which a person is engaging in or process to engage in the project and any air space in which a person is engaging in or proposes to engage in the project*".

The proposed Project Location and the 50 m from the edge of the Project Location are shown on **Figure 2**.

1.3 Summary of the Project Components

The Nanticoke Solar Project is a Class 3 Solar Facility and is proposed to have a name plate capacity of 44 MW_{AC}. The major components of the proposed project are as follows:

- Monocrystaline or polycrystalline solar photovoltaic (PV) modules;
- Combiner boxes and cabling;
- Support posts installed in the ground, and a fixed or single-axis mounting structure to hold the PV modules;
- Substation (located on the Nanticoke GS lands), including: a primary transformer; switchgear; PT's, CT's and metering, control and communication equipment and potentially a tower for communication if required by Hydro One;
- Integrated inverter/transformer units to convert electricity from direct current to alternating current, and to step-up the voltage;
- Interior access roads and turnaround areas; and,
- Temporary laydown/staging areas for deliveries of materials and equipment.

All components are within the Project Location (**Figure 2**).

1.4 Report Requirements

A NHA is required for proposed renewable energy projects to determine whether the following natural heritage features are within 120 m (i.e., 120 m during Records Review, and 50 m during Site Investigation) of the proposed Project Location:

- Significant Woodlands;
- Significant Wetlands;
- Significant Valleylands;
- Significant Wildlife Habitat;
- Provincial Parks;

Site Location	Figure 1
Nanticoke Solar	
First Base Solutions Web Mapping Service 2010	N W E S
UTM Zone 17 N, NAD 83	
0 205 410 820 Metres	1:20,000
BEACON ENVIRONMENTAL	Project 2140350 February, 2017

Project Location

Figure 2

OPG REA Application - Nanticoke Solar

Legend

Layer

- Access Road
- Transmission Line
- Perimeter Fence
- Solar Panel
- Laydown Area - Primary
- Laydown Area - Secondary
- Project Location Plus 50 m Setback
- Project Location

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

First Base Solutions
Web Mapping Service 2010

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- Conservation Reserves; and/or
- Area of Natural and Scientific Interest (ANSI; Earth or Life Science).

The *NHA Guide for Renewable Energy Project*s recommends that applicants consider collecting and searching records within 1 km of the Project Location. This NHA was completed to fulfill the regulatory requirements under O. Reg 359/09. This report identifies the natural heritage features and boundaries for these features within 1 km of the Project based on a review of background information and within 50 m during on-site field investigations. As there are natural heritage features confirmed within 50 m of the Project Location, this report as provides an Evaluation of Significance using evaluation criteria or procedures established or accepted by the MNRF.

Additional details regarding the natural features, their significance, potential impacts and mitigation measures required to protect these features are provided in the EIS. Fish habitat and species listed as at risk, under the *Endangered Species Act*, 2007 are discussed in separate reports in compliance and with direction from the MOECC and the Ministry of Natural Resources and Forestry (MNRF) and in compliance with the REA and other applicable legislation.

2. Records Review

The Records Review is required to gather information on natural heritage resources associated with the Project Location. The Records Review was completed, as per the direction provided under Part IV, Section 25 of O. Reg. 359/09. Various background information sources were obtained and reviewed to determine if the Project Location is situated:

1. In or within 120 m of a provincial park or conservation reserve;
2. In or within 120 m a natural feature, as defined to be:
    a. a wetland (coastal wetland, northern wetland or southern wetland);
    b. wildlife habitat;
    c. a woodland;
    d. an ANSI (life and earth science);
3. Within 50 m of an ANSI (earth science); and/or
4. Within 50 m of a natural feature protected by the REA regulation.

2.1 Records Review Methods

For the purpose of this review, the Records Review Area is identified as the Project Location plus 1 km.

2.1.1 Background Information Sources

The following background information sources were reviewed for the Records Review Area:

- Haldimand County Official Plan (2009);
- MNRF Make a Map: Natural Heritage Areas – Natural Heritage Information Centre (NHIC) Data (2016a);

- MNRF Land Information Ontario (LIO) data layers (2016b) for:
    - Wetland - Eco Regions 6E and 7E
    - Wooded Area
    - Watercourse
    - Waterbody
    - ANSI
    - Nesting Sites
    - Staging Area Wildlife
    - Nursery Area Wildlife
    - Conservation Reserve
    - NGO Nature Reserve
    - Provincial Park Regulated
    - National Wildlife Area
    - Crown Game Preserves
    - Significant Ecological Area
    - Spawning Area (Fish)
- MNRF Ontario Crown Land Use Policy Areas (2016);
- Important Bird Areas Canada database (2016);
- Fisheries and Oceans Canada Distribution of Fish Species at Risk – Long Point Region Conservation Authority (LPRCA) (2016);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (2016);
- Ontario Breeding Bird Atlas (2016);
- Ontario Reptile and Amphibian Atlas (2016);
- eBird Canada (2016);
- Haldimand County Winter Raptor Inventory (Badzinski 2003);
- Nanticoke Generating Station Natural Areas Survey (Gregory 2005);
- Nanticoke Generating Station Marsh Monitoring Program and Reconnaissance Survey of Amphibian and Reptile Occurrences (Gregory 2007);
- Nanticoke Generating Station 2010 Marsh Monitoring Program and Reconnaissance Survey of Amphibians and Reptiles (Gregory 2010);
- Nanticoke Generating Station 2011 Marsh Monitoring Survey (Clemens 2011);
- Nanticoke Generating Station 2012 Marsh Monitoring Program Report (Beacon 2012);
- Nanticoke Generation Station 2012 Biological Survey (Beacon 2012); and
- Nanticoke Generation Station 2013 Marsh Monitoring Program Report (Beacon 2013).

2.1.2 Agency Correspondence

Requests for natural heritage information for natural features and areas within the Records Review Area were made to the applicable regulatory agencies to request additional information that they may have on file. A summary is provided in **Table 2**.

Table 2. Natural Heritage Information Sources

Agency	Consultation Information	Information Obtained
Ministry of Natural Resources and Forestry - Guelph District – Vineland Office	February 26, 2015: Beacon submitted a Natural Heritage Assessment Records Review request to the Guelph District Office for any relevant natural heritage records for lands in or within 120 m of the Project Location.	March 9, 2015 MNRF sent a response including the results of a species at risk screening.
Long Point Region Conservation Authority	February 02, 2016 Beacon submitted request for relevant natural heritage information for the lands in or within 120 m of the Project Location	February 4, 2015 • LPRCA has no natural heritage information

Agency	Consultation Information	Information Obtained
		• Lake Erie shoreline may be habitat for Species at Risk
Environment Canada	December 7, 2016: Beacon submitted a request for relevant natural heritage information for lands in the vicinity of the Project Location.	No response has been received as of the date that this report was submitted
Haldimand County	December 7, 2016: Beacon submitted a request for relevant natural heritage information for lands in the vicinity of the Project Location.	December 9, 2016 Haldimand County contacted Beacon to determine what kind of information we would be interested in. Indicated they would follow up again with additional information if available.

2.2 Records Review Results

The results of the Records Review are described in the following sections and in related data layers shown on **Figure 3**.

2.2.1 Provincial Parks and Conservation Reserves

Based on a review of the applicable resources identified in Sections 2.1.1 and 2.1.2 no provincial parks or conservation reserves were identified within the Records Review Area. The closest provincial park is Selkirk Provincial Park, which is located approximately 5 km east from the Project Location. No Conservation reserves were identified within the Records Review Area.

2.2.2 Life Science ANSI

Through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 no Life Science ANSIs were identified within the Records Review Area.

2.2.3 Earth Science ANSI

Through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 no Earth Science ANSIs were identified within the Records Review Area.

2.2.4 Wetlands

Through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 two evaluated wetland was identified within the Records Review Area (**Figure 3**).

The Hickory Creek Wetland is within 60 m of the Project Location. This wetland is identified as Evaluated – Other, indicating that it is not a Provincially Significant Wetland (PSW).

The SAC8 Wetland is within 670 m of the Project Location. This wetland is also identified as Evaluated – Other.

No other evaluated or unevaluated wetlands were identified within the Records Review Area.

2.2.5 Woodlands

Through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 three woodlands were identified within the Records Review Area (**Figure 3**).

2.2.6 Significant Wildlife Habitat (Including rare species)

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

A review of the applicable resources identified in Section 2.2.1 was undertaken to identify if wildlife habitat is located within the Records Review Area. Wildlife habitat applicable to the NHA are grouped into the following categories:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern; and
- Animal Movement Corridors.

An assessment of Significant Wildlife Habitat (SWH) was completed for the Project Location and lands within the Records Review Area using background information. The results are presented in **Table 3**.

Reporting related to the protection of species at risk is being provided to the MNRF under separate cover. This reporting format meets the NHA requirements, as set out in Ontario Regulation 359/09, and is consistent with the direction provided by the MNRF.

Records Review

Figure 3

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Wetland
- Wooded
- Watercourse
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

First Base Solutions
Web Mapping Service 2010

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February, 2017

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Table 3. Summary of Significant Wildlife Habitat in or Within 120 m of the Project Location during Records Review

Significant Wildlife Habitat	Within Project Location	Within 120 m from Project Location
Seasonal Concentration Areas of Animals		
Waterfowl Stopover and Staging Area (Terrestrial)	N	N
Waterfowl Stopover and Staging Areas (Aquatic)	N	N
Shorebird Migratory Stopover Area	N	N
Raptor Wintering Area	N	N
Bat Hibernacula	N	N
Bat Maternity Colonies	N	N
Turtle Wintering Areas	N	N
Reptile Hibernaculum	N	N
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	N	N
Colonially - Nesting Bird Breeding Habitat (Tree / Shrubs)	N	N
Colonially – Nesting Bird Breeding Habitat (Ground)	N	N
Migratory Butterfly Stopover Areas	N	N
Landbird Migratory Stopover Areas	N	N
Deer Winter Congregation Areas	N	N
Rare Vegetation Communities		
Cliffs and Talus Slopes	N	N
Sand Barren	N	N
Alvar	N	N
Old Growth Forest	N	N
Savannah	N	N
Tallgrass Prairie	Y	Y
Other Rare Vegetation Communities	N	N
Specialized Habitat for Wildlife		
Waterfowl Nesting Area	N	N
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	N	N
Woodland Raptor Nesting Habitat	N	N
Turtle Nesting Areas	N	N
Seeps and Springs	N	N
Amphibian Breeding Habitat (Woodland)	N	N
Amphibian Breeding Habitat (Wetland)	N	N
Woodland Area Sensitive Bird Breeding Habitat	N	N
Habitat for Species of Conservation Concern (Not Including Endangered or Threatened Species)		
Marsh Bird Breeding Habitat	N	N
Open Country Bird Breeding Habitat	N	N
Shrub/Early Successional Bird Breeding Habitat	N	N
Terrestrial Crayfish	N	N
Special Concern and Rare Wildlife Species	Y	Y
Animal Movement Corridors		
Amphibian Movement Corridor	N	N

2.2.7 Provincial Plan Areas

O. Reg. 359/09 states that if any part of the Project Location falls within a Provincial Plan area such as the Oak Ridges Moraine Plan Area, the Niagara Escarpment Plan Area, and / or the Greenbelt that it could be subject to a different set of criteria to evaluate natural features and set of prohibitions. The Records Review Area is not located in the vicinity of any of the Provincial Plan Areas noted above.

2.3 Additional Wildlife Habitat Information

The information included in the following section was used to assist in the identification of wildlife habitat that could potentially occur within the Records Review Area.

2.3.1 Vegetation

A list of plant species identified through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 is provided in **Appendix A.** In total ten Species of Conservation Concern have been identified in the vicinity of the Project Location. These species will be further investigated during the Site Investigation to determine if habitat is present within the Records Review Area.

2.3.2 Birds

A list of bird species identified through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 is provided in **Appendix B**. In total, 171 bird species have been identified in the vicinity of the Project Location. The majority of the bird species that could potentially occur in the vicinity of the Project Location are considered Secure (SRank of S5) or Apparently Secure in Ontario (SRank of S4). Of these species identified through the Records Review 12 Species of Conservation Concern have been identified in the vicinity of the Project Location. These species will be further investigated during the Site Investigation to determine if habitat is present within the Records Review Area.

2.3.3 Amphibians & Reptiles

A list of amphibian and reptile species identified through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 is provided in **Appendix C**. In total, 26 amphibian and reptile species have been identified in the vicinity of the Project Location. This included five Species of Conservation Concern. These species will be further investigated during the Site Investigation to determine if habitat is present within the Records Review Area.

2.3.4 Mammals

A list of mammals identified through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 is provided in **Appendix C**. In total, 32 mammal species have been identified in the vicinity of the Project Location. This included one Species of Conservation Concern. These species will be further investigated during the Site Investigation to determine if habitat is present within the Records Review Area.

2.3.5 Insects

A list of mammals identified through the review of the applicable resources identified in Sections 2.1.1 and 2.1.2 is provided in **Appendix C**. In total, 18 insect species have been identified in the vicinity of the Project Location. This included one Species of Conservation Concern. This species will be further investigated during the Site Investigation to determine if habitat is present within the Records Review Area.

2.4 Records Review Conclusions

This Records Review has been completed in accordance with the regulatory requirements under Part IV, Section 25 of O. Reg 359/09. Further details regarding the natural features will be provided in the Site Investigation, Evaluation of Significance and EIS sections of this report, as necessary.

The Records Review will inform the NHA in establishing baseline conditions for the Project Location and will be supplemented with additional information obtained through the Site Investigations, as well as additional consultation with the regulatory agencies and stakeholders. A summary of the findings of the Records Review is presented in **Table 4** and an overview map of natural features within the vicinity of the Project Location is presented in **Figure 3**.

Table 4. Records Review Summary

Natural Feature	Distance to Project Location	Carried Forward to Site Investigation
Provincial Plan Areas		
Project location is not located within any provincial plan areas		No
Provincial Parks and Conservation Reserves		
No known features identified in or within 120 m of the Project Location		No
ANSI, Life Science		
No known features identified in or within 120 m of the Project Location		No
ANSI, Earth Science		
No known features identified in or within 120 m of the Project Location		No
Wetlands		
Hickory Creek Wetland (Evaluated – Other)	60	Yes
Woodlands		
Unevaluated Southern Woodlands	15	Yes
Significant Wildlife Habitat		
Seasonal Concentration Areas		
Waterfowl Stopover and Staging Areas (Terrestrial)		
No known features identified in or within 120 m of the Project Location		Yes
Waterfowl Stopover and Staging Areas (Aquatic)		
No known features identified in or within 120 m of the Project Location		Yes
Shorebird Migratory Stopover Areas		
No known features identified in or within 120 m of the Project Location		Yes
Raptor Wintering Area		
No known features identified in or within 120 m of the Project Location		Yes
Bat Hibernacula		

Natural Feature	Distance to Project Location	Carried Forward to Site Investigation
No known features identified in or within 120 m of the Project Location		Yes
Bat Maternity Colonies		
No known features identified in or within 120 m of the Project Location		Yes
Turtle Wintering Areas		
No known features identified in or within 120 m of the Project Location		Yes
Reptile Hibernaculum		
No known features identified in or within 120 m of the Project Location		Yes
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)		
No known features identified in or within 120 m of the Project Location		Yes
Colonially - Nesting Bird Breeding Habitat (Tree / Shrubs)		
No known features identified in or within 120 m of the Project Location		Yes
Colonially- Nesting Bird Breeding Habitat (Ground)		
No known features identified in or within 120 m of the Project Location		Yes
Migratory Butterfly Stopover Areas		
No known features identified in or within 120 m of the Project Location		Yes
Landbird Migratory Stopover Areas		
No known features identified in or within 120 m of the Project Location		Yes
Deer Winter Congregation Areas		
No known features identified in or within 120 m of the Project Location		Yes
Rare Vegetation Communities		
Cliffs and Talus Slopes		
No known features identified in or within 120 m of the Project Location		Yes
Sand Barren		
No known features identified in or within 120 m of the Project Location		Yes
Alvar		
No known features identified in or within 120 m of the Project Location		Yes
Old Growth Forest		
No known features identified in or within 120 m of the Project Location		Yes
Savannah		
No known features identified in or within 120 m of the Project Location		Yes
Tallgrass Prairie		
Planted Tallgrass Prairie present within the Project Location	Within	Yes
Other Rare Vegetation Communities		
No known features identified in or within 120 m of the Project Location		Yes
Specialized Habitat for Wildlife		
Waterfowl Nesting Area		
No known features identified in or within 120 m of the Project Location		Yes
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Woodland Raptor Nesting Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Turtle Nesting Areas		
No known features identified in or within 120 m of the Project Location		Yes
Seeps and Springs		
No known features identified in or within 120 m of the Project Location		Yes
Amphibian Breeding Habitat (Woodland)		
No known features identified in or within 120 m of the Project Location		Yes

Natural Feature	Distance to Project Location	Carried Forward to Site Investigation
Amphibian Breeding Habitat (Wetland)		
No known features identified in or within 120 m of the Project Location		Yes
Woodland Area Sensitive Bird Breeding Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Habitat for Species of Conservation Concern (Not Including Endangered or Threatened Species)		
Marsh Bird Breeding Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Open Country Bird Breeding Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Shrub/Early Successional Bird Breeding Habitat		
No known features identified in or within 120 m of the Project Location		Yes
Special Concern and Rare Wildlife Species		
Special Concern and Rare Wildlife Species, identified in the appendices, have been identified in or within 120 m of the Project Location.		Yes
Animal Movement Corridors		
Amphibian Movement Corridors		
No known features identified in or within 120 m of the Project Location		Yes

3. Site Investigation

The Site Investigation is the second stage of the NHA required under Part IV, Section 26 of O. Reg 359/09. This stage of the NHA involves undertaking of site-specific investigation of the air, land and water resources within the Site Investigation Area. For the purpose of the Site Investigation the Site Investigation Area is defined as the Project Location plus 50 m.

The purpose of the Site Investigation is to:

- Verify that the analysis of the project location undertaken through the Records Review is accurate, and make any necessary corrections to the determinations in the Records Review;
- Determine if any additional natural features that were not identified within the Records Review exist within the Site Investigation area;
- Confirm the boundaries of natural features that are located within the Site Investigation area; and
- Determine the distance from the project location to the boundaries of any natural features.

The results of the Site Investigations are presented in the subsections that follow. Field notes related to the Site Investigations, including survey dates, start and end times, weather conditions and field investigators involved, are included in **Appendix D**. Summaries of the species observed during the site investigation are included in **Appendix E**, **Appendix F**, and **Appendix G**. The Curriculum Vitae of all investigators is included in **Appendix H**.

3.1 Site Investigation Methods

3.1.1 Ecological Land Classification

Ecological Land Classification (ELC) and floral inventories were undertaken on January 23, 2015, April 27, 2015, May 29, 2015, June 17, 2015 and June 23, 2015. ELC was undertaken according to Lee *et al*. (1998). The landscape was divided into vegetation communities by delineation on field maps through the interpretation of recent aerial photographs and then verified in the field. The ELC is based on dominant species cover, and community structure, as well as the level of disturbance, presence of indicator species, and other notable features. The community codes follow the coding of the ELC.

Botanical surveys were completed by traversing the Project Location and visiting each vegetation community type while undertaking ELC. Provincial status for flora and fauna was based on the species lists on the database of the MNRF Natural Heritage Information Centre (NHIC 2013).

3.1.2 Wetlands

Wetlands located in or within 50 m of the Project Location were identified and delineated following the protocols provided in the Ontario Wetland Evaluation System (OWES) Southern Manual (MNRF 2013) by B. Henshaw and R. Aitken, both of whom are certified in the application of the OWES by MNRF (**Appendix H**).

Where property access was obtained, wetland boundaries were delineated and boundaries were identified by following plant species that are indicative of wetland habitat and determining where their cover is 50% or greater per the requirement under the OWES Southern Manual. Wetlands were classified according to the dominant vegetation form.

3.1.3 Woodlands

The locations and boundaries of the woodland and forested areas that were initially identified during the Records Review were verified through the Site Investigation.

The woodland boundary was staked and surveyed along the edge of the drip-line. Woodlands that were separated by more than 20 m were considered separated woodlands. Woodland interior was calculated by applying a 100 m buffer inward from the outer woodland edge and calculating the remaining area.

Information regarding the composition and structure of the woodlands was collected during the ELC assessment.

3.1.4 Significant Wildlife Habitat Identification Survey

The potential for wildlife habitat in and within 50 m of the Project Location was assessed using the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015), the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) and the Natural Heritage Reference Manual (OMNR 2005).

The evaluation criteria contained in these documents were used to identify Candidate Significant Wildlife Habitat.

3.1.5 Breeding Birds

Breeding birds were surveyed on May 29 and June 17, 2015 by Beacon. The Project Location was visited during the morning (between 6:30 am and 8:45 am) on days with low winds (0-2 Beaufort Scale) and with temperatures of approximately 12^{O}C and 15^{O}C at the start. All visual and auditory observations of birds were recorded. The entire Project Location was walked within 50 m in closed areas and 100 m in open areas such that all singing birds could be heard and recorded.

3.1.6 Amphibians and Reptiles

Nocturnal surveys for breeding amphibians were undertaken on June 2 and June 23, 2015 and April 15, 2016 during a period when frogs where heard calling from known breeding locations in the local area. Potential breeding habitat for frogs and toads was also assessed while conducting field surveys for the vegetation communities on the Project Location. No detailed surveys for snakes (i.e. placement of cover boards) were undertaken, however snakes were noted while conducting other field surveys within the Project Location.

3.1.7 Mammals

Mammal species were documented by visual observations, or presence of tracks or scat while undertaking other field surveys.

3.1.8 Invertebrates

Butterfly species were documented by visual observations while undertaking other field surveys.

3.2 Site Investigation Results

3.2.1 Site Investigation Dates, Times, Duration and Weather Conditions

As per the requirements of O. Reg 359/09 Section 26 (3) the conditions under which each Site Investigation was completed and its duration is provided in **Table 5**.

Table 5. Site Investigation Details

Date	Survey	Surveyor	Start Time	End Time	Alternative Site Investigations*	Weather Conditions		
						Temp (°C)	Wind Speed (Beaufort	Cloud Cover (%)
January 23, 2015	Woodlands Assessment SWH Assessment	RA DW	0830	1300	X	-3	2 / 3	100
April 27, 2015	ELC Classification Vegetation Inventory	RA DW	1245	1630	X	10	2 / 3	40
June 2, 2015	Amphibian Survey	RA JD	2100	2230	-	17	1	0
May 19, 2015	Vegetation Inventory	RA LW	0900	1600	-	9-17	1/3	20-100
May 29, 2015	Bird Survey ELC Classification Vegetation Inventory	RA	0540	1500	X	13	1 / 2	40
June 17, 2015	Bird Survey ELC Classification Vegetation Inventory	RA	0550	1400	X	15	1 / 2	80
June 23, 2015	ELC Classification Vegetation Inventory Amphibian Survey	DW JD	1645	2310	X	17	0	0
April 15, 2016	Amphibian Survey	DW JD	2130	2300	-	11	2	0
June 16, 2016	Wetland Staking Woodland Dripline Staking	BH LW	0900	1600	-	20	NA	NA

* X – Indicates dates where Alternative Site Investigations were completed

3.2.2 Alternative Site Investigation

As per Part IV, Section 26 of O. Reg. 359/09 all lands within the Site Investigation Area must be assessed for natural features. Access was not obtained to some lands located within 50 m of the Project Location as only landowners participating in the Project provided permission for land access (**Appendix I**). Dates where Alternative Site Investigations were completed are identified in **Table 5**. Areas where Alternative Site Investigations were completed are identified in **Appendix I**.

3.3 Natural Features

3.3.1 ELC Communities

The lands that are located within the Site Investigation Area are comprised of agricultural fields planted with various row crops, a planted prairie, successional meadow, thicket, woodland communities, deciduous forest and swamp communities. These communities are further described below and identified on **Figure 4**. Soils were sampled only for wetland communities to determine if they were mineral or organic soils.

Polygon 1: Anthropogenic Areas

Several non-natural or anthropogenic areas were identified within the Site Investigation Area. This included a pipeline corridor, a fly ash pile, the old coal stockpile area and an industrial area.

Polygon 2: Agricultural Fields

A number of agricultural fields were identified within the Site Investigation Area (**Figure 4**). At the time of the Site Investigation all of the agricultural fields were planted in row crops.

Polygon 3: Dry - Moist Old Field Meadow (CUM1-1)

The cultural meadow communities identified within the Site Investigation Area are dominated by a variety of old field grass and flower species including Kentucky Bluegrass (*Poa pratensis*), Red Clover (*Trifolium pretense*) and Tall Goldenrod (*Solidago altissima*).

Polygon 4: Planted Prairie

The planted prairie habitat identified within the Site Investigation Area (**Figure 4**) is dominated by a variety of grass and flower species including Big Bluestem (*Andropogon gerardii*), Queen Anne's Lace (*Daucus carota*), Northern Willowherb (*Epilobium ciliatum*), Red Clover (*Trifolium pratensis*), and Indian Grass (*Sorgastrum nutans*).

Polygon 5: Mineral Cultural Thicket (CUT1)

Mineral cultural thickets identified within the Site Investigation Area (**Figure 4**) are predominantly dominated by a dense layer of hawthorns (*Crataegus* spp.) and Grey Dogwood shrubs (*Cornus racemose*). A sparse canopy is present in some locations containing White Ash (*Fraxinus Americana*) and Eastern Cottonwood (*Populus deltoids*). A relatively sparse ground layer containing Kentucky Bluegrass, Tall Goldenrod and Smooth Brome (*Bromus inermis*) is also present within these communities.

Polygon 6: Deciduous Hedgerow (DH)

Several deciduous hedgerow were identified within the Site Investigation Area (**Figure 4**). The canopy and sub-canopy are predominantly dominated by Eastern Cottonwood, and Freemans Maple (*Acer* x *freemanii*). The shrub layer is dominated by hawthorns and Grey Dogwood. The predominant form within the hedgerows varies between trees and shrubs. A relatively sparse ground layer containing Tall Goldenrod and Kentucky Bluegrass is also present within these communities.

Polygon 7: Mineral Cultural Woodland (CUW1)

This community was identified within the Site Investigation Area (**Figure 4**). The canopy and sub-canopy are dominated by a dense layer of planted Sugar Maple (*Acer saccharum*), Green Ash (*Fraxinus pennsylvanica*) and Eastern Cottonwood. The shrub layer consists of a dense layer of Tartarian Honeysuckle (*Lonicera tatarica*). The ground layer consist of a dense layer of Tall Goldenrod, New-England Aster (*Symphyotrichum novae-angliae*), Prickly Sedge (*Carex spicata*) and a variety of grass species.

Polygon 8: Dry – Fresh White Ash Deciduous Forest (FOD 4-2) / Dry – Fresh Beech Deciduous Forest (FOD4-1) Complex

This community was identified within the Site Investigation Area (**Figure 4**). The canopy and sub-canopy is dominated by dense layer of White Ash, Beech (*Fagus grandifolia*), Red Oak (*Quercus rubra*), Shagbark Hickory (*Carya ovata*) and Sugar Maple. The shrub layer contains a relatively sparse layer of Beech, Ironwood (*Ostrya virginiana*) and Shagbark Hickory saplings. The ground layer contains a relatively sparse layer of Beech seedlings, Baneberry (*Acetea* sp.) and Spotted Geranium (*Geranium maculatum*).

Polygon 9: Dry – Fresh White Ash Deciduous Forest (FOD4-2)

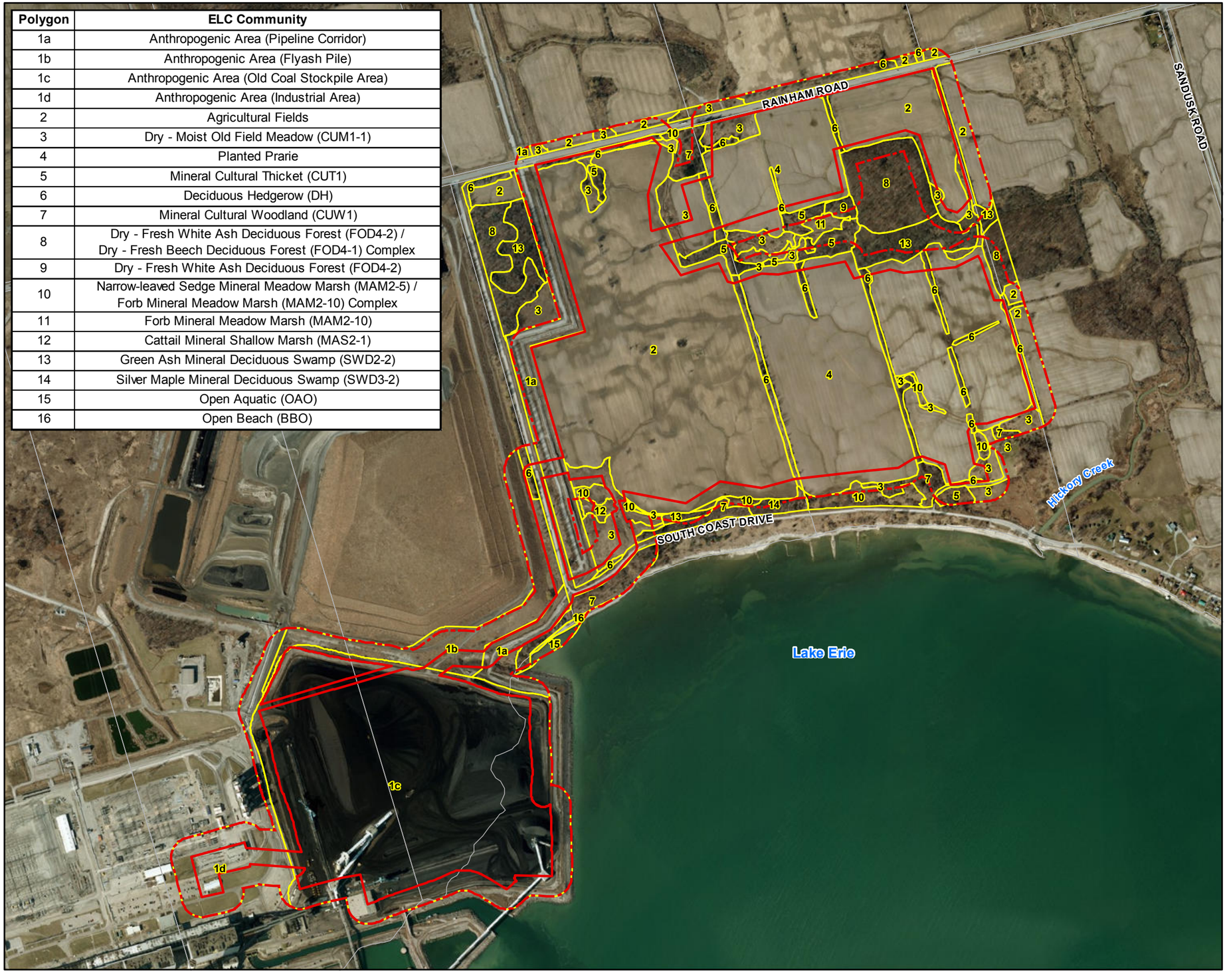
This community was identified within the Site Investigation Area (**Figure 4**). The canopy is dominated by a dense layer of White Ash. The shrub layer is dominated by Hawthorne shrubs. The ground layer is dominated by Garlic Mustard (*Alliaria petiolate*) and Rose Multiflora (*Multiflora rosa*).

Polygon 10: Narrow-leaved Sedge Mineral Meadow Marsh (MAM2-5) / Forb Mineral Meadow Marsh (MAM2-10) Complex

This community was identified within the Site Investigation Area (**Figure 4**). The ground layer contains a dense layer of sedges (*Carex sp*.), *Agrostis* sp., and Lance-leaved Aster (*Symphyotrichum lanceolatum*). A sparse shrub layer containing Red-osier Dogwood (*Cornus stolonifera*) and Grey Dogwood. The occasional Green Ash is also present within the canopy.

The soils within this community consist of a layer of silty clay over a layer of clay with a moisture regime of five (moist) and imperfect to poor drainage.

Polygon	ELC Community
1a	Anthropogenic Area (Pipeline Corridor)
1b	Anthropogenic Area (Flyash Pile)
1c	Anthropogenic Area (Old Coal Stockpile Area)
1d	Anthropogenic Area (Industrial Area)
2	Agricultural Fields
3	Dry - Moist Old Field Meadow (CUM1-1)
4	Planted Prarie
5	Mineral Cultural Thicket (CUT1)
6	Deciduous Hedgerow (DH)
7	Mineral Cultural Woodland (CUW1)
8	Dry - Fresh White Ash Deciduous Forest (FOD4-2) / Dry - Fresh Beech Deciduous Forest (FOD4-1) Complex
9	Dry - Fresh White Ash Deciduous Forest (FOD4-2)
10	Narrow-leaved Sedge Mineral Meadow Marsh (MAM2-5) / Forb Mineral Meadow Marsh (MAM2-10) Complex
11	Forb Mineral Meadow Marsh (MAM2-10)
12	Cattail Mineral Shallow Marsh (MAS2-1)
13	Green Ash Mineral Deciduous Swamp (SWD2-2)
14	Silver Maple Mineral Deciduous Swamp (SWD3-2)
15	Open Aquatic (OAO)
16	Open Beach (BBO)



Ecological Land Classification

Figure 4

Nanticoke Solar

Legend

- Project Location Plus 50 m Setback
- Project Location
- ELC Communities
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

First Base Solutions
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February, 2017

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Polygon 11: Forb Mineral Meadow Marsh (MAM2-10)

This community was identified within the Site Investigation Area (**Figure 4**). The ground layer consists of a dense layer of Great-hairy Willow Herb (*Epilobium hirsutum*), *Agrostis* sp., and Bebb's Sedge (*Carex bebbii*). A sparse shrub layer containing Grey Dogwood and a sparse canopy containing Green Ash are also present.

The soils within this community consists of a layer of silty clay with a moisture regime of six (very moist) and poor to imperfect drainage.

Polygon 12: Cattail Mineral Shallow Marsh (MAS2-1)

This community was identified within the Site Investigation Area (**Figure 4**). It is dominated by a dense layer of Broad-leaved Cattail (*Typha latifolia*).

The soils within this community consists of a shallow layer of organic soils (< 5 cm) over clay soils with a moisture that regime of six (very poor)

Polygon 13: Green Ash Mineral Deciduous Swamp (SWD2-2)

This community was identified within the Site Investigation Area (**Figure 4**). The canopy and sub-canopy are dominated by a dense layer of Green Ash, Bur Oak (*Quercus macrocarpa*), Shagbark Hickory and Basswood (*Tilia Americana*). The shrub layer consists of a somewhat sparse layer of Green Ash and Shagbark Hickory saplings. The ground layer consists of a somewhat dense layer of Dwarf Raspberry (*Rubus pubescens*), American Black Currant (*Ribes americanum*), Sensitive Fern (*Onoclea sensibilis*) and Jewelweed (*Impatiens capensis*).

The soils within this community consists of a layer of silty clay with a moisture regime of six (very moist) and poor to imperfect drainage.

Polygon 14: Silver Maple Mineral Deciduous Swamp (SWD 3-2)

This community was identified within the Site Investigation Area (**Figure 4**). The canopy and sub-canopy were dominated by a dense layer of Freemans Maple (*Acer* x *freemanii*), Green Ash and Eastern Cottonwood. The shrub layer contains a relatively sparse layer of Green Ash saplings and Red-osier Dogwood. The ground layer is comprised of a dense layer of grasses and sedges including Reed-canary Grass (*Phalaris arundinacea*), Agrostis (*Agrostis* sp.), and Fox Sedge (*Carex vulpinoidea*).

The soils within this community consist of a layer of silty clay with a moisture regime of six (very moist) and poor to imperfect drainage.

Polygon 15: Open Aquatic (OAO)

This community was identified where Lake Erie was identified within the Site Investigation Area (**Figure 4**). It consists of an open body of water with no vegetation.

3.3.2 Wetlands

Only one wetland, the Hickory Creek Wetland (WET-01) was identified within 60 m of the Project Location during the Records Review (**Figure 3**). The wetland has been previously evaluated but was not determined to be a PSW. Seven additional wetlands were identified in or within the Site Investigation Area: WET-02, WET-03, WET-04, WET-05, WET-06 and WET-07 (**Figure 5**). Another wetland that was located within 750 m of WET-03 was the SAC8 wetland (WET-08). This wetland has also been previously evaluated but was not determined to be a PSW (LIO, 2015).

For the purposes of this assessment WET-02, WET-04, WET-05 and WET-08 were complexable with each other and the Hickory Creek Wetland (WET-01) and SAC8 (WET-09) wetland complexes as they over 0.5 ha in area and located within 750 m of each other.

Wetland complex are wetlands that are located near each other and tend to have similar or complementary biological, social and/or hydrological functions (OMNR 2013). The rules and guidance for complexing wetlands are provided within the OWES Southern Manual

The three remaining wetlands (WET-03, WET-06 and WET-07) were excluded due to their small area (< 0.5 ha) and other factors. Wetland units less than 2 ha in area can be included as part of a wetland complex if, in the opinion of the OWES certified evaluator, they provide an important ecological benefit (OMNR 2013). Two evaluators (B. Henshaw and R. Aitken) determined from the data gathered during the Site Investigations process that as no important ecological benefits or functions were associated with these three wetlands they have not been included as part of the wetland.

The attributes, composition and functions of wetlands in and within 50 m of the Project Location are identified in **Table 6**.

Site Investigation Wetlands

Figure 5

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Site Investigation Delineated Wetland
- Evaluated Wetland - Other
- 375 m Wetland Complex Boundary
- Watercourse
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

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February, 2017

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Table 6. Summary of Wetlands within the Site Investigation Area

Wetland	Minimum Distance from Project Location (m)	Biological Component							Hydrological Component						Special Feature Components		
										Water Quality Improvement							
		Wetland Size (ha)	Wetland Type	Site Type	Vegetation Communities	Proximity to Other Wetlands	Interspersion Number	Open Water Type	Flood Attenuation	Short Term	Long Term Nutrient Trap	Groundwater Discharge	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitats	Fish Habitat
Hickory Creek Wetland (WET-01) WET-02 WET-04 WET-05 WET-08 Complex SAC8 Wetland Complex (WET-09)	WET-01 60 m (Fence / Laydown Area - Secondary) WET-02 50 m (Fence / Access Road) WET-04 26 m (Fence / Solar Field) WET-05 20m (Fence / Solar Field) WET-08 0 m (AC collection lines/wires– Alternative B) WET-09 718 m (Fence / Access Road	14.4	Marsh Swamp	Isolated Palustrine Riverine	**S1 (WET-02, WET-05 - S1, WET-08: SWD2-2) - h:** Green Ash, Bur Oak, Shagbark Hickory and Basswood. **ts:** Green Ash and Shagbark Hickory saplings. **gc:** Dwarf Raspberry American black currant Sensitive Fern and Jewelweed. **S2 (Part of WET-08 – SWD3-2) – h:** Freemans Maple, Green Ash and Eastern Cottonwood. **ts:** Green Ash saplings and Red-osier Dogwood. **gc:** Reed-canary Grass and Fox Sedge. **S3 (SAC8 Wetland – WET-09) – h:** deciduous swamp **M1 (WET-04- MAM2-10) – ne:** Great-hairy Willow Herb, Agrostis sp. and Bebb's Sedge. **M2 (Part of WET-08 - MAM2-5 / MAM2-10 Complex) – ne:** Sedges, Agrostis and Lance-leaved Aster. **M3 (Part of WET-08 – MAS2-1) – ne:** Broad-leaved Cattail. **M3 (Hickory Creek Wetland Complex – WET-01) – ne:** grass / forb meadow marsh. For the purpose of this evaluation these wetlands have been complexed with the Hickory Creek Wetland and the SAC8 Wetland due to their proximity to these features. Detailed information regarding the biological, hydrological and	1.7 km to the Peacock Point PSW Wetland Complex	51	Type 1	• Located in the lower portion of the watershed • Size of catchment basin: ~ 1,300 ha • No known upstream detention areas within catchment basin.	Surrounding land use is over 50% agricultural	Swamp and Marsh with less than 50% covered with organic soil	• Topography: flat / rolling • Wetland to catchment ratio: 1% • Seeps: None • Not located within 1 km of a known major aquifer	Emergent Vegetation	•Dominant Wetland Type: Palustrine •Soils: Clays	No species of conservation concern encountered	Winter cover for wildlife	Present Low Marsh

Wetland	Minimum Distance from Project Location (m)	Biological Component							Hydrological Component						Special Feature Components		
										Water Quality Improvement							
		Wetland Size (ha)	Wetland Type	Site Type	Vegetation Communities	Proximity to Other Wetlands	Interspersion Number	Open Water Type	Flood Attenuation	Short Term	Long Term Nutrient Trap	Groundwater Discharge	Shoreline Erosion Control	Groundwater Recharge	Species Rarity	Significant Features and Habitats	Fish Habitat
					special features of these wetlands are available in their OWES evaluations which are on file with the MNRF.												
WET-03	18.5 m (Primary Laydown Area)	0.05	Marsh	Palustrine	**M1 (WET-003 – MAS2-1) – ne:** Broad-leaved Cattail.	336 m to WET-04	N/A*	Type 1	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	None	None	None
WET-06	0 m (Within Project Location)	0.06	Marsh	Palustrine	**M1 (WET-06 - MAM2-5 / MAM2-10 Complex) – ne:** Sedges, Agrostis and Lance-leaved Aster.	195 to WET -06	N/A*	Type 1	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	None	None	None
WET-07	17 m (Secondary Laydown Area)	0.17	Marsh	Palustrine	**M1 (WET-06 - MAM2-5 / MAM2-10 Complex) – ne:** Sedges, Agrostis and Lance-leaved Aster.	114 m to WET-01	N/A*	Type 1	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	None	None	None

* Attribute not assessed as wetland was excluded due to small area (< 0.5 ha) and absence of important functions or features that would justify that these small areas be either included in any evaluation or this particular complex.

3.3.3 Woodlands

Through the Records Review six woodlands were identified within the Site Investigation Area. The boundaries of these woodlands are shown on **Figure 6**. The boundaries were staked and surveyed by a qualified individual using the woodland driplines to identify the outer edge of the feature. The attributes, composition and functions of all six woodlands are identified in **Table 7**.

Table 7. Woodland Features Identified Through the Records Review and Site Investigation

Woodland Feature ID	Minimum Distance from Project Locations (m)	Attributes			Composition	Functions
		Total Size	Forest Community Type	Woodland Age		
WOD-01	50 m (fence)	4.0 ha	Deciduous Forest / Deciduous Swamp	Mid-age to Mature	• Dry – Fresh White Ash Deciduous Forest (FOD 4-2) / Dry – Fresh Beech Deciduous Forest (FOD4-1) Complex: The canopy and sub-canopy is dominated by dense layer of White Ash, Beech, Red Oak, Shagbark Hickory and Sugar Maple. The shrub layer contains a relatively sparse layer of Beech, Ironwood and Shagbark Hickory saplings. The ground layer contains a relatively sparse layer of Beech seedlings, Baneberry and Spotted. • Green Ash Mineral Deciduous Swamp (SWD2-2): The canopy and sub-canopy are dominated by a dense layer of Green Ash, Bur Oak, Shagbark Hickory and Basswood. The shrub layer consists of a somewhat sparse layer of Green Ash and Shagbark Hickory saplings. The ground layer consists of a somewhat dense layer of Dwarf Raspberry, American Black Currant, Sensitive Fern and Jewelweed.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.
WOD-02	15 m (transmission line)	1.83 ha	Cultural Woodland	Young to Mid-age	• Mineral Cultural Woodland (CUW1): These communities generally consist of a canopy and sub-canopy that are dominated by a dense layer of planted Sugar Maple, Green Ash, and Eastern Cottonwood. The shrub layer generally consists of a dense layer of Tartarian Honeysuckle. The ground layer generally consist of a dense layer of Tall Goldenrod, New-England Aster, Prickly Sedge and a variety of grass species.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.
WOD-03	10 m (fence)	11.49 ha	Deciduous Forest / Deciduous Swamp	Mid-age to Mature	• Dry – Fresh White Ash Deciduous Forest (FOD 4-2) / Dry – Fresh Beech Deciduous Forest (FOD4-1) Complex: The canopy and sub-canopy is dominated by dense layer of White Ash, Beech, Red Oak, Shagbark Hickory and Sugar Maple. The shrub layer contains a relatively sparse layer of Beech, Ironwood and Shagbark Hickory saplings. The ground layer contains a relatively sparse layer of Beech seedlings, Baneberry and Spotted. • Dry – Fresh White Ash Deciduous Forest (FOD4-2): The canopy is dominated by a dense layer of White Ash. The shrub layer is dominated by Hawthorne shrubs. The ground layer is dominated by Garlic Mustard and Rose Multiflora. • Green Ash Mineral Deciduous Swamp (SWD2-2): The canopy and sub-canopy are dominated by a dense layer of Green Ash, Bur Oak, Shagbark Hickory and Basswood. The shrub layer consists of a somewhat sparse layer of Green Ash and Shagbark Hickory saplings. The ground layer consists of a somewhat dense layer of Dwarf Raspberry, American Black Currant, Sensitive Fern and Jewelweed.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.
WOD-04	12 m (fence)	0.96 ha	Cultural Woodland	Young to Mid-age	• Mineral Cultural Woodland (CUW1): These communities generally consist of a canopy and sub-canopy that are dominated by a dense layer of planted Sugar Maple, Green Ash, and Eastern Cottonwood. The shrub layer generally consists of a dense layer of Tartarian Honeysuckle. The ground layer generally consist of a dense layer of Tall Goldenrod, New-England Aster, Prickly Sedge and a variety of grass species.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.
WOD-05	10 m (fence)	0.80 ha	Cultural Woodland	Young to Mid-age	• Mineral Cultural Woodland (CUW1): These communities generally consist of a canopy and sub-canopy that are dominated by a dense layer of planted Sugar Maple, Green Ash, and Eastern Cottonwood. The shrub layer generally consists of a dense layer of Tartarian Honeysuckle. The ground layer generally consist of a dense layer of Tall Goldenrod, New-England Aster, Prickly Sedge and a variety of grass species.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.
WOD-06	19 m (fence)	1.27 ha	Deciduous Swamp / Cultural Woodland	Young to Mid-age	• Mineral Cultural Woodland (CUW1): These communities generally consist of a canopy and sub-canopy that are dominated by a dense layer of planted Sugar Maple, Green Ash, and Eastern Cottonwood. The shrub layer generally consists of a dense layer of Tartarian Honeysuckle. The ground layer generally consist of a dense layer of Tall Goldenrod, New-England Aster, Prickly Sedge and a variety of grass species • Silver Maple Mineral Deciduous Swamp (SWD 3-2): The canopy and sub-canopy were dominated by a dense layer of Freemans Maple, Green Ash and Eastern Cottonwood. The shrub layer contains a relatively sparse layer of Green Ash saplings and Red-osier Dogwood. The ground layer is comprised of a dense layer of grasses and sedges including Reed-canary Grass, Agrostis, and Fox Sedge.	Provides habitat for woodland plants and animals, carbon storage and water and soil retention.

Site Investigation Woodlands

Figure 6

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Site Investigation Delineated Woodland
- Wooded Area (Records
- Watercourse
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

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February, 2017

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3.3.4 Wildlife Habitat

A review of known wildlife habitat that has been identified within the Site Investigation Area was completed during the Records Review (Section 2.2.6). This information has been updated by using the results of the Site Investigation and the criteria provided in the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) and the *Eco-region Criteria Schedule for Wildlife Habitat Applicable to Ecoregion 7E* (MNRF 2015). This information is presented in **Figure 7** and **Table 8**.

Table 8. Summary of Candidate Significant Wildlife Habitat within the Site Investigation Area

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Seasonal Concentration Areas of Animals				
Waterfowl Stopover and Staging Areas (Terrestrial)	American Black Duck, Northern Pintail, Gadwall, Blue-winged Teal, Green-winged Teal, American Wigeon, Northern Shoveler, Tundra Swan	CUM1 and CUT1 communities that have evidence of annual spring flooding from melt water or run-off. Fields with seasonal flooding and waste grains in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee area may be important to Tundra Swans when farming practices provide food.	Cultural meadows and thickets that flood annually in the spring (mid-March to May). Agricultural fields with waste grains that are used by waterfowl are not considered Significant Wildlife Habitat unless used by Tundra Swans in the Long Point, Rondeau, Lake Saint Clair, Grand Bend and Point Pelee areas.	**No** There is no evidence of substantial annual flooding or persistent standing water within the meadow, thicket and agricultural lands located in and within 50 m of the Project Location to provide this type of habitat. Food may be present in some years, not documented by Beacon.
Waterfowl Stopover and Staging Areas (Aquatic)	Canada Goose, Cackling Goose, Snow Goose, American Black Duck, Northern Pintail, Northern Shoveler, American Wigeon, Gadwall, Green-winged Teal, Blue-winged Teal, Hooded Merganser, Common Merganser, Lesser Scaup, Greater Scaup, Long-tailed Duck, Surf Scoter, White-winged Scoter, Black Scoter, Ring-necked duck, Common Goldeneye, Bufflehead, Redhead, Ruddy Duck, Red-breasted Merganser, Brant, Canvasback	MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7	Ponds, marshes, lakes, bays, costal inlets and watercourses that are used as stopover areas during migration. These habitats typically have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water).	**No** There is no evidence of substantial annual flooding or persistent standing water within swamp habitat that is located within 50 m of the Project Location to provide this type of habitat.
Shorebird Migratory Stopover Area	Greater Yellowlegs, Lesser Yellowlegs, Marbled Godwit, Hudsonian Godwit, Black-bellied Plover, American Golden-Plover, Semipalmated Plover, Solitary Sandpiper, Semipalmated Sandpiper, Pectoral Sandpiper, White-rumped Sandpiper, Baird's Sandpiper, Least Sandpiper, Purple Sandpiper, Stilt Sandpiper, Short-billed Dowitcher, Red-necked Phalarope, Whimbrel, Ruddy Turnstone, Sanderling, Dunlin	BBO1, BBO2, BBS1, BBS2, BBT1, BBT2, SDO1, SDS2, SDT1, MAM1, MAM2, MAM3, MAM4, MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bare and seasonally flooded, muddy and un-vegetation shoreline habitats.	**No** There is no evidence of substantial annual flooding or persistent standing water within the marsh habitat present within 50 m of the Project Location to provide this type of habitat.
Raptor Winter Area	Rough-legged Hawk, Red-tailed Hawk, Northern Harrier, American Kestrel, Snowy Owl, Short-eared Owl, Bald Eagle	A combination of Forest Communities (FOD, FOM, FOC) and Upland (CUW, CUT, CUS and CUW) communities must be present to support this habitat type. Bald Eagle wintering areas includes FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or lakes with open water.	A combination of fields and woodlands that provide roosting, foraging and resting habitat for wintering raptors. Raptor wintering (hawk/owl) sites need to be > 20 ha with a combination of forest and upland. Least disturbed sites, idle/fallow or lightly grassed field / meadow (> 15 ha) with adjacent woodlands. Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water and large trees and snags available for roosting.	**No** Cultural meadow habitats adjacent woodlands within 50 m of the Project Location are not large enough to provide this type of habitat.
Bat Hibernacula	Big Brown Bat, Tri-coloured Bat	CCR1, CCR2, CCA1, CCA2. Building are not considered to be Significant Wildlife Habitat.	Hibernacula's may be found in caves, mine shafts, underground foundations and karsts.	**No** There are no caves, mine shafts, underground foundations or karst within 50 m of the Project Location to provide this type of habitat.
Bat Maternity Colonies	Big Brown Bat, Silver-haired Bat	FOD, FOM, SWD and SWM.	Maternity colonies can be found in tree cavities, vegetation and buildings. Deciduous and mixed forest communities with greater than 10 ha of large diameter (> 25 cm dbh) wildlife trees.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01, WOD-03 and WOD-06. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Turtle Winter Areas	Midland Painted Turtle, Northern Map Turtle, Snapping Turtle	SW, MA, OA SA, FEO, BOO	Over-wintering sites for turtles are typically in the same area as their core habitat. Waterbodies have to be deep enough to not frees and have soft mud substrates.	**No** The marsh communities that are located in or within 50 m of the Project Location have insufficient standing water to provide this type of habitat.
Reptile Hibernaculum	Eastern Gartersnake, Northern Watersnake, Northern Red-bellied Snake, Northern Brownsnake, Smooth Green Snake, Northern Ring-necked Snake, Milksnake, Eastern Ribbonsnake	Snake hibernacula may be found in any other than very wet ones. Talus, Rock Barren, Crevice, Cave and Alvar sites may be directly related to these sites. Observation or congregation of snakes on sunny warm days in the spring or fall is a good indicator.	Snakes hibernate in sites located below frost lines in burrows, rock crevices and other natural locations. Rock piles, slopes, stones fences and crumbling foundations can also be used by hibernating snakes. Areas of broken and fissures rocks can also provide access to sites below the frost line.	**No** Potential habitat does not exist in or within 50 m of the Project Location as no features were documented that provided access to sites below the frost line.

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	Cliff Swallow, Northern Rough-winged Swallow	Roding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, barns within ELC communities CUM1, CUT1, CUS1, BLO1, BLS1, BLT1, CLO1, CLS1, CLT1	Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.	**No** No exposed soil banks were identified in or within 50 m of the Project Location to provide this type of habitat.
Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	Great Blue Heron, Black-crowned Night Heron, Great Egret, Green Heron	SWM2, SWM3, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7, FET1	Nests in live or dead standing trees in wetlands, lakes, islands and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	**No** No stick nests were documented within swamp habitats within 50 m of the Project Location.
Colonially - Nesting Bird Breeding Habitat (Ground) CNG-01, CNG-02, CNG-03	Herring Gull, Great Black-backed Gull, Little Gull, Ring-billed Gull, Common Tern, Caspian Tern, Brewer's Blackbird	Any rocky island or peninsula within a lake or larger river Fore Brewer's Blackbird MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, CUM, CUT, CUS communities in close proximity to watercourses or pastures with scattered trees or shrubs	Nesting colonies of gulls and terns occur on rocky islands or peninsulas within a lake or larger river. For Brewers Blackbirds in meadow communities in close proximity to watercourses or pastures with scattered trees or shrubs	**Yes** Potentially suitable habitat for Brewers Blackbird may be present within marsh habitat that is located within 50 m of the Project Location. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.
Migratory Butterfly Stopover Areas	Painted Lady, Red Admiral, Monarch	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario.	Cultural meadow, savannah and thicket communities that are within 5 km of Lake Ontario or Lake Erie and are at least 10 ha in size and contain a combination of field and forest habitat.	**No** Potential habitat does not exist in or within 50 m of the Project Location as meadow and thicket habitats in and within 50 m of the Project Location were not large enough to support this habitat type.
Landbird Migratory Stopover Areas	All migratory songbird and raptor species.	FOC, FOM, FOD, SWC, SWM, SWD	Woodlands that are at least 5 ha in area and within 5 km of Lake Ontario or Lake Erie.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Deer Winter Congregation Areas	White-tailed Deer	FOC, FOM, FOD, SWC, SWM, SWD and CUP	Deer movement in winter months within eco-region 7E are not constrained by snow depth, however they still congregate in suitable woodlands. These woodlands will typically be larger than 100 ha in size, however woodlands smaller than 100 ha may be considered significant based on MNR assessments.	**No** The woodlands within 50 m of the Project Location were not large enough to support this habitat type.
Rare Vegetation Communities				
Cliffs and Talus Slops	N/A	CLO, CLS, CLT, TAO, TAS, TAT	A cliff is a vertical to near vertical bedrock that is greater than 3 m in height. A talus slope is rock rubble at the base of a cliff made up of coarse rocky debris.	**No** These habitat types are not present within 50 m of the Project Location.
Sand Barren	N/A	SBO, SBS, SBT	Sand barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little to no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah.	**No** This habitat type is not present within 50 m of the Project Location.
Alvar	N/A	ALO, ALS, ALT, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2	Alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Old Growth Forest	N/A	FOD, FOC, FOM, SWD, SWC, SWM	Old growth forests are characterized by heavy mortality or turnover of over story trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris. Stands must be 30 ha or greater in size with a minimum of 10 ha of interior habitat (interior habitat determined with a 100 m buffer).	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Savannah	N/A	TPS1, TPS2, TPW1, TPW2, CUS2	Savannah is a tallgrass prairie habitat that has tree cover between 20 - 60%.	**No** Potential habitat does not exist in or within 50 m of the Project Location.

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Tallgrass Prairie TP-1, TP-2	N/A	TPO1, TPO2 (Planted)	Tallgrass Prairie has ground cover that is dominated by prairie grasses. An open tallgrass prairie has less than 25% tree cover.	**Yes** Although planted at this site and therefore artificial in nature, suitable habitat is present within the Project Location within the Planted Prairie (TP-1 and TP-2). This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.
Other Rare Vegetation Communities	N/A	N/A	Rare vegetation communities may include beaches, fens, forests, marsh, barrens, dunes and swamps, as identified in Appendix M of the *Significant Wildlife Habitat Technical Guide* (OMNR 2000).	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Specialized Habitat for Wildlife				
Waterfowl Nesting Area	American Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, Green-winged Teal, Wood Duck, Hooded Merganser, Mallard	All upland habitats located adjacent to these ELC communities: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4	Waterfowl nesting areas are upland areas adjacent to marsh, shallow aquatic and swamp habitat. In order to be considered significant these features must extend 120 m from of a wetland in order to deter predators	**No** Marsh habitat within 50 m of the Project Location does not have enough standing water to support this habitat.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Osprey, Bald Eagle	FOD, FOM, FOC, SWD, SWM, SWC communities adjacent to riparian areas, rivers, lakes, ponds and wetlands	Nests for these species are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands or on structures over water. Osprey nests are usually at the top of a tree, while Bald Eagle nets are typically in super canopy trees.	**Yes** Potentially suitable habitat for Bald Eagle and Osprey Nesting, Foraging and Perching Habitat may be present within WOD-01, WOD-03 and WOD-06. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Woodland Raptor Nesting Habitat	Northern Goshawk, Cooper's Hawk, Sharp-shinned Hawk, Red-shouldered Hawk, Barred Owl, Broad-winged Hawk	May be found in all forested EC ecosites. May also be found in SWC, SWM, SWD and CUP3	Woodland raptor habitat can be found in all natural or conifer plantation woodland/forest stands that are greater than 30 ha in size with more than 4 ha of interior forest habitat (interior habitat determined with a 200 m buffer).	**No** Woodlands within 50 m of the Project Location do not have sufficient interior forest habitat to support this habitat.
Turtle Nesting Areas	Midland Painted Turtle, Northern Map Turtle, Snapping Turtle	Exposed mineral soil (sand or gravel) areas in or within 100 m of the following ELC ecosites: MAS1, MAS2, MAD3, SAS1, SAM1, SAF1, BOO1, FEO1	Ideal nesting habitat for turtles are close to water and away from roads and sites that are less prone to loos of eggs by predation. These areas are often associated with exposed mineral soil (sand or gravel) areas within 100 m of a marsh, shallow aquatic, bog or fen habitat.	**No** No exposed mineral sands or gravels identified within 100 m of the marsh ecosites identified within 50 m of the Project Location.
Seeps and Springs	Wild Turkey, Ruffed Grouse, Spruce Grouse, White-tailed Deer, Salamanders	N/A	Seeps/springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats.	**No** Seeps or springs were identified within 50 m of the Project Location.
Amphibian Breeding Habitat (Woodland) ABWD-01, ABWD-02, ABWD-03	Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Western Chorus Frog, Wood Frog	FOC, FOM, FOD, SWC, SWM, SWD	This type of habitat is associated with the presence of a wetland, lake or pond that is within or adjacent (within 120 m) of a woodland. Woodlands with permanent ponds or those contain water until mid-July are more likely to be used as breeding habitat.	**Yes** Potentially suitable habitat for Amphibian Breeding Habitat (Woodland) may be present within WET-02, WET-05 and WET-08. The habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the evaluation of significance.
Amphibian Breeding Habitat (Wetland) ABWT-01, ABWT-02, ABWT-03	Eastern Newt, American Toad, Spotted Salamander, Four-toed Salamander, Blue-spotted Salamander, Gray Treefrog, Western Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog, Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA.	Wetlands and pools that are greater than 500 m^2 and are isolated from woodlands (greater than 120 m)	**Yes** Potentially suitable habitat for Amphibian Breeding Habitat (Wetland) may be present within WET-04, and WET-08. The habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance
Woodland Area-Sensitive Bird Breeding Habitat	Yellow-bellied Sapsucker, Red-breasted Nuthatch, Veery, Blue-headed Vireo, Northern Parula, Black-throated Green Warbler, Blackburnian Warbler, Black-throated Blue Warbler, Ovenbird, Scarlet Tanager, Winter Wren, Pileated Woodpecker, Cerulean Warbler, Canada Warbler	FOC, FOM, FOD, SWC, SWM, SWD	Habitats where interior forest breeding birds are breeding. These forests are typically larger mature forest stands or woodlands that are greater than 30 ha in size (interior habitat determined with a 200 m buffer)	**Yes** Potentially suitable habitat for Woodland Area-Sensitive Bird Breeding Habitat may be present within WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)				

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Marsh Bird Breeding Habitat MBBH-01	American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Marsh Wren, Sedge Wren, Common Loon, Green Heron, Trumpeter Swan, Black Tern, Yellow Rail	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1	This type of habitat occurs in wetlands with shallow water and emergent aquatic vegetation present	**Yes** Potentially suitable habitat for Marsh Bird Breeding Habitat may be present within WET-06. This habitat is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance. Other potentially suitable habitat may be present within 50 m of the Project Location within WET-02, WET-03, WET-04, WET-05, WET-07 and WET-08 is to be considered Generalized Candidate Significant Wildlife Habitat.
Open Country Bird Breeding Habitat	Upland Sandpiper, Grasshopper Sparrow, Vesper Sparrow, Northern Harrier, Savannah Sparrow, Short-eared Owl	CUM1, CUM2	This type of habitat occurs in larger grassland areas (including natural and cultural fields and meadows) that are greater than 30 ha in size. Grasslands that are being actively used for farming (i.e. row cropping, intensive hay, livestock pasturing in the last 5 years) typically do not provide ideal habitat for open country bird species.	**No** Cultural meadows within this area are not large enough to support this habitat type.
Shrub/Early Successional Bird Breeding Habitat	Indicator Species: Brown Thrasher, Clay-colored Sparrow. Common Species: Field Sparrow, Black-billed Cuckoo, Eastern Towhee, Willow Flycatcher Special Concern: Yellow-breasted Chat, Golden-winged Warbler	CUT1, CUT2, CUS1, CUS2, CUW1, CUW2	This type of habitat occurs in large field areas succeeding to shrub and thicket habitats that are greater than 10 ha in size.	**No** Cultural thicket communities and cultural woodlands within this area are not large enough to support this habitat type.
Terrestrial Crayfish TC-01	Chimney Crayfish, Digger Crayfish, Devil Crayfish, Meadow Crayfish	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM and CUM1 inclusions of above meadow marsh ecosites can be used by terrestrial crayfish	This type of habitat occurs in meadows and edge of shallow marshes.	**Yes** Suitable habitat may be present in the Project Location with WET-06. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance. Other potentially suitable habitat may be present within 50 m of the Project Location within WET-02, WET-03, WET-04, WET-05, WET-07 and WET-08 is to be considered Generalized Candidate Significant Wildlife Habitat.
Species of Special Concern – Plants				
Harlberd-leaved Smartweed (*Persicaria arifolia*) Srank = S3	N/A	N/A	This species is most commonly associated with high quality bottomland woodlands, swamps, seeps and springs, low areas along ponds and sloughs with consistent moisture levels.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Hirsute Sedge (*Carex hisutella*) Srank = S3	N/A	N/A	This species is most commonly associated with upland woodlands, savannas, rocky glades and sandy meadows.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Weak Stellate Sedge (*Carex seorsa*) Srank = S2	N/A	N/A	This species is most commonly associated with the edges of high quality bottomland woodlands, swamps, seeps and springs, low areas along ponds and sloughs with consistent moisture levels.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Swamp Rosemallow (*Hibiscus moscheutos* ssp. *Moscheuto)* Srank = S3	N/A	N/A	This species is restricted to shoreline marshes in the Carolinian and Great Lakes - St. Lawrence forest regions, associated with lakes Erie, Ontario and St. Clair.	**No** Potential habitat does not exist in or within 50 m of the Project Location.

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Honey Locust (*Gleditsia triacanthos*) Srank = S2	N/A	N/A	Native, naturally occurring specimens are most commonly associated with the moist soils of river floodplains. The do however occasionally occur in dry upland areas and waste places.	**Yes** Suitable habitat may be present within 50 m of the Project Location within wooded habitat. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat
Ironweed (*Vernonia missurica*) Srank = S1? TP-01, TP-02	N/A	N/A	This species is associated with moist to mesic prairies, the openings and edges of woodlands, swamps and the edges of lakes.	**Yes** This species was planted within the Planted Prairie. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance
Nodding Wild Onion (*Allium cernuum*) Srank = S2 TP-01, TP-02	N/A	N/A	This species is most commonly associated with prairies and thinly wooded bluffs.	**Yes** This species was planted within the Planted Prairie. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.
Pale-purple Coneflower (*Echinacea pallida*) Srank = S1 TP-01, TP-02	N/A	N/A	This species is most commonly associated with prairies, openings in dry rocky woods and oak savannas.	**Yes** This species was planted within the Planted Prairie. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance
Prairie Dock (*Silphium terebinthinaceum* var. *terebinthinaceum*) Srank = S1 TP-01, TP-02	N/A	N/A	This species is most commonly associated with prairies and savannas.	**Yes** This species was planted within the Planted Prairie. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.
Tall Coreopsis (*Coreopsis tripteris*) Srank = S2 TP-01, TP-02	N/A	N/A	This species is most commonly associated with prairies and savannas.	**Yes** This species was planted within the Planted Prairie. This habitat type is to be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.
Species of Special Concern – Birds				
Bald Eagle (*Haliaeetus leucocephalus*) Srank = S4, ESA = SC	See Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	See Bald Eagle and Osprey Nesting, Foraging and Perching Habitat N/A	This species nests in a variety of forest types, almost always near a major lake or river.	**Yes** Potentially suitable habitat for Bald Eagle Nesting, Foraging and Perching may be present within WOD-01, WOD-03 and WOD-06. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Black-crowned Night-Heron (*Nycticorax nycticorax*) Srank = S3	See Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	See Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	This species nests in and along swamps, streams, rivers, margins of pools, ponds, lakes, lagoons, tidal mudflats, salt marsh, freshwater marshes, man-made ditches, canals, ponds, reservoirs, and wet agricultural fields. Essentials seem to be good cover, and freshwater, saltwater, or brackish foraging area.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Canada Warbler (*Cardellina canadensis*) Srank = S4, SARA = THR, ESA = SC	N/A	N/A	This species nests in a wide range of deciduous and coniferous forests. It is most abundant in moist, mixed coniferous-deciduous forests with a well-developed understory.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Canvasback (*Aythya valisineria*) Srank = S1	N/A	N/A	This species nests in small lakes, deep-water marshes, sheltered bays of large fresh water and alkali lakes, permanent and semi-permanent ponds, sloughs, potholes, and shallow river impoundments.	**No** Potential habitat does not exist in or within 50 m of the Project Location.

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Caspian Tern (*Sterna caspia*) Srank = S3	N/A	N/A	This species breeds in wide variety of habitats, ranging from coastal estuarine, salt marsh, and barrier islands along Pacific, Atlantic and Gulf Coasts, to James Bay beaches and freshwater islands in Great Lakes and other inland sites. In western interior, often nests on islands in rivers and salt lakes.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Eastern Wood-Pewee (*Contopus virens*) Srank = S4, SARA = SC, ESA = SC	N/A	N/A	The eastern wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Great Black-backed Gull (*Larus marinus*) Srank = S2	N/A	N/A	This species breeds mainly in coastal belts of temperate and boreal upper middle latitudes, extending into sub-Arctic and low Arctic. It nests on small islands, rocky islets, tops of stacks, salt marshes, dredge-spoil islands, barrier beaches, and dunes on barrier islands.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Golden-winged Warbler (*Vermivora chrysoptera*) Srank = S4, SARA = THR, ESA = SC	See Shrub/Early Successional Bird Breeding Habitat	See Shrub/Early Successional Bird Breeding Habitat	This species is most commonly associated with mixed habitats that include dense patches of herbs and shrubs with some taller trees.	**No** Cultural thicket communities and cultural woodlands within this area are not large enough to support this habitat type.
Hooded Warbler (*Setophaga citrina*) Srank = 3, SARA = THR, ESA = SC	N/A	N/A	This species is most commonly associated with forested habitats where trees are large enough to create significant tree fall gaps. Commonly invades selectively logged deciduous forests, as well as pine plantations, 1–5 yr after harvesting, and remains as long as there are suitable understory shrubs for nesting.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Northern Shrike (*Lanius excubitor*) Srank = S2S3	N/A	N/A	This species nests throughout taiga and taiga-tundra ecotone of Alaska and Canada, wherever suitable trees or shrubs ≥1 m high occur in association with open landscapes, and in willow, alder and poplar stands that extend beyond spruce line into tundra zone.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Peregrine Falcon (*Falco peregrinus*) Srank = S3, SARA = SC, ESA = SC	N/A	N/A	This species typically nests on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on.	**Yes** Suitable habitat may be present within 50 m of the Project Location within the Nanticoke OPG industrial area. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Redhead (*Aythya americana*) Srank = S2	N/A	N/A	This species is a habitat generalist that is most commonly associated with seasonally and semi permanently flooded wetlands in Prairie Pothole Region.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Red-headed Woodpecker (*Melanerpes erythrocephalus*) Srank = S4, SARA = THR, ESA = SC	N/A	N/A	This species lives in open woodland and woodland edges, and is often found in parks, golf courses and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01, WOD-02 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Rough-legged Hawk (*Buteo lagopus*) Srank = S1	N/A	N/A	This species nests in the open country, mainly in high subarctic and arctic latitudes in boreal forest; in low-lying boreal forest-tundra ecotone; and in treeless tundra, uplands and alpine regions.	**No** Potential habitat does not exist in or within 50 m of the Project Location.

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Wood Thrush (*Hylocichla mustelina*) Srank = S4, SARA = THR, ESA = SC	N/A	N/A	This species is most commonly associated with in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually in sugar maple or American beech.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Species of Special Concern - Reptiles and Amphibians				
Eastern Ribbonsnake (*Thamnophis sauritus*) Srank = S3, SARA = SC, ESA = SC	N/A	N/A	This species is most commonly found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together.	**Yes** Suitable habitat may be present within 50 m of the Project Location with WET-04 and WET-08. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Jefferson / Blue-spotted Salamander Complex (*Ambystoma hybrid pop.*) Srank = S2 - S4	See Amphibian Breeding Habitat (Woodland)	See Amphibian Breeding Habitat (Woodland)	This species is most commonly found in moist, loose soil, under logs or in leaf litter. In early spring this species travels to woodland ponds to breed where they lay their eggs in clumps attached to underwater vegetation.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WET-02 and WET-05. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Milksnake (*Lampropeltis triangulum*) Srank = S3, SARA = SC	N/A	N/A	This species can be found in a variety of habitats but tend to use open habitats such as rocky outcrops, fields and forest edges. In rural areas this snake may be common, especially around barns where they thrive on the abundant mice. The milksnake hibernates underground, in rotting logs or in the foundations of old buildings.	**Yes** Suitable habitat may be present within 50 m of the Project Location surrounding the various woodlands that have been identified within 50 m of the Project Location. This habitat type is to be considered Candidate Significant Wildlife Habitat and has been carried forward to the Evaluation of Significance
Northern Map Turtle (*Graptemys geographica*) Srank = S3, SARA = SC, ESA = SC	N/A	N/A	This species inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled.	**No** Potential habitat does not exist in or within 50 m of the Project Location.
Snapping Turtle (*Chelydra serpentina*) Srank = S3, SARA = SC, ESA = SC	N/A	N/A	Snapping turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid-summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WET-04. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Mammals				
Woodland Vole (*Pitymys pinetorum*) Srank = S3, SARA = SC, ESA = SC	N/A	N/A	In Ontario, the Woodland Vole lives in mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow.	**Yes** Suitable habitat may be present within 50 m of the Project Location within WOD-01 and WOD-03. This habitat type is to be considered Generalized Candidate Significant Wildlife Habitat.
Insects				

Significant Wildlife Habitat Type	Candidate Wildlife Species	Candidate ELC Codes	Habitat Description	Habitat Assessment
Monarch (*Danaus plexippus*) Srank = S2N, S4B, ESA = SC	See Migratory Butterfly Stopover Areas	Migratory Butterfly Stopover Areas	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico.	**No** Potential habitat does not exist in or within 50 m of the Project Location as the cultural meadow habitats located in and within 50 m of the Project Location that are adjacent forest communities are not large enough to support this habitat type according to the Significant Wildlife Habitat Criteria Schedules.
Animal Movement Corridors				
Amphibian Movement Corridors	Eastern Newt, American Toad, Spotted Slamander, Four-toed Salamander, Blue-spotted Salamander, Gray Treefrog, Western Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog, Bullfrog	Corridors may be found in all ecosties associated with water.	This habitat consists of movement corridors between breeding habitat and summer habitat. Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies and undeveloped areas are most significant. Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps < 20 m.	**Yes** Under the Significant Habitat Criteria Schedules Amphibian Movement Corridors must be determined when significant Amphibian Breeding habitat has been identified. As it has not yet been determined if the amphibian breeding habitat adjacent these features within 50 m of the Project Location is significant this habitat type will be considered Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance.

Based on the wildlife habitat review completed during the Site Investigation the following habitats have been determined to be Candidate Significant Wildlife Habitat and will be carried forward to the Evaluation of Significance:

- Seasonal Concentration Area of Animals
  - Colonial – Nesting Bird Breeding Habitat (Ground)
- Rare Vegetation Communities
  - Tallgrass Prairie (planted)
- Specialized Habitat for Wildlife
  - Amphibian Breeding Habitat (Woodland)
  - Amphibian Breeding Habitat (Wetland)
- Habitat for Species of Conservation Concern
  - Marsh Bird Breeding Habitat
  - Terrestrial Crayfish
  - Ironweed (planted)
  - Nodding Wild Onion (planted)
  - Pale-purple Coneflower (planted)
  - Prairie Dock (planted)
  - Tall Coreopsis (planted)
  - Milksnake
- Animal Movement Corridors
  - Amphibian Movement Corridors

The forms of wildlife habitat that are located within 50 m of the Project Location but are outside of the Project Location that are not likely to be affected by the development or operation of the solar facility have been categorized as "Generalized Candidate Significant Wildlife Habitat", as outlined in Appendix D of the *Natural Heritage Assessment Guide for Renewable Energy Projects* (OMNR 2012) and will be treated as significant in the EIS. These include:

- Seasonal Concentration Areas of Animals
  - Bat Maternity Colonies
  - Landbird Migratory Stopover Areas
- Specialized Habitat for Wildlife
  - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
  - Woodland Area – Sensitive Bird Breeding Habitat
- Habitat for Species of Conservation Concern
  - Marsh Bird Breeding Habitat
  - Terrestrial Crayfish
  - Harlberd-leaved Smartweed
  - Hirsute Sedge
  - Weak Stellate Sedge
  - Honey Locust
  - Bald Eagle
  - Eastern Wood-Pewee
  - Hooded Warbler
  - Peregrine Falcon
  - Red-headed Woodpecker

Site Investigation Candidate Significant Wildlife Habitat

Figure 7

Nanticoke Solar

RAINHAM ROAD
SANDUSK ROAD
SOUTH COAST DRIVE
Hickory Creek
Lake Erie
TP-01
TP-02
TC-01
MBBH-01
ABWD-01 / CNG-01
ABWT-01 / CNG-01
ABWD-02 / CNG-02
ABWT-03 / CNG-03
ABWD-03 / CNG-03
ABWT-02 / CNG-02

Legend

- Project Location
- Project Location Plus 50 m Setback
- Lot Fabric

Candidate Significant Wildlife Habitat

- Planted Prairie Habitat
- Terrestrial Crayfish / Marsh Breeding Bird Habitat
- Amphibian Breeding Habitat (Woodland)
- Amphibian Breeding Habitat (Wetland) / Colonially – Nesting Bird Breeding Habitat (Ground)
- Generalized Significant Wildlife Habitat

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

First Base Solutions
Web Mapping Service 2010

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BEACON ENVIRONMENTAL

Project 214350
February, 2017

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- Wood Thrush
- Eastern Ribbonsnake
- Jefferson / Blue-spotted Salamander Complex
- Snapping Turtle
- Woodland Vole

3.3.5 Summary of Corrections to Records Review

The boundaries of natural areas within the Site Investigation Area have been refined based on the results of the Site Investigations. **Table 9** identifies corrections made to the results of the Records Review.

Table 9. Summary of Corrections to Records Review Data

Natural Feature	Identified During Records Review?	Identified During Site Investigation	Amendment Required
Wetlands			
WET-02	No	Yes	Addition of a previously unidentified wetland
WET-03	No	Yes	Addition of a previously unidentified wetland
WET-04	No	Yes	Addition of a previously unidentified wetland
WET-05	No	Yes	Addition of a previously unidentified wetland
WET-06	No	Yes	Addition of a previously unidentified wetland
WET-07	No	Yes	Addition of a previously unidentified wetland
Woodlands			
WOD-01	Yes	Yes	Woodland boundary refined
WOD-02	Yes	Yes	Woodland Boundary refined
WOD-03	Yes	Yes	Woodland Boundary refined
WOD-04	No	Yes	Addition of a previously unmapped woodland
WOD-05	No	Yes	Addition of a previously unmapped woodland
WOD-06	No	Yes	Addition of a previously unmapped woodland
Significant Wildlife Habitat			
Seasonal Concentration Areas of Animals			
Bat Maternity Colonies	No	Yes	Addition of Generalized Candidate Significant Wildlife Habitat for Bat Maternity Colonies within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Colonially – Nesting Bird Breeding	No	Yes	Addition of Candidate Significant Wildlife Habitat for Colonially – Nesting Bird Breeding Habitat (Ground) was identified

Natural Feature	Identified During Records Review?	Identified During Site Investigation	Amendment Required
Habitat (Ground)			within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Landbird Migratory Stopover Areas	No	Yes	Addition of Generalized Candidate Significant Wildlife Habitat for Landbird Migratory Stopover Areas within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Specialized Habitat for Wildlife			
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	No	Yes	Addition of Generalized Candidate Significant Wildlife Habitat for Bald Eagle and Osprey Nesting, Foraging and Perching Habitat. This feature will be carried forward to the Evaluation of Significance.
Amphibian Breeding Habitat (Woodland)	No	Yes	Addition of Candidate Significant Wildlife Habitat for Amphibian Breeding Habitat (Woodland) within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Amphibian Breeding Habitat (Wetland)	No	Yes	Addition of Candidate Significant Wildlife Habitat for Amphibian Breeding Habitat (Wetland) within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Woodland Area-Sensitive Bird Breeding Habitat	No	Yes	Addition of Generalized Candidate Significant Woodland Area-Sensitive Bird Breeding Habitat within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Habitat for Species of Conservation Concern			
Marsh Bird Breeding Habitat	No	Yes	Addition of Candidate Significant Wildlife Habitat and Generalized Candidate Significant Wildlife Habitat for Marsh Bird Breeding Habitat within 50 m of the Project Location. This feature will be carried forward to the Evaluation of Significance.
Terrestrial Crayfish	No	Yes	Addition of Candidate Significant Wildlife Habitat and Generalized Candidate Significant Wildlife Habitat for Terrestrial Crayfish in the Project Location. This feature will be carried forward to the Evaluation of Significance.
Animal Movement Corridors			
Amphibian Movement Corridors	No	Yes	Addition of Candidate Significant Wildlife Habitat for Amphibian Movement Corridors. This feature will be carried forward to the Evaluation of Significance.

3.4 Site Investigation Summary

The Site Investigation Report has been prepared to fulfill the requirements of the NHA as required by Part IV, Section 26 of O. Reg. 359/09. As required, the Site Investigation has verified the accuracy of the results of the Records Review and has identified features that were not identified during the Records Review.

Table 10 provides a summary of the natural features that have been identified in or within 50 m of the Project Location and will be carried forward to the Evaluation of Significance.

Table 10. Natural Features within the Site Investigation Area Based on Results of On-site Investigations

Natural Feature	Location Relative to Project Location	Evaluation of Significance Status	
		Evaluation Required (Y/N)	Previously Evaluated (Y/N)
Wetlands			
WET-02	Within 50 m from Project Location	No	No
WET-03	Within 50 m of the Project Location	Yes	No
WET-04	Within 50 m of the Project Location	Yes	No
WET-05	Within 50 m of the Project Location	Yes	No
WET-06	Within Project Location	Yes	No
WET-07	Within 50 m of the Project Location	Yes	No
WET-08	Within 50 m of the Project Location	Yes	No
Woodlands			
WOD-01	Within 50 m of the Project Location	Yes	No
WOD-02	Greater than 50 m from the Project Location	Yes	No
WOD-03	Within 50 m of the Project Location	Yes	No
WOD-04	Within 50 m of the Project Location	Yes	No
WOD-05	Within 50 m of the Project Location	Yes	No
WOD-06	Within 50 m of the Project Location	Yes	No
Significant Wildlife Habitat			
Seasonal Concentration Areas of Animals			
Colonially – Nesting Bird Breeding Habitat (Ground)	In and within 50 m of the Project Location	Yes	No
Generalized Bat Maternity Colonies	Within 50 m of the Project Location	No*	No
Generalized Landbird Migratory Stopover Areas	Within 50 m of the Project Location	No*	No
Rare Vegetation Communities			
Tallgrass Prairie	Planted Tallgrass Prairie is located within the Project Location	Yes	No
Specialized Habitat for Wildlife			
Generalized Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Within 50 m of the Project Location	No*	No
Generalized Woodland Area – Sensitive Bird Breeding Habitat	Within 50 m of the Project Location	No*	No

Natural Feature	Location Relative to Project Location	Evaluation of Significance Status	
		Evaluation Required (Y/N)	Previously Evaluated (Y/N)
Candidate Amphibian Breeding Habitat (Woodland)	Within 50 m of the Project Location	Yes	No
Candidate Amphibian Breeding Habitat (Wetland)	Within 50 m of the Project Location	Yes	No
Habitat for Species of Conservation Concern			
Generalized Marsh Bird Breeding Habitat	Within 50 m of the Project Location	No*	No
Candidate Marsh Bird Breeding Habitat	Within WET-06 within the Project Location	Yes	No
Generalized Terrestrial Crayfish Habitat	Within 50 m of the Project Location	No*	No
Candidate Terrestrial Crayfish Habitat	Within Project Location	Yes	No
Species of Conservation Concern			
Harlberd-leaved Smartweed - Generalized	Within 50 m ofthe Planted Prairie within the Project Location	No*	No
Hirsute Sedge – Generalized	Within 50 m of the Project Location	No*	No
Weak Stellate Sedge – Generalized	Within 50 m of the Project Location	No*	No
Honey Locust – Generalized	Within 50 m of the Project Location	No*	No
Ironweed	Planted within the Planted Prairie within the Project Location	Yes	No
Nodding Wild Onion	Planted within the Planted Prairie within the Project Location	Yes	No
Pale-purple Coneflower	Planted within the Planted Prairie within the Project Location	Yes	No
Prairie Dock	Planted within the Planted Prairie within the Project Location	Yes	No
Tall Coreopsis	Planted within the Planted Prairie within the Project Location	Yes	No
Bald Eagle – Generalized	Within 50 m of the Project Location	No*	No
Eastern Wood-Pewee – Generalized	Within 50 m of the Project Location	No*	No
Hooded Warbler – Generalized	Within 50 m of the Project Location	No*	No
Peregrine Falcon – Generalized	Within 50 m of the Project Location	No*	No
Red-headed Woodpecker – Generalized	Within 50 m of the Project Location	No*	No
Wood Thrush – Generalized	Within 50 m of the Project Location	No*	No
Eastern Ribbonsnake – Generalized	Within 50 m of the Project Location	No*	No
Jefferson / Blue-spotted Salamander Complex – Generalized	Within 50 m of the Project Location	No*	No
Milksnake	In and Within 50 m of the Project Location	Yes	No

Natural Feature	Location Relative to Project Location	Evaluation of Significance Status	
		Evaluation Required (Y/N)	Previously Evaluated (Y/N)
Snapping Turtle – Generalized	Within 50 m of the Project Location	No*	No
Woodland Vole – Generalized	Within 50 m of the Project Location	No*	No
Animal Movement Corridors			
Amphibian Movement Corridors	Within 50 m of the Project Location	Yes	No

* As these features are not located within the Project Location an evaluation of significance is not required as they will be assumed to be significant or will not be impacted by the development of a solar facility.

4. Evaluation of Significance

An Evaluation of Significance Report is required to be submitted to MNRF per the requirements outlined in Part IV, Section 28 of O. Reg 359/09. Each natural feature within the Site Investigation Area must be assessed for significance (i.e., provincially significant, significant or not significant) using the criteria included in the *NHA Guide for Renewable Energy Projects* (OMNR 2012).

4.1 Methods

Information gathered during the Records Review and Site Investigation was used to identify natural features within the Site Investigation Area that have potential to be significant or provincially significant. The criteria outlined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF, 2015) were applied to determine whether a feature is significant or provincially significant, and whether development prohibitions apply. All significant features that are within the Site Investigation Area, are required to be further assessed in an EIS. If through the Evaluation of Significance, a natural feature was determined to be not significant, or provincially significant, the feature was not carried forward to the EIS.

4.1.1 Wetlands

Provincially significant wetlands are those confirmed by the OMNR as being the most valuable within the landscape. This is determined using the scientific point-based ranking system for in the OWES. A Provincially Significant Wetland is any wetland that has been confirmed by OMNR and has received a score of:

- A total of 600 or more points; or
- 200 or more points in either the Biological Component or the Special Features Component.

Wetlands identified within the Site Investigation Area were assessed using *Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Project* (OMNR 2012). This assessment provides applicants with a process to complete an Evaluation of Significance and inform the identification of potential negative effects and mitigation for the preparation of an EIS.

Through the OWES process closely spaced wetlands may be grouped using a process called complexing. The OWES criteria indicates that wetlands that are located within 750 m of each other can be complexed and evaluated as wetland complexes.

The OWES also provides a minimum area criterion for which a wetland unit may be included as part of a wetland complex. Wetland units less than 2 ha are only to be included as part of a complex when, in the opinion of the evaluator, the small wetland pocket may provide important ecological benefit.

Wetland communities within the Site Investigation Area were evaluated by B. Henshaw and R. Aitken, both of whom are certified in the application of the OWES by MNRF.

Under O.Reg 359/09, where an applicant identifies an unevaluated wetland within the Site Investigation Area but is not proposing to develop within or span the wetland the applicant can choose to treat the wetland as provincially significant and conducted an EIS, provided the criteria and procedures found in the *Appendix C - of the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects* of the of the *Natural Heritage Assessment Guide for Renewable Energy Projects* (OMNR, 2012) are followed.

Treating a wetland as significant as part of a Renewable Energy Project does not officially define the status of a wetland (either as significant or not significant).

4.1.2 Woodlands

Woodlands identified within the Site Investigation Area were assessed following the protocols provided in the *NHA Guide for Renewable Energy Projects* (OMNR, 2012) and the *Natural Heritage Reference Manual* (OMNR, 2010). This process assesses woodlands based on canopy cover, size, ecological function and other characteristics.

To be considered significant, a woodland meeting a significance criterion in Table 8 of the *Natural Heritage Assessment Guide for Renewable Energy Projects* must also have an average minimum width of 40 m measured to crown edges where the criterion size threshold is 0.5 to 4 hectares, which is the case for this particular project.

Woodlands that satisfy at least one of these criteria, and are greater than 40 m in width, are considered significant.

4.1.3 Significant Wildlife Habitat

Candidate Significant Wildlife Habitat that was identified within the Site Investigation Area was assessed using the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000) and the *Ecoregion 7E Criteria Schedule* (MNRF 2015).

4.1.3.1 Seasonal Concentration Areas of Animals

Colonially – Nesting Bird Breeding Habitat (Ground)

Breeding bird surveys were undertaken during the spring of 2015 within CNG-01, CNG-02 and CNG-03 to determine if Brewers Blackbird was nesting within the marsh habitat that is located within these areas. Breeding bird surveys were completed as per the specifications provided in Section 3.1.5.

4.1.3.2 Rare Vegetation Communities

Planted Tallgrass Prairie

As detailed botanical inventories of these communities (TP-01, TP-02) were completed by Beacon in 2012, supplemental inventories to update this information were undertaken during the ELC and botanical surveys. This was accomplished by walking the habitat such that the majority of the vegetation growing within it could be observed and documented. The location of the Planted Prairie where these surveys were completed is shown on **Figure 7**

The Planted Prairie was created by Ontario Power Generation in consultation with MNRF in 2010 as part of a habitat creation project. A number of plant species that are considered Species of Conservation Concern were planted as part of this project and have since been identified within this habitat type.

4.1.3.3 Specialized Habitat for Wildlife

Amphibian Breeding Habitat (Woodland / Wetland)

Amphibian surveys were undertaken during the spring of 2015 and 2016 within ABWD-01, ABWD-02 and ABWD-03 ABWT-01, ABWT-02 and ABWT-03 to record the presence or absence of early, mid, and late season breeding frogs and toads. Three surveys were undertaken using the *Marsh Monitoring Protocol* (Bird Studies Canada, 2009). On each occasion, the Project Location was visited after sunset to listen for calling frogs and toads in areas supporting potential breeding habitats (i.e. ponds, wetlands). Incidental observations of amphibians were also completed during other surveys.

Survey details including dates, times and weather conditions were collected for each survey and are provided in **Table 5.** The locations of the candidate significant wildlife habitat are shown on **Figure 7**.

4.1.3.4 Habitat of Species of Conservation Concern

Marsh Bird Breeding Habitat

Breeding bird surveys were undertaken during the spring of 2015 within MBBH-01 to assess its suitability for marsh breeding birds and to determine if marsh breeding birds were present within this habitat. Breeding bird surveys were completed as per the specifications provided in Section 3.1.5. The habitat assessment were undertaken during the ELC and botanical surveys. The location of this candidate marsh bird breeding habitat is shown on **Figure 7**.

Terrestrial Crayfish

Surveys for terrestrial crayfish within TC-01 were completed during the completion of ELC and botanical inventories by carefully walking through and around the edge of the wetland feature searching for any evidence of chimneys.

Species of Special Concern – Planted Prairie Plants (Ironweed, Nodding Wild Onion, Pale-purple Coneflower, Prairie Dock and Tall Coreopsis)

Surveys for Candidate Significant Wildlife Habitat for planted prairie plant Species of Conservation Concern were completed during the botanical and ELC surveys.

Reptiles and Amphibians of Special Concern (Milksnake)

As Milkshake use a wide variety of habitats and are cryptic in nature surveys for them consisted of incidental surveys for them were completed during all site visits under suitable weather conditions.

Amphibian Movement Corridors

An assessment of the Surveys to assess the significance of potential Amphibian Movement Corridors will only be completed if any of the Candidate Significant Wildlife Habitats for Amphibian Breeding Habitat (Woodland) or Amphibian Breeding Habitat (Wetland) meet the criteria to be considered significant based on the results of the amphibian surveys and the criteria provide in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (OMNR, 2015).

If these surveys are required they will consist of three (3) visual encounter surveys of the naturalized vegetated communities adjacent Watercourse 2 and Watercourse 7 that are located within the Study Area. They will be scheduled to take place in the early spring (April – May) on a warm day. If possible at least one of the surveys will be scheduled during or following a warm rain. During these surveys downed wood or other objects under which amphibians or reptiles may be hiding will be moved and then replaced.

4.1.4 Generalized Candidate Significant Wildlife Habitat

Appendix D (*Process for Identifying and Addressing Significant Wildlife Habitat*) of the *NHA Guide for Renewable Energy Projects* (OMNR 2012) provides a list of Candidate Significant Wildlife Habitats that occur within the Site Investigation Area that are not required to be individually identified and delineated. These features are required to be treated as existing. These features are carried forward to the EIS, but habitat use studies nor an examination of potential negative environmental effects to habitat use are required. Generalized mitigation measures that are tailored to the construction activity are required.

Generalized Candidate Significant Wildlife Habitat that has been identified as having the potential to occur within the Site Investigation Area includes the following:

- Bat Maternity Colonies;
- Landbird Migratory Stopover Areas
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Woodland Area – Sensitive Bird Breeding Habitat
- Marsh Bird Breeding Habitat
- Terrestrial Crayfish
- Species of Special Concern – Woodland Plants (Halberd-leaved Smartweed, Hirsute Sedge, Weak Stelate Sedge and Honey Locust);
- Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush);
- Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
- Woodland Vole.

4.2 Evaluation of Significance Results

4.2.1 Wetlands

A total of seven wetland communities were identified within the Site Investigation Area (**Figure 5**). Of these seven wetlands, four wetlands (WET-02, WET-04, WET-05, and WET-08) were over 0.5 ha and were within 750 m of each other. These wetlands were assumed to be significant and have been carried forward to the EIS.

The remaining three wetlands (WET-03, WET-06 and WET-07) were excluded due to their small area (< 0.5 ha) and the absence of any important features or functions that would justify their inclusion into the wetland complex by evaluators B. Henshaw and R. Aitken. These wetlands were determined not to be significant and will not be carried forward to the EIS. WET-06 is located within the Project Location and is to be removed in order to accommodate the development of this project. Correspondence with the local Long Point Region Conservation Authority (LPRCA) will be completed in order to determine if a permit if necessary for the removal of this feature.

The assessment of the wetlands is included in **Table 6** and presented on **Figure 8**.

4.2.2 Woodlands

A total of six woodland communities were identified within the Site Investigation Area, all of which are located outside of the Project Location (**Figure 6**). Four of these woodlands(WOD-01, WOD-03, WOD-04 and WOD-05) have been identified as significant and will be carried forward to the EIS. The remaining woodlands (WOD-02 and WOD-06) were excluded due to their small size, narrow width and absence of any features that would justify their classification as significant. These woodlands will not be carried forward to the EIS.

The assessment of the woodlands in included in **Table 12** and presented on **Figure 9**.

4.2.3 Significant Wildlife Habitat

Wildlife habitat was assessed using the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) and the Ecoregion 7E Criteria Schedules (MNRF 2015). Candidate wildlife habitat was identified by applying the criteria within these documents to the habitat within the Site Investigation Area. Details of the evaluation are outlined in **Table 13** and presented on **Figure 10**.

General information pertaining to the findings of the Breeding Bird and Amphibian Surveys is provided below.

4.2.3.1 Breeding Birds

A total of 55 species of birds (**Appendix F**) were documented within the Study Area in 2015. Forty-eight (48) of the species detected exhibited evidence of breeding and are considered to be breeding on the subject property.

The most numerous species included Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), Yellow Warbler (*Setophaga petechial*), Brown-headed Cowbird (*Molothrus ater*), Tree Swallow (*Tachycineta bicolor*) and American Goldfinch (*Spinus tristis*). Species that were observed flying or foraging over the property, or observed during migration and not considered to be breeding on the property, include: Great Blue Heron (*Ardea Herodias*), Canada Goose (*Branta canadensis*), Turkey Vulture (*Cathartes aura*), Bald Eagle (*Haliaeetus leucocephals*), Ring-billed Gull (*Larus delawarensis*), Barn Swallow (*Hirundo rustica*) and Blackpoll Warbler (*Setophaga striata*).

4.2.3.2 Breeding Amphibians

A total of seven species of amphibians were documented within the Study Area in 2015 / 2016. The location and relative abundance of each species relative to the Candidate Significant Wildlife Habitat for Amphibian Breeding Habitat (Woodland) or Amphibian Breeding Habitat (Wetland) identified during the Site Investigations are identified in **Table 11**.

Table 11. Breeding Amphibian Surveys Results.

	Candidate Amphibian Breeding Habitat (Woodlands)			Candidate Breeding Habitat (Wetlands)		
Species	**ABWD-01**	**ABWD-02**	**ABWD-03**	**ABWT-01**	**ABWT-02**	**ABWT-03**
American Toad (Anaxyrus americanus)		4	5	5	2	2
Western Chorus Frog (Pseudacris triseriata)	CC: 3*	11	2	5	5	4
Gray Treefrog (Hyla versicolor)	5			1		
Green Frog (Rana clamitans melanota)						4

Evaluation of Significance Wetlands

Figure 8

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Site Investigation Delineated Wetland (Outside of 50 m Project Location Setback)
- Evaluated Wetland - Other (Outside of 50 m Project Location Setback)
- Watercourse
- Lot Fabric

Site Investigation Delineated Wetlands (Within 50 m Project Location Setback)

- Assumed Provincially Significant Wetland
- Unevaluated Wetland Feature*

* OWES states that "wetland units less than 2 ha in size may be included as part of the complex. Such tiny wetlands may be recognized when, in the opinion of the evaluator, the small wetland pocket may provide important ecological benefit."

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

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Web Mapping Service 2010

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Project 214350
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Evaluation of Significance Woodlands

Figure 9

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Significant Woodland
- Site Investigation Deliniated Woodland (Non-significant)
- Unevaluated Woodland
- Watercourse
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

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Evaluation of Significance Significant Wildlife Habitat

Figure 10

Nanticoke Solar

Legend

- Project Location
- Project Location Plus 50 m Setback
- Planted Prairie / Prairie Species of Special Concern
- Amphibian Breeding Habitat (Woodland)
- Generalized Significant Wildlife Habitat
- Lot Fabric

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

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	Candidate Amphibian Breeding Habitat (Woodlands)			Candidate Breeding Habitat (Wetlands)		
Species	**ABWD-01**	**ABWD-02**	**ABWD-03**	**ABWT-01**	**ABWT-02**	**ABWT-03**
Northern Leopard Frog (Lithobates pipiens)	2					
Spring Peeper (Pseudacris crucifer)	5		2			1
Wood Frog (Lithobates sylvaticus)	5					

* Calling Code 3 – Full chorus; calls continuous and overlapping not allowing for a reasonable count or estimate as per the *Marsh Monitoring Protocol* (Bird Studies Canada, 2009)

Table 12. Woodlands Evaluation of Significance

Woodland Feature ID	Evaluation Criteria Standards														# of Criteria met	Determination of Significance
	Woodland Size		Woodland Interior		Proximity to Other Significant Woodlands/Habitats		Linkages		Water Protection		Woodland Diversity Representation (Composition)		Uncommon Characteristics			
	Must be a least 4 ha		Must have woodland interior of any area.		Must be within 30 m of a significant natural feature or fish habitat and be at least 1 ha in area.		Must be located between two other significant features each of which are 120 m apart and be at least 1 ha in area.		Must be located within 50 m of a sensitive ground water discharge, recharge, headwater, watercourse or fish habitat and be at least 0.5 ha in area.		Must be dominated by native naturally occurring species including Sugar Maple, Black Maple, Silver Maple, Red Maple, Yellow Birch, Hickory, Beech, Black Ash, Walnut, Tamarack, Spruce, Pine, Oak, Basswood or Hemlock and be at least 1 ha in area.		Must have rare vegetation community (S1, S2, S3) and be more than 0.5 ha in area. Or habitat of a rare, uncommon or restricted woodland plant species with ten individual stems or 100m of leave coverage and be more than 0.5 ha in area. Or characteristics of older woodlands with larger tree size structures in native species and be more than 1 ha in area.			
	Criteria Met		Criteria Met		Criteria Met		Criteria Met		Criteria Met		Criteria Met		Criteria Met			
	Y/N	Description	Y/N	Description	Y/N	Description	Y/N	Description	Y/N	Description	Y/N	Description	Y/N	Description		
WOD-01	Y	4.0 ha	N	0.0 ha	N	Does not meet criteria	N	Does not meet criteria	N	Does not meet criteria	Y	Dominated by listed species	N	Does not meet criteria	2	Significant
WOD-02*	N	1.83 ha	N	0.0 ha	Y	Within 30 m of Lake Erie	N	Does not meet criteria	Y	Within 50 m of fish habitat	N	Does not meet criteria	N	Does not meet criteria	2	Non-Significant
WOD-03	Y	11.49 ha	Y	< 0.1 ha	Y	Within 30 m of fish habitat and Candidate Significant Wildlife Habitat	N	Does not meet criteria	Y	Within 50 m of a watercourse and fish habitat	Y	Dominated by listed species	N	Does not meet criteria	6	Significant
WOD-04	N	0.96 ha	N	0.0 ha	N	Does not meet criteria	N	Does not meet criteria	Y	Within 50 m of a watercourse and fish habitat	N	Does not meet criteria	N	Does not meet criteria	1	Significant
WOD-05	N	0.80 ha	N	0.0 ha	N	Does not meet criteria	N	Does not meet criteria	Y	Within 50 m of a watercourse	N	Does not meet criteria	N	Does not meet criteria	1	Significant
WOD-06*	N	1.27 ha	N	0.0 ha	N	Does not meet criteria	N	Does not meet criteria	Y	Within 50 m of watercourse	Y	Dominated by listed species	N	Does not meet criteria	2	Non-Significant

* To be considered significant, a woodland meeting a significance criterion in Table 8 of the *Natural Heritage Assessment Guide for Renewable Energy Projects* must have an average minimum width of 40 m measured to crown edges where the criterion size threshold is 0.5 to 4 hectares, and 60 m where the criterion area threshold is 10 ha or greater. As WOD-02 and WOD-06 did not have an average width of greater than 40 m they cannot be considered a significant woodland.

Table 13. Significant Wildlife Habitat Located in and within 50 m of the Project Location

Wildlife Habitat	Wildlife Species	Habitat Description / ELC Ecosite Codes	Defining Criteria	Survey Results	Assessment Results
Seasonal Concentration Areas of Animals					
Colonially – Nesting Bird Breeding Habitat (Ground) CNG-01, CNG-02, CNG-03	• Herring Gull • Great Black-backed Gull • Little Gull • Ring-billed Gull • Common Tern • Caspian Tern • Brewer's Blackbird	• Gull and Tern species colonies can be found on any rocky island or peninsula (natural or artificial) within a lake or large river. • Brewers Blackbird can be found nesting in close proximity to watercourses in open fields or pastures with scattered trees or shrubs. ELC communities: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, CUM, CUT and/or CUS.	Presence of: • > 25 active nests for Herring Gulls or Ring-billed Gulls. • > 5 active nests for Common Tern. • > 2 active nests for Caspian Tern. • > 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull.	The results of the breeding bird surveys are included in **Appendix F**. None of the target species were documented breeding in the study area during breeding bird surveys.	**Not Significant** None of the target species identified within the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* for Colonially – Nesting Bird Breeding Habitat (Ground) were identified within the Study Area during the completion of breeding bird surveys.
Rare Vegetation Communities					
Tallgrass Prairie (Planted) TP-01, TP-01	N/A	• A Tallgrass Prairie has ground cover dominated by prairie grasses. ELC communities: TPO1 and/or TPO2	• No minimum size to site; • Site must be restored or a natural site; • Remnant sites, such as railway right of ways are not considered to be Significant Wildlife Habitat; • Presence of one or more of the Prairie indicator species listed in Appendix N of the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000)	Prairie species listed in Appendix N of the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000) were identified within the planted prairie habitats at TP-01 and TP-02.	**Significant** Prairie species listed in Appendix N of the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000) were identified within the planted prairie habitats at TP-01 and TP-02.
Specialized Habitat for Wildlife					
Amphibian Breeding Habitat (Woodlands) ABWD-02, ABWD-03	• Eastern Newt • Blue-spotted Salamander • Spotted Salamander • Gray Treefrog • Spring Peeper • Western Chorus Frog • Wood Frog	Breeding pools within the following forested ELC communities: • Coniferous Forest (FOC) • Mixed Forest (FOM) • Deciduous Forest (FOD) • Coniferous Swamp (SWC) • Mixed Swamp (SWM) • Deciduous Swamp (SWD)	• Presence of a wetland, pond or woodland pool (including vernal pools) > 500 m^2 within or adjacent (120 m) to a woodland (no minimum size) with a breeding population of: • 1 or more of the listed newt / salamander species; • 2 or more of the listed frog species with at least 20 individuals (adults or egg masses); or • 2 or more of the listed frog species with a call level code of 3	Amphibian Call Survey Results: • ABWB-02: Western Chorus Frog (11), American Toad (4) • ABWB-03: American Toad (5), Western Chorus Frog (2), Spring Peeper (2) Habitat Assessment: • An assessment of these wetlands found that water levels within then are generally not deep enough to provide sufficient depth or duration to support breeding habitat for salamanders or newts.	**ABWD-02 – Not Significant** **ABWD-03 - Not Significant** ABWD-02 and ABWD-03 do not support a sufficient number of breeding amphibians to be characterized as Significant Wildlife Habitat.
Amphibian Breeding Habitat (Wetland) ABWT-01, ABWT-02, ABWT-03	• Eastern Newt • American Toad • Spotted Salamander • Four-toed Salamander • Blue-spotted Salamander • Gray Treefrog • Western Chorus Frog • Northern Leopard Frog • Pickerel Frog • Green Frog • Mink Frog • Bullfrog	The following ELC communities: • Swamp (SW) • Marsh (MA) • Fen (FE) • Bog (BO) • Open Aquatic (OA) • Shallow Aquatic (SA) That are generally isolated (>120 m) from woodland ecosites. Larger wetland containing predominantly aquatic species (eg. Bullfrog) may be adjacent woodlands.	• Presence of wetlands > 500 m^2 supporting a breeding population of: • 1 or more of the listed newt / salamander species or 2 or more of the listed frog / toad species with at least 20 individuals (adults or egg masses) • 2 or more of the listed frog / toad species with call level codes of 3 • Wetlands with confirmed breeding Bulllfrog	Amphibian Call Survey Results • ABWT-01: American Toad (5), Western Chorus Frog (5), Gray Treefrog (1) • ABWT-02: American Toad (2), Western Chorus Frog (5) • ABWT-03: American Toad (2), Western Chorus Frog (4), Green Frog (4), Spring Peeper (1)	**Not Significant** None of the Candidate Significant Wildlife Habitat for Amphibian Breeding Habitat (Wetlands) support a sufficient number of breeding amphibians to be characterized as Significant Wildlife Habitat under the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E*.

Wildlife Habitat	Wildlife Species	Habitat Description / ELC Ecosite Codes	Defining Criteria	Survey Results	Assessment Results
Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)					
Marsh Bird Breeding Habitat MBBH-01	• American Bittern • Virginia Rail • Sora • Common Moorhen • American Coot • Pied-billed Grebe • Marsh Wren • Sedge Wren • Common Loon • Green Heron • Trumpeter Swam Special Concern: • Black Tern • Yellow Rail	All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. ELC communities include: • Bedrock Meadow Marsh (MAM1) • Mineral Meadow Marsh (MAM2) • Organic Meadow Marsh (MAM3) • Great Lakes Costal Meadow Marsh (MAM4) • Mineral Fen Meadow Marsh (MAM5) • Tallgrass Meadow Marsh (MAM6) • Submerged Shallow Aquatic (SAS1) • Mixed Shallow Aquatic (SAM1) • Floating-leaved Shallow Aquatic (SAF1) • Open Fen (FEO1) • Open Bog (BOO1) For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. For Green Heron All: • Swamp (SW) • Marsh (MA) • Mineral Cultural Meadow (CUM1)	Presence of: • 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species. • Any wetland with breeding of 1 or more Black Terns, Trumpeter Swam, Green Heron or Yellow Rail.	The results of the breeding bird surveys are included in **Appendix F**. None of the target species were documented breeding in the study area during breeding bird surveys.	**Not Significant** None of the target species identified within the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* for Marsh Bird Breeding Habitat were identified within the Study Area during the completion of breeding bird surveys.
Terrestrial Crayfish TC-01	• Chimney Crayfish or Digger Crayfish (*Fallicambarus fodiens*) • Devil Crayfish or Meadow Crayfish (*Cambarus Diogenes*)	Wet meadow edges or shallow marshes (no minimum size) could provide habitat for terrestrial crayfish. ELC communities include: • Bedrock Meadow Marsh (MAM1) • Mineral Meadow Marsh (MAM2) • Organic Meadow Marsh (MAM3) • Great Lakes Costal Meadow Marsh (MAM4) • Mineral Fen Meadow Marsh (MAM5) • Tallgrass Meadow Marsh (MAM6) • Bedrock Shallow Marsh (MAS1) • Mineral Shallow Marsh (MAS2) • Organic Shallow Marsh (MAS3) • Swamp Thicket (SWT) • Deciduous Swamp (SWD) • Mixed Swamp (SWM)	Presence of: • 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites.	Surveys for terrestrial crayfish within TC-01 were completed during the completion of ELC and botanical inventories by carefully walking through and around the edge of the wetland feature searching for any evidence of chimneys. No chimneys (burrows) were observed.	**Not Significant** None of the target species identified within the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* for Terrestrial Crayfish were identified within TC-01.
Species of Special Concern and Rare Wildlife Species					
Ironweed (*Vernonia missurica*) Srank = S1?	N/A	This species is associated with moist prairies, the openings and edges of woodlands, swamps and the edges of lakes.	Presence of Ironweed	Supplemental inventories were completed in 2015 to update detailed botanical inventories completed in 2012.	**Significant** Ironweed was planted within the planted prairie (TP-01 and TP-02).

Wildlife Habitat	Wildlife Species	Habitat Description / ELC Ecosite Codes	Defining Criteria	Survey Results	Assessment Results
Nodding Wild Onion (*Allium cernuum*) Srank = S2	N/A	This species is most commonly associated with prairies and thinly wooded bluffs.	Presence of Nodding Wild Onion	Supplemental inventories were completed in 2015 to update detailed botanical inventories completed in 2012.	**Significant** Nodding Wild Onion was planted within the planted prairie (TP-01 and TP-02).
Pale-purple Coneflower (*Echinacea pallida*) Srank = S1	N/A	This species is most commonly associated with prairies, openings in dry rocky woods and oak savannas.	Presence of Pale-purple Coneflower	Supplemental inventories were completed in 2015 to update detailed botanical inventories completed in 2012.	**Significant** Pale-purple Coneflower was planted within the planted prairie (TP-01 and TP-02).
Prairie Dock (*Silphium terebinthinaceum var. terebinthinaceum*)	N/A	This species is most commonly associated with prairies and savannas.	Presence of Prairie Dock	Supplemental inventories were completed in 2015 to update detailed botanical inventories completed in 2012.	**Significant** Prairie Dock was planted within the planted prairie (TP-01 and TP-02).
Tall Coreopsis (*Coreopsis tripteris*) Srank = S2	N/A	This species is most commonly associated with prairies and savannas.	Presence of Tall Coreopsis	Supplemental inventories were completed in 2015 to update detailed botanical inventories completed in 2012.	**Significant** Nodding Wild Onion was planted within the planted prairie (TP-01 and TP-02).
Milksnake (*Lampropeltis triangulum*) Srank = S3, ESA = SC	N/A	This species can be found in a variety of habitats but tend to use open habitats such as rocky outcrops, fields and forest edges. In rural areas this snake may be common, especially around barns where they thrive on abundant mice. Milksnake hibernates underground, in rotting logs or in the foundation of old buildings.	Presence of Milksnake	As Milkshake use a wide variety of habitats and are cryptic in nature surveys for them consisted of incidental surveys for them were completed during all site visits under suitable weather conditions.	**Not Significant** Milksnake was not observed during surveys.
Animal Movement Corridors					
Amphibian Movement Corridors	• Eastern Newt • American Toad • Spotted Salamander • Four-toed Salamander • Blue-spotted Salamander • Gray Treefrog • Western Chorus Frog • Northern Leopard Frog • Pickerel Frog • Green Frog • Mink Frog • Bullfrog	Movement corridors between breeding habitat and summer habitat can be found in all ecosites associated with water. Corridors must be determined when Amphibian breeding habitat is confirmed as Significant Wildlife Habitat.	• Field studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20m.	ABWD-01 has been confirmed as Significant Wildlife Habitat. No surveys have been completed to date as an assessment of the habitats surrounding indicate that they do not support Amphibian Movement Corridors as defined in the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* as there are: • No ecosites associated with water connected ABWD-01 • There are no watercourse or water ways connected to ABWD-01 • There are no wooded corridors connected to ABWD-01	**Not Significant** Only one of the Amphibian Breeding Habitats identified within the Study Area was determined to be significant. ABWD-01 is located within an isolated woodlot that is bordered by a road to the west, an agricultural field to the north and a pipeline corridor to the east and south. There are no natural habitats associated ABWD-01 that meet the criteria for Amphibian Movement Corridors as defined in the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E*. As none of the other Amphibian Breeding Habitats associated with potential wildlife corridors were determined to be significant no further evaluation of Amphibian Movement Corridors are required.

Significant wildlife habitat identified within the Site Investigation Area includes the following (**Figure 7**):

- Rare Vegetation Communities
  - Tallgrass Prairie (planted)
- Habitat For Species of Conservation Concern
  - Planted Prairie Plants (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis)

4.2.4 Conclusion

An Evaluation of Significance was undertaken to assess all natural features within the Site Investigation Area for Significance (i.e., Provincially Significant, Significant or Not Significant). Criteria that have been approved by MNRF were used to complete the assessments. Based on the results of the evaluation of significance, the following significant features are being carried forward to the EIS as they are within 50 m of the Project Location:

- Four wetlands (WET-02, WET-04, WET-05, and WET-08);
- Four woodlands (WOD-01, WOD-03, WOD-04 and WOD-05);
- Planted Tallgrass Prairie (Significant Wildlife Habitat);
- Species of Special Concern (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis; Significant Wildlife Habitat), which are all associated with the Planted Prairie Feature; and
- Generalized Candidate Significant Wildlife including:
  - Bat Maternity Colonies;
  - Landbird Migratory Stopover Areas;
  - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
  - Amphibian Breeding Habitat (Woodland)
  - Woodland Area – Sensitive Bird Breeding Habitat;
  - Marsh Bird Breeding Habitat;
  - Terrestrial Crayfish;
  - Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
  - Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush);
  - Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
  - Woodland Vole.

The features listed above will be carried forward to the EIS; potential negative effects and mitigation will be identified for all features except those listed as Generalized Candidate Significant Wildlife Habitat. These features will not be assessed for potential negative effects; however, general mitigation measures that are tailored to the construction activity will be identified. **Table 14** summarizes the results of the Evaluation of Significance (**Figures 8, 9 and 10**).

Table 14. Evaluation of Significance Summary

Natural Feature	Details			
Type	**Minimum Setback from Project Location (m)**	**Significant Feature**	**Treated as / assumed significant**	**Not Significant**
Wetlands				
WET-02	50	-	X	-
WET-03	18.5	-	-	X
WET-04	26	-	X	-
WET-05	20	-	X	-
WET-06	Within Project Location	-	-	X
WET-07	17	-	-	X
WET-08	20	-	X	-
Woodlands				
WOD-01	50	X	-	-
WOD-02	24	-	-	X
WOD-03	10	X	-	-
WOD-04	10	X	-	-
WOD-05	10	X	-	-
WOD-06	-	-	-	X
Wildlife Habitat				
Seasonal Concentration Areas				
Colonially – Nesting Bird Breeding Habitat (Ground) (CNG-01, CNG-02)	26	-	-	X
Rare Vegetation Communities				
Tallgrass Prairie	Within Project Location	X	-	-
Specialized Wildlife Habitat				
Amphibian Breeding Habitat (Woodland)	ABWD-02 - 20 ABWD-03 - 20	-	-	X
Amphibian Breeding Habitat (Wetland)	20	-	-	X
Habitat for Species of Conservation Concern				
Marsh Bird Breeding Habitat (MBBH-01)	Within Project Location	-	-	X
Terrestrial Crayfish (WET-06)	Within Project Location	-	-	X
Planted Prairie Plants (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie	Within Project Location	X	-	-

Natural Feature	Details			
Type	Minimum Setback from Project Location (m)	Significant Feature	Treated as / assumed significant	Not Significant
Dock and Tall Coreopsis)				
Milksnake (WOD-01, WOD-02, WOD-03, WOD-04, WOD-05, WOD-06)	Not Applicable	-	-	X
Animal Movement Corridors				
Amphibian Movement Corridors	Not Applicable	-	-	X

5. Environmental Impact Study

5.1 Project Location Overview

The proposed Project Location is located on the shore of Lake Erie near the existing OPG Nanticoke Generating Station (G.S.) site in Haldimand County, Ontario (**Figure 1**). A Project Location was identified and a 50 m setback was applied for the Records Review, Site Investigation, Evaluation of Significance and Environmental Impact Study (i.e., Site Investigation Area). As per the guidance provided in the *NHA Guide for Renewable Energy Project*s the Records Review Area was expanded to include records within 1 km of the Project Location. The entire Project will take place within the Project Location. The project will consist of up to a 44 MWAC solar electricity generation facility and will be considered a Class 3 solar facility.

The Project Location is divided into two areas consisting of agricultural lands, and an old coal storage area (**Figure 1**). The total site area is approximately 157.9 ha. In general, the agricultural land consists of exposed soils with fairly flat undulating hills with majority of the slopes ranging from 1 to 5% with slightly steeper slopes near the creek embankments. The Project Location consists of silt and clay. The hydraulic soil group (HSG) classification is Group D, consisting of low infiltration soils (Arcadis 2016a). The agricultural lands are divided into three basins, which drain mainly via overland flow to Hickory Creek. A third of the agricultural lands drain *via* Watercourse 7 and its associated wetlands, into Hickory Creek (Figure 2 from Arcadis 2016a). The coal pile area stormwater runoff is collected via a series of catch basins, culverts and ditches, and then pumped to the ash lagoon system located to the north west of the coal pile area (Arcadis 2016a).

5.2 Project Footprint and Activity Summary

A site plan for the Project was developed once the natural features and the setbacks for the natural features had been established. This minimized the negative effects to the natural features (**Figure 2**)

by allowing the Project Location to be developed around them using avoidance as the primary source of mitigation for the natural features. Surveys will be required to accurately locate the Project Footprint and take measurements to identify land elevations. Crews will drive all-terrain vehicles to reach areas primarily using existing farm access roads and actively farmed agricultural fields. Geotechnical sampling will also be required. This will be undertaken by a track-mounted drill rig that will drill boreholes to determine soil and/or rock characteristics.

No permanent roads will be built as part of the Project. Municipal and provincial roads will be used for transportation of materials, workers, and equipment. Minor modifications and improvements may be required to some of the existing roads (e.g., widening the turning radius) for equipment transportation. On-site access to the solar panels will be by either temporary dirt roads, or compacted permanent interior roads. Following completion of the construction phase, the interior roads will be used for maintenance and operating activities throughout the duration of the facility's operation (**Figure 2**).

Portions of the Nanticoke GS lands, and the West, Centre and East Parcel lands will be used as construction assembly and laydown areas (**Figure 2**). Construction of laydown areas may include the removal of topsoil, and the installation of clean compacted crushed gravel on an as-needed basis, which is planned to be re-purposed when the laydown area is no longer required. Any topsoil removed will be re-used onsite. The West, Centre and East Parcel lands will be seeded with vegetation.

New culverts may be required to maintain drainage and to comply with best management practices of storm water management, and these will be constructed sufficient to support the construction equipment and delivery trucks. The exact culvert details (if any are required), installation details and erosion-control measures will be determined during the detailed design phase and in conjunction with the Ontario Ministry of Environment

As the proposed Project Location includes the former coal yard and agricultural lands there is little clearing and grubbing required on the land. There are isolated trees and shrubs that would be cleared with some vegetation removal. Grading activities are proposed to generally level portions of the agricultural lands (Arcadis, 2016a). Prior to construction, the construction area will be fenced (**Figure 2**). The fencing used will prevent access to large animals and humans.

The electrical substation for the solar farm will be located on the Nanticoke GS lands near the Hydro One Nanticoke switchyard. The substation equipment will include a 230kV main power transformer, switchgear, station service equipment; revenue grade Potential Transformers (PTs), Current Tranformers (CTs) and metering, a permanent control building, and control and communication equipment. The substation area will be surrounded by a chain-link fence with a locked gate.

Figure 2 identifies two possible AC collection lines/wires alternatives that would connect the West, Central and East Parcels to the project located on the coal yard. The AC collection lines/wires may be overhead or buried. Alternative A shows the northern option that runs east-west across or under South Coast Drive and then north-south on either the Nanticoke GS property or the Haldimand Country Right-of-Way. Alternative B or the southern option has the AC collection lines/wires running south, crossing Wetland 08 and Watercourse 07 but east of the Imperial Oil (IOL) pipeline and then turning approximately ninety degrees and crossing South Coast Drive toward the Nanticoke GS. As there will bebe no construction within the wetland or watercourse, therefore, environmental, cultural and socio-economic differences between the two alternatives would be negligible. The two route alternatives show the most likely alignments at this point but these alignments may shift slightly (i.e. up to twenty meters) based on final design. Should Alternative B be determined to be the preferred

alternative, a full wetland evaluation, using procedures accepted by MNRF, will be required. The NHA and EIS, including the required mitigation, will be updated for both the wetland and watercourse features. Proper amendment procedures will be followed.

Waste and debris generated during the construction activities will be collected and disposed of at an approved waste management/transfer facility. All reasonable efforts will be made to minimize waste generated and to recycle materials, including returning packaging material to suppliers for reuse/recycling. During construction, industry best practices for spill prevention will be utilized. In the unlikely event of a minor spill, this will be cleaned up immediately and any impacted soils will be removed from site and disposed of at an approved and appropriate facility. At the conclusion of construction, vehicles and construction equipment will be removed from the Project Location.

Topsoil that was removed during construction will be replaced and re-contoured over disturbed areas, and the West, Centre and East Parcel lands will be seeded with vegetation. Stormwater control materials and equipment installed for the duration of the construction phase will be removed once inspections have determined that the threat of erosion has diminished to the original, pre-construction levels or lower. Stormwater Management activities and infrastructure will be in accordance with the Conceptual Storm Water Management Plan Report (Arcadis, 2016a).

Routine preventative maintenance activities are scheduled at regular intervals with specific maintenance tasks scheduled for each interval. Maintenance is performed by removing the block from service and inspecting the electrical, control and mechanical systems on the array. Consumables are used, such as the various greases used to keep the mechanical components operating at peak performance. Following all maintenance work on the block, the area is cleaned. All surplus lubricants and grease-soaked rags are removed and disposed of in a prescribed manner. All maintenance activities will adhere to the same spill prevention industry best practices undertaken during the construction phase. Additional maintenance activities will include grass cutting, vegetation removal and fence repair. No pesticides or herbicides are planned to be used during maintenance activities. The majority of the routine maintenance can occur in evening hours.

If the project is not repowered, the equipment will be dismantled and the lands restored to their pre-construction state (agricultural land use for the western parcels or as may be appropriate at that time). Driveways and culverts (if installed) will be removed unless arrangements are made to leave them in place. Driveway bedding material will be removed and replaced with clean sub- and top-soil for reuse by the landowner for agricultural or other purposes.

Decommissioning of the Project will not result in any adverse impacts to surface or groundwater quality (Arcadis 2016d). Restoration of land use is not a concern for the Nanticoke GS lands, as the coal yard will never again be used to store coal; so any specific restoration activities are limited to the West, Centre and East Parcels. The Project doesn't include any permanent changes to the original use of the West, Centre and East Parcels. Therefore, it will be possible to restore the site to its pre-construction land use by ensuring the following:

- Site cleanup;
- Any excavation and/or trenching caused by the removal of building or equipment foundations, rack supports and underground electrical cables will be backfilled with the appropriate material and leveled to match the ground surface;

- The roads, parking areas and substation yard will be removed completely, filled with suitable sub-grade material and leveled. Top soil will be placed on these areas to restore agricultural capability;
- Any compacted ground will be tilled, mixed with suitable sub-grade materials and leveled.

5.3 Schedule

Nanticoke Solar received an LRP Contract on March 9, 2016. The development and permitting phase of the project started earlier, in 2015, and is expected to progress until the fourth quarter of 2017. Upon receipt of the REA, we will commence the early stages of construction, expected to be late in the fourth quarter of 2017.

5.4 EIS Overview

According to the *NHA Guide for Renewable Energy Projects* (OMNR 2012), the EIS identifies the potential negative environmental effects that may result from the proposed renewable energy project, and describes how those potential effects will be address through mitigation. Part V, Sections 37(2) and 38 of O.Reg 359/09 requires that an EIS is prepared in accordance with the *NHA Guide for Renewable Energy Projects* (OMNR 2012), if the Project Location occurs within 50 m of a provincially significant wetland and in or within 50 m of a significant woodland, significant wildlife habitat or significant ANSI (life science). An EIS must assess the construction, installation, use, operation, changing and retiring of the renewable energy facility.

Based on the results of the evaluation of significance, the following features area being carried forward to the EIS as they are within 50 m of the Project Location:

- Four wetlands (WET-02, WET-04, WET-05, and WET-08);
- Four woodlands (WOD-01, WOD-03, WOD-04 and WOD-05);
- Planted Tallgrass Prairie (TP-01 and 02);
- Planted Species of Special Concern (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis), which are all associated with the Planted Prairie Feature (TP-01 and 02); and
- Generalized Candidate Significant Wildlife including:
    - Bat Maternity Colonies;
    - Landbird Migratory Stopover Areas;
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
    - Amphibian Breeding Habitat (Woodland)
    - Woodland Area - Sensitive Bird Breeding Habitat;
    - Marsh Bird Breeding Habitat
    - Terrestrial Crayfish Habitat
    - Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
    - Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Woodthrush);

- Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
- Woodland Vole.

The Project is located in predominately agricultural lands; however, a central parcel of land is a recently planted tallgrass prairie feature. Although the Project Location is not within the Oak Ridges Moraine or the Greenbelt, the planted tallgrass prairie is considered Significant Wildlife Habitat. There are several planted Species of Special Concern associated with the planted prairie including Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis. As such, these features are being carried forward to an EIS to assess potential negative environmental effects and identify mitigation measures designed to prevent or minimize potential negative effects. As the planted Species of Special Concern are all associated with the Planted Tallgrass Prairie, the report addresses these features together.

The Project Location and the associated 50 m setback, in relation to significant natural features are shown on **Figures 8** through **10**. Per the requirements outlined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012), features identified as Generalized Candidate Significant Wildlife Habitat are not assessed for potential negative effects; however, general mitigation measures that are tailored to the construction activity will be identified.

5.5 Assessment of Negative Effect and Mitigation Measures during Construction

5.5.1 Significant Wetlands

Four of the six wetlands within 50 m of the Project Location were assumed to be significant and evaluated using the evaluation of significance criteria outlined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012) including WET-02, WET-04, WET-05, and WET-08 (**Figure 8**). There is no development proposed within any wetlands that are assumed to be significant. The specific distance from each wetland to the Project Location is provided in **Table 13**; a minimum 20 m buffer has been maintained from the boundary of each of the wetlands that are assumed to be significant to the Project Location.

- WET-02 is a Green Ash Mineral Swamp (i.e. ELC code SWD2-2) that forms part of a larger woodland (WOD-01). This feature is 50 m from the perimeter fence and is separated from the Project Location by a fenced pipeline corridor.
- WET-04 is a Forb Mineral Meadow Marsh (i.e., ELC code MAM2-10), which is associated with Watercourse 02. This feature is 26 m from the perimeter fence, and over 30 m from the solar panels and a turnaround for an access road.
- WET-05 is a Green Ash Mineral Deciduous Swamp (i.e., ELC code SWD2-2) that is also associated with Watercourse 02. WET-05 is 20 m from the perimeter fence and approximately 30 m from the solar panels.
- WET-08 is primarily a Narrow-leaved Sedge Mineral Meadow Marsh (MAM2-5) / Forb Mineral Meadow Marsh (MAM2-10) Complex, associated with Watercourse 07. This wetland feature provides amphibian breeding habitat. This feature is located 20 m from the perimeter fence, and there is an access road within 25 m of this feature.

As previously indicated WET-03, WET-06 and WET-07 were not included in part of the wetland evaluation as it was determined that they did not meet the size criteria and did not possess any special forms, features or functions to justify their evaluation as per the protocols provided in the OWES.

WET-06 is located within the Project Location and is to be removed in order to accommodate the development of this feature. Correspondence with the Long Pint Region Conservation Authority (LPRCA) will be completed in order to determine if a permit is required for the removal of this feature. WET-07 is located 18 m from the perimeter fence and primary laydown area.

WET-02, WET-04, WET- 05 and WET-08 have been assumed to be significant and provided generalized candidate significant wildlife habitat for:

- Marsh Bird Breeding Habitat (WET-04, and WET-08);
- Terrestrial Crayfish;
- Eastern Ribbonsnake (WET-04, WET-05 and WET-08)
- Jefferson / Blue-spotted Salamander Complex (WET-02 and WET-08); and
- Snapping Turtle.

Potential negative impacts wetlands that have assumed to be significant that are located within 50 m of the Project Location and proposed mitigation measures during the construction and decommissioning phases of the Project are detailed in **Table 14.** They are also further described below.

5.5.1.1 Negative Effects and Mitigation

No direct impacts to wetlands that are located within 50 m of the Project Location and have been assumed to be significant are anticipated as there will be not direct loss of wetland habitat or function, and a minimum 20 m buffer is being maintained from the edge of each wetland to the nearest Project component. The width of a wetland buffer is typically determined based on a combination of the sensitivity of the feature, importance of the receiving feature, the stressor from the proposed adjacent land use, and the existing and potential site conditions. Typically wetlands in areas that do not have highly sensitive wildlife values are typically subject to 15 m buffers, though they may vary from a few metres to 30 m. Once the proposed mitigation has been applied, the primary concern for the wetlands within 50 m of the Project Location is the maintenance of the hydrology of the feature. This is seldom achieved through an increased buffer, and requires proper engineering to ensure that the hydrology is maintained. This is described further in the following section.

Wetland habitats can be particularly sensitive to soil compaction and indirect hydrological effects. Minor grading is proposed in the Project Location although the existing drainage pattern will be maintained to ensure that any surface flows to the existing wetlands will be maintained (Arcadis 2016a). As outlined in the Stormwater Management Plan, the lower third of the agricultural lands drains into wetland 8 and watercourse 7 (**Figure 8**; Arcadis 2016a). Post-development, the drainage area will increase from 28 ha to 37 ha in size. The increase in the contributing drainage area should have no negative impacts on downstream sources due to the large low laying wetland area (Wetland 8) along the southern boundary of the Project Location (Arcadis 2016a). The low lying wetland covers approximately 49,500 m^2 of area with a minimum storage depth above the 100-yr flood plain of 0.5 m, resulting in an additional storage volume of approximately 24,750 m^3 above the existing 100-yr flood plain. The drainage area will be increased by approximately 12 ha from pre-development conditions. Utilizing the 100-yr storm event rainfall depth of 130 mm, an additional rainfall volume of 15,600 m^3 is anticipated to be drained to the

wetland area. This accounts for only 30% of the additional available storage capacity of the wetland (Arcadis 2016a). The remaining lands with solar panels will continue to drain as they would under pre-construction conditions. The access roads will be narrow, and unpaved. As a result, there will be minimal changes to surface water flow. Lands with solar panels will continue to drain as they would under pre-construction conditions.

Indirect negative effects to significant wetlands including dust generation, sediment and erosion, waste management, and accidental spills will be mitigated through standard construction best management practices (**Table 13**). Silt fencing will be used around Project Location boundaries, as well hay bales or geotextile lined check dams will be used in ditches (Arcadis 2016a). Erosion blankets will be used on slopes steeper than 2H:1V (Arcadis 2016a). All erosion and sediment control features will be inspected on a weekly basis and after rainfall events. All exposed soils will be planted with grass, as soon as possible after construction (Arcadis 2016a). A waste management plan will ensure that any waste and debris generated during the construction activities will be collected and disposed of at an approved facility. There is not expected to be any negative effects from accidental spills during borehole investigation, or spills and leaks during construction and decommissioning, as general mitigation measures described in **Table 15** will protect these features against negative effects due to accidental hazardous materials spills.

During construction indirect impacts through the generation of noise are anticipated. Wildlife rely on sounds for communication, navigation, predator avoidance, and to locate food; therefore, wildlife using the wetlands in close proximity to the Project may experience temporary disturbance, although it is expected to be minimal. Wildlife moving through the area may experience temporary avoidance or displacement during construction and decommission. Once the Project is in operation, noise disturbance will decrease and movement patterns will re-establish.

Table 15. Potential Negative Environmental Effects and Mitigation Measures for Wetlands during Construction and Decommissioning

Activity	Potential Negative Environmental Effect	Proposed Mitigation
• Surveying and Geotechnical Activities	• Surface water and groundwater contamination due to fuel and/or chemical spills • Encroachment on feature	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Roads and Civil Site Preparation, Construction Assembly and Laydown Area, Site Preparation and Inverter Station Installation • Installation of Electrical Collector System • Installation of AC collection lines/wires • Installation Substation • Dismantling • Land Restoration Activities	• Increased erosion and sedimentation potential • Encroachment on feature • Change in surface water drainage • Change in soil compaction • Removal or degradation of wetland vegetation • Surface water and groundwater contamination due to fuel and/or chemical spills • Changes in wildlife species composition and wetland plant communities	• Design and implement erosion and sediment control plan – including silt fences around the perimeter of the Project Location • Inspect erosion and sediment control features weekly, and immediately after rainfall. • Temporarily suspend work if excessive runoff or sediment is observed • Stockpile materials at a distance greater than 30 m from wetland • Use pervious materials on roads • Limit traffic on disturbed soil • Maintain existing grading, where feasible • Where possible, construct roads at or near existing grade • Maintain fence around perimeter of Project – discourage workers from entering wetland area • Maintain minimum of 20 m buffer around wetlands • Stabilize and/or re-vegetate all areas of disturbed soils using erosion blankets, and grass seed • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Delivery of Equipment • Installation of Racking System • Solar Panel Assembly and Installation	• Surface water and groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic, wetland and terrestrial biota •	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Clean-up and Reclamation	• Introduction or spread of invasive or non-native species • Increased erosion and sedimentation potential • Change in surface water drainage	• Use native topsoil • Stabilize and/or re-vegetate all areas of disturbed soils that drain into wetlands • Maintain existing grading, where feasible
• Noise and Human Activity	• Disturbance to wildlife • Mortality of wildlife	• Clearly post speed limits

5.5.2 Woodlands

Four of the woodlands within 50 m of the Project Location meet the criteria for significance based on the evaluation of significance criteria outlined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012; **Figure 9**). There is no development proposed within any significant woodland. The specific distance from each significant woodland to the Project Location is provided in **Table 16**; a minimum 10 m buffer has been maintained from the boundary of each woodland to the Project Location.

- WOD-01 is part of a wetland / wooded area that is northwest of the Project Location. The closest project component is the perimeter fence, which at its closest point is situated 50 m from WOD-01.
- WOD-03 is part of a watercourse / wetland / wooded area that bisects the middle of the Project Location. The closest project component is the perimeter fence which, at it its closest point is situated 10 m from WOD-03.
- WOD-04 is also part of a watercourse /wetland / wooded area that bisects the middle of the Project Location. The closest project component is the perimeter fence, which at its closest point, is situated 13 m from WOD-04.
- WOD-05 is associated with the watercourse that flows south of the Project Location. The closest project component is the perimeter fence / secondary laydown area, which at its closest point, it situated 10 m from WOD-05.

These features have been assumed to be significant and provided generalized candidate significant wildlife habitat for:

- Bat Maternity Colonies;
- Landbird Migratory Stopover Areas;
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
- Woodland Area – Sensitive Bird Breeding Habitat (WOD-03);
- Terrestrial Crayfish
- Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
- Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush);
- Reptiles and Amphibians of Special Concern (Jefferson / Blue-Spotted Salamander Complex); and
- Woodland Vole.

Potential negative impacts to significant woodlands within 50 m of the Project Location and proposed mitigation measures during the construction and decommissioning phases of the Project are detailed in **Table 16**. They are also further described below.

5.5.2.1 Negative Effects and Mitigation

No direct negative effects to woodlands are anticipated as no woodland is being removed, and a minimum 10 m buffer is being maintained from the edge of each woodland to the nearest Project component. The limits of the woodlands were established though a staking exercise, which used the dripline to define the limits. A minimum 10 m buffer was applied to the dripline. In many jurisdictions a

10 m dripline buffer is added to woodlands when an adjacent land use change or land redevelopment is proposed. An example is the Carolinian Canada Committee (2003) in their *Draft Guidelines for Environmental Impact Statements,* which provide generic buffer guidelines, based on best available science at the time, of 10 m for woodlands measured from the dripline. Effects from human disturbance, and other potential encroachment issues that are identified in **Table 16** will be mitigated by erecting a chain-link perimeter fence. Therefore, the predominant function of the 10 m buffer will be to provide additional rooting area for large trees, and provide some buffering from noise and light issues, which will also be mitigated using measures outlined **Table 16**. A minimum 10 m buffer will be sufficient for providing some separation from the disturbance associated with construction and decommissioning, as well as provide protection for the trees from accidental damage to limbs and roots.

Noise and light issues are difficult to quantify. The species using the woodland are already demonstrating an ability to use lands that area associated with some level of disturbance, as the existing adjacent land use is agriculture. Given that the level of disturbance will be similar to the existing disturbance, and that it will be temporary during construction and decommissioning, the indirect effects on these species through noise and light are expected to be low. Wildlife moving through the area may experience temporary avoidance or displacement during construction and decommission. Once the Project is under operation, noise disturbance will decrease; and movement patterns will re-establish.

Other indirect negative effects to woodlands resulting from construction and decommissioning activities including dust generation, sediment and erosion, waste management, are expected to be temporary. Other indirect impacts have the potential to occur though accidental spills or accidental damage to tree roots or limbs. All potential indirect negative effects will be controlled through the use of standard mitigation measures, as outlined **Table 16**. The creation of an Environmental Management Plan will further ensure that the quality of the woodland features are maintained throughout the life of the Project.

Table 16. Potential Negative Environmental Effects and Mitigation Measures for Woodlands during Construction and Decommissioning

Activity	Potential Negative Environmental Effect	Proposed Mitigation
• Surveying and Geotechnical Activities	• Encroachment on woodlands • Accidental damage to tree roots and limbs	• Clearly delineate work area prior to construction
• Roads and Civil Site Preparation, Construction Assembly and Laydown Area, Site Preparation and Inverter Station Installation • Installation of Electrical Collector System • Installation Substation • Land Restoration Activities	• Increased erosion and sedimentation potential • Encroachment on feature • Accidental damage to tree roots and limbs • Change in surface water drainage • Change in soil compaction • Removal or degradation of woodland vegetation • Surface water and groundwater contamination due to fuel and/or chemical spills • Changes in wildlife species composition and woodland plant communities • Project lighting shining into natural features adjacent Project Location	• Design and implement erosion and sediment control plan – including silt fences around Project Location perimeter • Temporarily suspend work if excessive runoff or sediment is observed • Use pervious materials on roads • Stockpile materials at a distance greater than 30 m from woodland • Maintain existing grading, where feasible • Where possible, construct roads at or near existing grade • Maintain fence around perimeter of Project – discourage workers from entering woodland area • Maintain minimum of 10 m buffer around woodlands • Stabilize and/or re-vegetate all areas of disturbed soils which drain into woodlands • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan • Install lighting in such a way that light is not directed towards natural areas surrounding the Project Location -either through the strategic placement of lights or the use of light shields
• Delivery of Equipment • Installation of Racking System • Solar Panel Assembly and Installation	• Surface water and Groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic, woodland and terrestrial biota •	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Clean-up and Reclamation	• Introduction or spread of invasive or non-native species • Increased erosion and sedimentation potential • Change in surface water drainage	• Use native topsoil • Stabilize and/or re-vegetate all areas of disturbed soils that drain into woodlands • Maintain existing grading
• Dismantling	• Surface water and Groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic, woodland and terrestrial biota •	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Noise and Human Activity	• Disturbance to wildlife • Mortality of wildlife	• Clearly post speed limits • Direct any lighting away from natural features -either through the strategic placement of lights or the use of light shields

5.5.3 Planted Prairie and Planted Special of Conservation Concern

A planted Tallgrass Prairie is located in the centre of the Project Location (**Figure 10**). It has an area of approximately 25.38 ha. This planted prairie was created by OPG in consultation with MNRF in 2010 as part of a habitat creation project. This area was previously under cultivation. The former agricultural lands were planted with with a seed mixture of native warm season grasses and flowering plants characteristic of the tallgrass prairie ecosystem (Beacon 2012).

MNRF has indicated that this planted prairie habitat and rare planted species within it should be considered a native community in this circumstance. However, we note that in many circumstances MNRF does not consider planted species (e.g., Butternuts) to be considered further under the *Endangered Species Act*. On a professional level we consider that the prairie is not a naturally occurring habitat at this site and likely would not persist without on-going management.

In 2012, the dominant plant species were Big Bluestem (*Andropogon gerardii*), Queen Anne's Lace (*Daucus carota*), Northern Willowherb (*Epilobium ciliatum*), Red Clover (*Trifolium pratensis*), and Indian Grass (*Sorgastrum nutans*) (Beacon 2012). These species continue to dominate the species composition in 2016 (**Section 3.4.1** this report). Queen Anne's Lace and Red Clover are ruderal species that commonly colonize bare ground and recently disturbed areas. Northern Willowherb is another "volunteer" species that frequently colonizes moist areas in agricultural fields (Beacon 2012). In 2012, Beacon noted that it remained unknown why the prairie plants had not become well-established, however, it may have been due to variability in environmental conditions, such as differences in soil type, soil moisture, and microtopography. Another explanation could be that the seed was unevenly distributed during the planting process so that some areas got more seed than others. They also note the presence of abundant and fairly aggressive old field species in the surrounding landscape, and the absence of natural disturbance. Tallgrass prairies are rare ecosystems in Ontario as they require regular disturbance through ecological processes such as fire, drought and grazing. Planted prairies often struggle to thrive as small remnant patches, as they lack a native seed source, and become overrun by non-native species. The availability of excessive nutrients can disadvantage prairie plants in this regard.

Five planted Species of Conservation of Concern were identified in the planted prairie: Ironweed (S1), Nodding Wild Onion (S2), Pale-Purple Coneflower (S1), Prairie Dock (S1) and Tall Coreopsis (S2).

5.5.3.1 Negative Effects and Mitigation

The planted prairie and the planted Species of Conservation Concern will be removed to facilitate the installation of the solar panels, perimeter fence and access road. The removal of the planted prairie feature and these plants will be permanent.

A compensation habitat has been identified. The new habitat will include 27.9 ha of grassed habitat dominated by Big Bluestem (*Andropogon gerardii*), Canada Wild Rye Grass (*Elymus canadensis*), Virginia Wild Rye (*Elymus virginicus*), Switchgrass (*Panicum virgatum*), Little Bluestem (*Sorghastrum nutans*) and Indian Grass (*Sorhastrum nutans*). The original seed mixture for the tallgrass prairie included a mix of grasses and forbes. Prairie forbes do not do well without active maintenance, and when they die, they provide opportunity for invasive species to establish. Therefore, a seed mix that is dominated by the grasses listed above will be planted; the same grass mixture was originally planted at the Dennis Farm. Forbe species (about 30%), including prairie forbes, will also be planted at the compensation property, however, at this time the species composition has not yet been determined.

Forbe species for inclusion may be Arrow Leaved Aster (*Aster saggitifolius*), Black Eyed Susan (*Rudbeckia hirta*), Foxglove/Beardtongue (*Penstemon digitalis*), New England Aster (*Aster novae-angliae*), and Wild Bergamot (*Monarda fistulosum*).

The new habitat will be located at 1886 St. Clair Parkway, Courtright, Ontario, N0N 1H0, as a local site was not found despite a considerable amount of search effort. Nanticoke Solar contacted many local farmers, who either did not meet the size criteria or did not want to lease their lands. Nanticoke Solar also worked with the local First Nation community although they could also not provide the land outside of their reserve, and could not enter into a lease agreement for lands on their reserve without federal approval, which could not have occurred within the timeline required for this project.

The habitat will be monitored annually for five years. A document outlining the site preparation, planting, seed composition, and maintenance activities will be prepared including photographs before and after.

The land will be maintained, as needed, by undertaking the following practices:

1) Topseed in order to maintain required grass coverage;
2) Mowing or cutting in order to stimulate growth; and/or
3) Shrub removal to maintain grassland habitat.

All management activities should take place outside the breeding bird season. A Habitat Management Plan will be created and maintained by Nanticoke Solar, which will outline a habitat monitoring, maintenance and a contingency planAs the planted prairie feature and the planted plant species of conservation or being permanently removed, these features are not addressed in the subsequent sections.

5.5.4 Generalized Candidate Significant Wildlife

A number of wildlife habitat types were identified within the 50 m setback from the Project Location; however, it is not expected that construction or decommissioning activities will have any negative effect on these features if the mitigation described above is applied.

As outlined in the *NHA Guide for Renewable Energy Projects* (OMNR 2012), potential impacts to Generalized Candidate Significant Wildlife Habitat are typically associated with the temporary disturbance from construction and decommissioning activities and therefore are grouped together as generalized impacts and mitigation measures.

The following is a list of the wildlife habitats that have been identified as requiring Generalized Habitat Consideration. These features have been reviewed and a list of mitigation measures to be applied during construction and decommissioning have been identified (**Table 16**).

- Bat Maternity Colonies;
- Landbird Migratory Stopover Areas;
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Woodland Area – Sensitive Bird Breeding Habitat (WOD-03);
- Amphibian Breeding Habitat (Woodland);
- Marsh Bird Breeding Habitat;
- Terrestrial Crayfish Habitat;

- Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
- Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush);
- Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
- Woodland Vole.

Disturbance from construction and decommissioning activities, including increased traffic, noise and dust, may result in avoidance of habitat use by wildlife species. The greatest disturbance will occur during critical life history periods, which includes:

- May 01 to June 30 for bats;
- April 1 to August 15 for birds; and
- April 1 to June 15 for reptiles and amphibians.

Currently, construction of the Project is scheduled to begin September 2017, and would avoid the critical period for bats, birds, and reptiles and amphibians during the early stages of construction, which can be the most disruptive. The disturbance from construction and decommissioning will be temporary.

Disturbance may occur throughout the entire life of the Project; however, the level of disturbance will be temporary during construction and decommissioning and will be low during operations. The level of disturbance during construction and decommissioning will be similar to existing disturbance experienced during the agricultural activities that currently take place onsite. **Table 17** provides a summary of potential negative impacts and general mitigation tailored to the construction activities identified.

Table 17. Potential Negative Environmental Effects and Mitigation Measures for Generalized Candidate Significant Wildlife during Construction and Decommissioning

Activity	Potential Negative Environmental Effect	Proposed Mitigation
• Surveying and Geotechnical Activities	• Changes in wildlife species composition and wetland and woodland plant communities	• Delineate construction area • No encroachment on woodland or wetland or watercourses
• Roads and Civil Site Preparation, Construction Assembly and Laydown Area, Site Preparation and Inverter Station Installation • Installation of Electrical Collector System • Installation of AC collection lines/wires • Installation Substation • Land Restoration Activities	• Increased erosion and sedimentation potential • Encroachment on wetland or woodland feature • Change in surface water drainage • Change in soil compaction • Removal or degradation of wetland or woodland vegetation • Surface water and groundwater contamination due to fuel and/or chemical spills • Changes in wildlife species composition and wetland plant communities	• Design and implement erosion and sediment control plan – including silt fences around perimeter of Project Location • Temporarily suspend work if excessive runoff or sediment is observed until it is ensured that the sediment and erosion control features are functioning properly, or excess sediment has ceased • Stockpile materials at a distance greater than 30 m from wetland or woodland or watercourse • Maintain existing grading, where feasible • Maintain fence around perimeter of Project – discourage workers from entering any natural area • Maintain minimum of 10 m from woodlands, 20 m buffer around wetlands, and 30 m from all watercourses • Stabilize and/or re-vegetate all areas of disturbed soils which drain into wetlands and woodlands using erosion control blankets, mud mats, and grass seed. • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Delivery of Equipment • Installation of Racking System • Solar Panel Assembly and Installation	• Surface water and groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic and terrestrial biota •	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Clean-up and Reclamation	• Introduction or spread of invasive or non-native species • Increased erosion and sedimentation potential • Change in surface water drainage	• Use native topsoil • Stabilize and/or re-vegetate all areas of disturbed soils that drain into wetlands and woodlands and watercourses • Maintain existing grading
• Dismantling	• Surface water and groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic and terrestrial biota •	• Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Noise and Human Activity	• Disturbance to wildlife • Mortality of wildlife	• Clearly post speed limits

5.5.5 Other General Construction Mitigation

5.5.5.1 Vegetation Removal

As described above, removal of vegetation within significant natural features will be limited to the planted tallgrass prairie. Additional vegetation removal will occur within the agricultural fields, and within hedgerows. When vegetation removal is required, the following mitigation measures will be implemented:

- The limits of the vegetation to be cleared will be identified prior to clearing so that the minimum required amount of vegetation is removed;
- When clearing is to occur adjacent to a natural feature, the limit of the clearing area will be staked so that sensitive natural features are not disturbed;
- Clearing limits will be monitored to ensure that no encroachment on natural features has occurred, and the minimum amount of vegetation is removed; and
- If encroachment on a natural feature occurs, restoration of the feature will take place under the direction of a qualified biologist.

5.5.5.2 Timing

The federal *Migratory Bird Convention Act* (1994) protects the nests, eggs and young of most bird species from harm or destruction. Environment Canada considers the 'general nesting period' of breeding birds in southern Ontario to be between late March and the end of August. This includes times at the beginning and end of the season when only a few species might be nesting. In light of this we recommend that during the peak period of bird nesting, between April 01 and August 15, no vegetation clearing or disturbance to nesting bird habitat occur. Vegetation includes grasses. In the 'shoulder' seasons of, we suggest that vegetation clearing could occur, but only after an ecologist with appropriate avian knowledge has surveyed the area to confirm lack of nesting. If evidence of nesting is observed, then vegetation clearing (in an area around the nest) has to wait until nesting has concluded. Generally speaking, the smaller and simpler the habitat is, the easier it is to confirm that no nesting is occurring. Likelihood of nesting birds being present in the 'shoulder' seasons also depends on the habitat type. Between September 1 and March 31, vegetation clearing can occur without nest surveys, but the law for nest protection still holds (i.e. if an active nest is known it should be protected).

5.5.5.3 Topsoil Clearing

Following construction, topsoil in areas of temporary disturbance will be replaced/restored. Disturbed areas in agricultural fields will be reseeded with a grass mix. Reseeded areas will be monitored for one year to ensure regeneration success.

5.5.5.4 Accidental Spills

All equipment should be maintained in good working order and be free of material that could contribute deleterious substances to waterbodies. Fuelling areas and storage should be kept at least 30 m from all natural features, and will be clearly identified. Emergency spill kits should be maintained on-site and a spill response plan developed in case of emergency.

5.5.5.5 Erosion and Sediment Control

Construction works such as grading, grubbing and excavation can cause the movement of sediment into wetlands and watercourses, both on and downstream of the property. A comprehensive erosion and sediment control plan will be developed and implemented during the construction and decommissioning phases of the project to reduce or eliminate the transport of sediments, nutrients, contaminants, and increased turbidity within these features. Siltation and erosion controls including silt fences, silt blankets, hay bales and geotextile check dams will be installed before any work on the Project Location begins, and removed after the threat of siltation and erosion effects has ceased (e.g., disturbed areas are re-vegetated). The siltation erosion measures should be checked regularly during the construction and decommissioning phases to ensure it remains in good condition. Any deficiencies in the measures should be repaired.

5.6 Assessment of Negative Effect and Mitigation Measures during Operation

5.6.1 Significant Wetlands

The operation of the Project is expected to have minimal negative effects on wetlands assumed to be significant. There are no Project components located within a significant wetland feature, and a perimeter fence will be installed around the entire Project Location (**Figure 8**). A minimum of 20 m buffer has been applied to significant wetland features. Concerns related to dust generation from vehicular traffic on access roads during inspection and maintenance activities are recognized to be minimal, and if required, reduced speeds, and dust suppression could be utilized. This is not expected to be required as there will be minimal traffic use during the operation of the facility.

Accidental spills and the improper storage of waste and accidental spills have the potential to negatively impact wetlands assumed to be significant. Erosion and sediment controls will be used to manage any indirect impacts during operation. Potential negative impacts to wetlands assumed to be significant within 50 m of the Project Location and proposed mitigation measures during the operation phase of the Project are detailed in **Table 18**.

Table 18. Potential Negative Environmental Effects and Mitigation Measures for Wetlands during Operation

Activity	Potential Negative Environmental Effect	Proposed Mitigation
• General Operation	• Increased area of impervious or less pervious surfaces • Soil compaction • Alteration to surface water quality and quantity entering wetlands • Change in thermal regime •	• Implement erosion and sediment control plan • Stockpile materials at a distance greater than 30 m from wetland • No encroachment on wetland is allowed • Stabilize and/or re-vegetate all areas of disturbed soils which drain into wetlands • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Routine maintenance activities	• Surface water and groundwater contamination due to fuel and/or chemical spills • Lethal or sub-lethal toxic effects on aquatic, wetland and terrestrial biota •	• Maintain fence around perimeter of Project – discourage workers from entering wetland area • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Noise and Human Activity	• Disturbance to wildlife • Mortality of wildlife	• Clearly post speed limits

5.6.2 Significant Woodlands

The operation of the Project is expected to have minimal negative effects on significant woodlands. A minimum 10 m buffer is being maintained and a perimeter fence is being installed around the Project Location (**Figure 9**). During the operation phase, there will be minimal use of roads, which will typically only be required during inspection or maintenance. Dust generation may be a concern during road use; however, posted speed limits will mitigate dust concerns.

Additional considerations include erosion and sediment control, accidental spills, and improper storage of waste including toxic chemicals. Potential negative impacts to significant woodlands within 50 m of the Project Location and proposed mitigation measures during the operation phase of the Project are detailed in **Table 19**.

Table 19. Potential Negative Environmental Effects and Mitigation Measures for Woodlands during Operation

Activity	Potential Negative Environmental Effect	Proposed Mitigation
• General Operation	• Loss of pervious surface • Increased erosion	• Implement erosion and sediment control plan
• Routine maintenance activities	• Soil compaction • Accidental damage to roots and limbs • Surface water and groundwater contamination due to fuel and/or chemical spills	• Stockpile materials at a distance greater than 30 m from woodland • Maintain fence around perimeter of Project • No encroachment on woodland is allowed • Stabilize and/or re-vegetate all areas of disturbed soils which drain into woodlands • Incorporate a designated area for equipment maintenance and fueling • Storage of fuel should only occur in permitted areas • Maintain an emergency spill kit on-site in case of emergency • Develop and implement a spill response plan
• Noise and Human Activity	• Disturbance to wildlife • Mortality of wildlife	• Clearly post speed limits

5.7 Environmental Effects Monitoring Plan Overview

O. Reg 359/09 requires that an Environmental Effects Monitoring Plan be prepared as part of the Design and Operations Report. The Design and Operations Report (Arcadis 2016b) outlines the mitigation measures and environmental monitoring associated with potential negative effects of the proposed development. The intent of monitoring will be to verify compliance with federal and/or provincial requirements and to assess the actual impacts of the operation. Detailed post-construction monitoring plans, if required, will be developed, following discussions with the applicable agencies (e.g., Ministry of Natural Resources, and Ministry of Environment and Climate Change) and in accordance with any conditions prescribed in the REA (Arcadis 2016b).

Following the REA Regulation, the Environmental Effects Monitoring Plan should identify:

- Performance objectives in respect of negative environmental effects;
- Mitigation measures to assist in achieving the performance objectives;
- Program for monitoring negative environmental effects for the duration of the project; and
- Contingency plan in the event specified mitigation measures fail.

The Environmental Effects Monitoring Plan (EEMP) outlined within the Design and Operations Report (Arcadis 2016b) addresses potential environmental concerns that may arise during Construction, Operation and Decommissioning of the Project including:

- Construction staging;
- Erosion and sediment control;
- Vegetation and wildlife during construction;
- Soil quality and agricultural capacity;
- Waste management;
- Noise, air and dust during construction;
- Inspections;
- Post-construction noise emission monitoring.

The Environmental Effects Monitoring Plan was developed in consultation with this report. It allows for the identification of problems with the existing mitigation measures, should they arise, and measures the effectiveness of the mitigation in meeting the specified performance objectives. In the event that routine monitoring indicates performance objectives are not being met, the contingency measures will be adopted to ensure actions are taken to meet the performance objectives. Table 3-1 in the Design and Operations Plan outlines potential environmental effects, mitigation and monitoring (Arcadis 2016b). The mitigation measures outlined in this table will be applied throughout the life of the project. In addition, an erosion and sediment control plan and a revegetation plan for the former storage area will be implemented as outlined in the Conceptual Stormwater Management Report (Arcadis 2016a).

5.8 Construction Plan Report Overview

O. Reg 359/09requires proponents of Class 3 solar projects to prepare a Construction Plan Report which outlines the following:

- Details of the construction and installation activities;
- The location and timing of any construction or installation activities;
- Any negative environmental effects that may result from the construction or installation activities; and
- Mitigation measures in respect of any negative environmental effects.

A Construction Plan Report has been prepared by Arcadis (2016c). Mitigation measures outlined within the Construction Plan Report are consistent with those discussed within this EIS. The Construction Plan Report and all EIS documents should be read in conjunction with each other to ensure that necessary measures are taken to reduce impacts to water bodies, and other natural heritage features considerations not discussed within this report.

6. Summary

The NHA and EIS contained herein, have been prepared to satisfy the requirements outlined in O.Reg 359/09. The report provides the results of the Records Review, Site Investigation and Evaluation of Significance as well as an EIS detailing potential negative effects and appropriate mitigation measures for avoiding negative effects.

The EIS report was completed to mitigate potential negative environmental effects to the following significant natural features located in and within 50 m of the Project Location:

- Four wetlands (WET-02, WET-04, WET-05, and WET-08);
- Four woodlands (WOD-01, WOD-03, WOD-04 and WOD-05);
- Planted Tallgrass Prairie (TP-01 and TP-02);
- Planted Species of Special Concern (Ironweed, Nodding Wild Onion, Pale-Purple Coneflower, Prairie Dock and Tall Coreopsis), which are all associated with the Planted Prairie Feature; and
- Generalized Candidate Significant Wildlife including:
    - Bat Maternity Colonies;
    - Landbird Migratory Stopover Areas;
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
    - Amphibian Breeding Habitat (Woodland)
    -
    - Woodland Area – Sensitive Bird Breeding Habitat;
    - Marsh Bird Breeding Habitat;
    - Terrestrial Crayfish Habitat;
    - Species of Special Concern – Woodland Plants (Harlberd-leaved Smartweed, Hirsute Sedge, Weak Stellate Sedge and Honey Locust);
    - Bird Species of Special Concern (Bald Eagle, Eastern Wood-Pewee, Hooded Warbler, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush);
    - Reptiles and Amphibians of Special Concern (Eastern Ribbonsnake, Jefferson / Blue-Spotted Salamander Complex and Snapping Turtle); and
    - Woodland Vole

Mitigation measures identified within EIS will be reviewed and appropriately implemented to reduce or eliminate the potential for negative effects to wetlands, woodlands, and Generalized Candidate Significant Wildlife Habitat.

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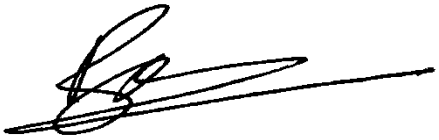

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Appendix A

Nanticoke Solar Records Review
Plant List

Appendix A

Nanticoke Solar Records Review Plant List

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Acer negundo	Manitoba Maple			S5	x	x		
Acer platanoides	Norway Maple			SE5	x	x		
Acer rubrum	Red Maple			S5	x	x		
Acer saccharinum	Silver Maple			S5	x	x		
Acer saccharum var. *saccharum*	Sugar Maple			S5	x	x		
Acer X *freemanii*	Freeman's Maple			S5		x		
Alisma plantago-aquatica	Broad-leaved Water-plantain			S5	x	x		
Rhus hirta	Staghorn Sumac			S5	x	x		
Toxicodendron radicans ssp. *negundo*	Poison Ivy			S5	x	x		
Cicuta maculata	Spotted Water-hemlock			S5	x	x		
Daucus carota	Queen Anne's Lace			SE5	x	x		
Sanicula odorata	Clustered Snakeroot			S5	x	x		
Sium suave	Hemlock Water-parsnip			S5	x	x		
Apocynum androsaemifolium ssp. *androsaemifolium*	Spreading Dogbane			S5		x		
Apocynum cannabinum	Clasping-leaved Indian Hemp			S4?		x		
Ilex verticillata	Winterberry			S5	x	x		
Arisaema triphyllum ssp. *triphyllum*	Jack-in-the-pulpit			S5	x	x		
Asclepias incarnata ssp. *incarnata*	Swamp Milkweed			S5	x	x		
Asclepias syriaca	Common Milkweed			S5	x	x		
Achillea millefolium var. *millefolium*	Common Yarrow			SE?	x	x		
Ambrosia artemisiifolia	Annual Ragweed			S5	x	x		
Arctium minus	Lesser Burdock			SE5	x	x		
Aster ericoides var. *ericoides*	Heath Aster			S5	x	x		
Bidens frondosa	Devil's Beggar's Ticks			S5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Centaurea sp.	Knapweed Species			-	x	x		
Cichorium intybus	Chicory			SE5	x	x		
Cirsium arvense	Crepping Thistle			SE5	x	x		
Cirsium vulgare	Bull Thistle			SE5	x	x		
Conyza canadensis	Fleabane			S5		x		
Coreopsis tripteris	Tall Coreopsis			S2		x		
Echinacea pallida	Pale-purple Coneflower			S1		x		
Echinacea purpurea	Eastern Purple Coneflower			SE1		x		
Erigeron annuus	White-top Fleabane			S5		x		
Eupatorium perfoliatum	Common Boneset			S5	x	x		
Eurybia macrophylla	Large-leaved Aster			S5	x	x		
Euthamia graminifolia	Grass-leaved Goldenrod			S5	x	x		
Helianthus giganteus	Tall Sunflower			S5		x		
Lactuca serriola	Prickly Lettuce			SE5		x		
Leucanthemum vulgare	Oxeye Daisy			SE5	x	x		
Oligoneuron ohioense	Ohio Golderod			S4		x		
Prenanthes sp.	Rattlesnake-root Species			-		x		
Rudbeckia hirta	Black-eyed Susan			S5		x		
Silphium perfoliatum var. *perfoliatum*	Cup-plant			S2		x		
Silphium terebinthinaceum var. *terebinthinaceum*	Prairie Dock			S1		x		
Solidago canadensis	Canada Goldenrod			S5	x	x		
Solidago canadensis var. *scabra*	Tall Goldenrod			S5		x		
Solidago gigantea	Smooth Goldenrod			S5	x	x		
Solidago nemoralis var. *nemoralis*	Field Goldenrod			S5	x	x		
Solidago rugosa ssp. *rugosa*	Rough Goldenrod			S5	x	x		
Sonchus arvensis ssp. *arvensis*	Field Sowthistle			SE5	x	x		
Symphyotrichum laeve	Smooth Blue Aster			S5		x		
Symphyotrichum lanceolatum ssp. *lanceolatum*	Panicled Aster			S5	x	x		
Symphyotrichum lateriflorum var. *lateriflorum*	Calico Aster			S5	x	x		
Symphyotrichum novae-angliae	New England Aster			S5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Symphyotrichum pilosum var. *pilosum*	Hairy Aster			S5		x		
Taraxacum officinale	Common Dandelion			SE5	x	x		
Tragopogon pratensis ssp. *pratensis*	Meadow Goat's-beard			SE5	x	x		
Tussilago farfara	Colt's Foot			SE5	x	x		
Vernonia missurica	Ironweed			S1?		x		
Xanthium strumarium	Rough Cockle-bur			S5	x	x		
Impatiens capensis	Spotted Jewel-weed			S5	x	x		
Berberis thunbergii	Japanese Barberry			SE5	x	x		
Podophyllum peltatum	May Apple			S5	x	x		
Betula alleghaniensis	Yellow Birch			S5	x	x		
Carpinus caroliniana ssp. *virginiana*	American Hornbeam			S5	x	x		
Ostrya virginiana	Eastern Hop-hornbeam			S5	x	x		
Catalpa sp.*eciosa*	Northern Catalpa			SE1	x	x		
Echium vulgare	Common Viper's-bugloss			SE5	x	x		
Alliaria petiolata	Garlic Mustard			SE5	x	x		
Barbarea vulgaris	Yellow Rocket			SE5	x	x		
Capsella bursa-pastoris	Common Shepherd's Purse			SE5	x	x		
Cardamine douglassii	Purple Cress			S4	x	x		
Cardamine pensylvanica	Pennsylvania Bitter-cress			S5	x	x		
Hesperis matronalis	Dame's Rocket			SE5	x	x		
Rorippa palustris ssp. *hispida*	Hispid Yellow-cress			S5	x	x		
Diervilla lonicera	Northern Bush-honeysuckle			S5		x		
Lonicera dioica	Glaucous Honeysuckle			S5		x		
Lonicera morrowii	Morrow's Honeysuckle			SE3		x		
Lonicera tatarica	Tartarian Honeysuckle			SE5	x	x		
Sambucus nigra ssp. *canadensis*	Common Elderberry			S5	x	x		
Viburnum lentago	Nannyberry			S5	x	x		
Viburnum opulus var. *americanum*	Highbush Cranberry			S5	x	x		
Silene latifolia	Bladder Campion			SE5		x		
Stellaria graminea	Little Starwort			SE5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Stellaria longifolia	Longleaf Stitchwort			S5	x	x		
Euonymus obovata	Running Strawberry-bush			S5	x	x		
Chenopodium album var. *album*	White Goosefoot			SE5	x	x		
Hypericum perforatum	St. John's-wort			SE5	x	x		
Cornus racemosa	Gray Dogwood			S5	x	x		
Cornus sericea ssp. *sericea*	Red-osier Dogwood			S5	x	x		
Juniperus sp.	Juniper Species				x	x		
Juniperus virginiana	Eastern Red Cedar			S5	x	x		
Thuja occidentalis	Northern White Cedar			S5	x	x		
Carex bebbii	Bebb's Sedge			S5	x	x		
Carex blanda	Woodland Sedge			S5		x		
Carex crinita	Fringed Sedge			S5	x	x		
Carex cristatella	Crested Sedge			S5	x	x		
Carex gracillima	Graceful Sedge			S5	x	x		
Carex hystericina	Porcupine Sedge			S5	x	x		
Carex intumescens	Bladder Sedge			S5	x	x		
Carex lacustris	Lake-bank Sedge			S5	x	x		
Carex leptonervia	Finely-nerved Sedge			S5		x		
Carex lupulina	Hop Sedge			S5	x	x		
Carex pensylvanica	Pennsylvania Sedge			S5	x	x		
Carex pseudo-cyperus	Cyperus-like Sedge			S5	x	x		
Carex radiate	Stellate Sedge			S5	x	x		
Carex retrorsa	Retrorse Sedge			S5	x	x		
Carex rosea	Rosy Sedge			S5	x	x		
Carex scoparia	Pointed Broom Sedge			S5	x	x		
Carex sp.*icata*	Spiked Sedge			SE5		x		
Carex stipata	Stalk-grain Sedge			S5	x	x		
Carex vulpinoidea	Fox Sedge			S5	x	x		
Eleocharis erythropoda	Bald Spikerush			S5	x	x		
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush			S5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Scirpus atrovirens	Woolgrass Bulrush			S5		x		
Scirpus cyperinus	Cottongrass Bulrush			S5	x	x		
Dipsacus fullonum ssp. *sylvestris*	Common Teasel			SE5	x	x		
Athyrium filix-femina var. *angustum*	Lady-fern			S5	x	x		
Dryopteris carthusiana	Spinulose Wood Fern			S5	x	x		
Dryopteris cristata	Crested Wood Fern			S5		x		
Onoclea sensibilis	Sensitive Fern			S5	x	x		
Equisetum arvense	Field Horsetail			S5	x	x		
Equisetum sylvaticum	Woodland Horsetail			S5	x	x		
Coronilla varia	Crown-vetch			SE5	x	x		
Desmodium canadense	Showy Tick-trefoil			S4		x		
Gleditsia triacanthos	Honey Locust			S2	x	x		
Lotus corniculatus	Bird's-foot Trefoil			SE5	x	x		
Medicago lupulina	Black Medic			SE5	x	x		
Medicago sativa ssp. *sativa*	Alfalfa			SE5		x		
Melilotus alba	White Sweet Clover			SE5	x	x		
Melilotus officinalis	Yellow Sweet Clover			SE5	x	x		
Robinia pseudo-acacia	Black Locust			SE5	x	x		
Trifolium hybridum ssp. *elegans*	Alsike Clover			SE5	x	x		
Trifolium pratense	Red Clover			SE5	x	x		
Trifolium repens	White Clover			SE5	x	x		
Vicia cracca	Tufted Vetch			SE5	x	x		
Vicia tetrasperma	Lentil Vetch			SE5		x		
Fagus grandifolia	American Beech			S5	x	x		
Quercus macrocarpa	Bur Oak			S5		x		
Quercus rubra	Northern Red Oak			S5	x	x		
Geranium maculatum	Wild Geranium			S5	x	x		
Geranium robertianum	Herb-robert			SE5	x	x		
Ribes americanum	Wild Black Currant			S5	x	x		
Ribes cynosbati	Prickly Gooseberry			S5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Ribes glandulosum	Skunk Currant			S5	x	x		
Hamamelis virginiana	American Witch-hazel			S5	x	x		
Carya cordiformis	Bitternut Hickory			S5	x	x		
Carya ovata var. *ovata*	Shagbark Hickory			S5	x	x		
Juncus dudleyi	Dudley's Rush			S5	x	x		
Juncus effusus ssp. *solutus*	Soft Rush			S5	x	x		
Juncus sp.	Rush Species					x		
Juncus torreyi	Torrey's Rush			S5	x	x		
Glechoma hederacea	Ground Ivy			SE5	x	x		
Lycopus americanus	American Bugleweed			S5	x	x		
Lycopus europaeus	European Bugleweed			SE5	x	x		
Lycopus uniflorus	Northern Bugleweed			S5	x	x		
Monarda fistulosa	Wild Bergamot			S5		x		
Nepeta cataria	Catnip			SE5	x	x		
Lindera benzoin	Spicebush			S5	x	x		
Lemna minor	Lesser Duckweed			S5	x	x		
Wolffia borealis	Dotted Watermeal			S4S5	x	x		
Wolffia columbiana	Columbia Watermeal			S4S5	x	x		
Allium cernuum	Nodding Wild Onion			S2		x		
Convallaria majalis	European Lily-of-the-valley			SE5	x	x		
Erythronium americanum ssp. *americanum*	Yellow Trout-lily			S5	x	x		
Lilium michiganense	Michigan Lily			S5	x	x		
Maianthemum canadense	Wild-lily-of-the-valley			S5	x	x		
Maianthemum racemosum. ssp. *racemosum*	False Solomon's Seal			S5	x	x		
Polygonatum pubescens	Downy Solomon's Seal			S5	x	x		
Lythrum salicaria	Slender-spike Loosestrife			SE5	x	x		
Hibiscus moscheutos ssp. *moscheutos*	Swamp Rosemallow	SC	SC	S3		x		
Fraxinus americana	White Ash			S5	x	x		
Fraxinus excelsior	European Ash			SE2		x		
Fraxinus pennsylvanica	Green Ash			S5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Ligustrum vulgare	European Privet			SE5	x	x		
Syringa vulgaris	Common Lilac			SE5	x	x		
Circaea lutetiana ssp. *canadensis*	Enchanter's Nightshade			S5	x	x		
Epilobium ciliatum ssp. *ciliatum*	Hairy Willow-herb			S5	x	x		
Epilobium hirsutum	Great-hairy Willow-herb			SE5	x	x		
Epilobium sp.	Willow-herb Species					x		
Oenothera biennis	Common Evening-primrose			S5		x		
Epipactis helleborine	Eastern Helleborine			SE5	x	x		
Osmunda cinnamomea	Cinnamon Fern			S5	x	x		
Osmunda regalis var. sp.*ectabilis*	Royal Fern			S5	x	x		
Oxalis stricta	Upright Yellow Wood Sorrel			S5	x	x		
Picea abies	Norway Spruce			SE3	x	x		
Picea glauca	White Spruce			S5	x	x		
Picea pungens	Colorado Spruce			SE1	x	x		
Pinus nigra	Black Pine			SE2	x	x		
Pinus resinosa	Red Pine			S5	x	x		
Pinus strobus	Eastern White Pine			S5		x		
Tsuga canadensis	Eastern Hemlock			S5	x	x		
Plantago lanceolata	English Plantain			SE5	x	x		
Plantago major	Nipple-seed Plantain			SE5	x	x		
Plantago rugelii	Black-seed Plantain			S5		x		
Agrostis gigantea	Redtop			SE5	x	x		
Agrostis perennans	Autumn Bentgrass			S5		x		
Agrostis stolonifera	Spreading Bentgrass			S5	x	x		
Alopecurus pratensis	Meadow Foxtail			SE5		x		
Andropogon gerardii	Big Bluestem			S4		x		
Bromus inermis ssp. *inermis*	Smooth Brome			SE5	x	x		
Bromus tectorum	Downy Chess			SE5		x		
Calamagrostis canadensis	Blue-joint Reedgrass			S5	x	x		
Cinna arundinacea	Stout Wood Reedgrass			S4	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Dactylis glomerata	Orchard Grass			SE5	x	x		
Echinochloa crusgalli	Barnyard Grass			SE5	x	x		
Elymus canadensis	Nodding Wild-rye			S4S5		x		
Elymus hystrix	Bottle-brush Grass			S5	x	x		
Elymus repens	Quack Grass			SE5	x	x		
Elymus virginicus var. *virginicus*	Virginia Wild-rye			S5	x	x		
Glyceria striata	Fowl Manna Grass			S5	x	x		
Hordeum jubatum ssp. *jubatum*	Fox-tail Barley			SE5	x	x		
Leersia oryzoides	Rice Cutgrass			S5	x	x		
Leersia virginica	White Cutgrass			S4	x	x		
Lolium pratense	Meadow Fescue			SE5		x		
Miscanthus sinensis	Chinese Silver Grass			SE1	x	x		
Panicum capillare	Old Panic Grass			S5	x	x		
Panicum virgatum	Switch Grass			S4		x		
Phalaris arundinacea	Reed Canary Grass			S5	x	x		
Phleum pratense	Timothy			SE5	x	x		
Phragmites australis	Common Reed			S5	x	x		
Poa compressa	Canada Bluegrass			S5	x	x		
Poa palustris	Fowl Bluegrass			S5		x		
Poa pratensis ssp. *pratensis*	Kentucky Bluegrass			S5	x	x		
Schizachyrium scoparium	Little Bluestem			S4		x		
Setaria viridis	Green Bristle Grass			SE5	x	x		
Sorghastrum nutans	Yellow Indian-grass			S4		x		
Polygonum hydropiper	Water-pepper			SE5		x		
Polygonum lapathifolium	Dock-leaf Smartweed			S5	x	x		
Polygonum pensylvanicum	Pennsylvania Smartweed			S5	x	x		
Polygonum persicaria	Lady's Thumb			SE5	x	x		
Polygonum sagittatum	Arrow-leaved Tearthumb			S4	x	x		
Polygonum virginianum	Virginia Knotweed			S4		x		
Rumex crispus	Curly Dock			SE5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Claytonia virginica	Narrow-leaved Spring Beauty			S5	x	x		
Potamogeton natans	Floating Pondweed			S5		x		
Lysimachia ciliata	Fringed Loosestrife			S5	x	x		
Trientalis borealis ssp. *borealis*	Northern Starflower			S5		x		
Actaea pachypoda	White Baneberry			S5		x		
Actaea rubra	Red Baneberry			S5		x		
Anemone quinquefolia var. *quinquefolia*	Wood Anemone			S5	x	x		
Anemone virginiana var. *virginiana*	Virginia Anemone			S5		x		
Caltha palustris	Marsh Marigold			S5	x	x		
Ranunculus abortivus	Kidney-leaved Buttercup			S5	x	x		
Ranunculus acris	Tall Buttercup			SE5	x	x		
Ranunculus recurvatus var. *recurvatus*	Hooked Crowfoot			S5	x	x		
Ranunculus sceleratus var. *sceleratus*	Cursed Crowfoot			S5		x		
Rhamnus cathartica	Buckthorn			SE5	x	x		
Agrimonia gryposepala	Tall Hairy Agrimony			S5	x	x		
Amelanchier sp.	Serviceberry Species					x		
Crataegus macrosperma	Variable Hawthorn			S5	x	x		
Crataegus phaenophyrum	Washington Hawthorn			SE	x	x		
Crataegus pringlei	Pringle's Hawthorn			S5	x	x		
Crataegus punctata	Dotted Hawthorn			S5	x	x		
Fragaria virginiana	Virginia Stawberry			S5	x	x		
Geum aleppicum	Yellow Avens			S5		x		
Geum canadense	White Avens			S5	x	x		
Malus pumila	Common Apple			SE5	x	x		
Malus sp.	Apple Species				x	x		
Potentilla simplex	Old-field Cinquefoil			S5	x	x		
Prunus serotina	Wild Black Cherry			S5	x	x		
Prunus virginiana var. *virginiana*	Choke Cherry			S5	x	x		
Pyrus communis	Common Pear			SE4	x	x		
Rosa blanda	Smooth Rose			S5		x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Rosa multiflora	Rambler Rose			SE4	x	x		
Rosa palustris	Swamp Rose			S5	x	x		
Rosa sp.	Rose Species					x		
Rubus allegheniensis	Allegheny Blackberry			S5	x	x		
Rubus idaeus ssp. *strigosus*	Wild Red Raspberry			S5	x	x		
Rubus occidentalis	Black Raspberry			S5		x		
Rubus pubescens	Dwarf Raspberry			S5	x	x		
Sorbus aucuparia	European Mountain-ash			SE4	x	x		
Spiraea alba	Narrow-leaved Meadow-sweet			S5	x	x		
Cephalanthus occidentalis	Buttonbush			S5	x	x		
Galium aparine	Cleavers			S5	x	x		
Galium triflorum	Sweet-scent Bedstraw			S5	x	x		
Populus alba	White Poplar			SE5	x	x		
Populus grandidentata	Large-tooth Aspen			S5	x	x		
Populus tremuloides	Quaking Aspen			S5	x	x		
Populus X canadensis	Carolina Poplar			SE1	x	x		
Salix alba	White Willow			SE4	x	x		
Salix discolor	Pussy Willow			S5	x	x		
Salix eriocephala	Heart-leaved Willow			S5	x	x		
Salix nigra	Black Willow			S4?	x	x		
Salix pentandra	Laurel Willow			SE2	x	x		
Salix X rubens	Reddish Willow			SE4	x	x		
Salix X sepulcralis	Weeping Willow			SE2	x	x		
Penthorum sedoides	Ditch-stonecrop			S5	x	x		
Tiarella cordifolia	Heart-leaved Foam-flower			S5	x	x		
Penstemon digitalis	Foxglove Beardtongue			S4S5		x		
Penstemon hirsutus	Hairy Beardtongue			S4		x		
Verbascum thapsus	Common Mullein			SE5		x		
Veronica officinalis	Common Speedwell			SE5		x		
Veronica serpyllifolia ssp. *serpyllifolia*	Thyme-leaved Speedwell			SE5	x	x		

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Smilax herbacea	Smooth Herbaceous Greenbrier			S4	x	x		
Solanum dulcamara	Climbing Nightshade			SE5	x	x		
Sparganium eurycarpum	Large Bur-reed			S5	x	x		
Thelypteris palustris var. *pubescens*	Marsh Fern			S5	x	x		
Tilia americana	American Basswood			S5	x	x		
Typha angustifolia	Narrow-leaved Cattail			S5	x	x		
Typha latifolia	Broad-leaf Cattail			S5	x	x		
Ulmus americana	American Elm			S5	x	x		
Ulmus pumila	Siberian Elm			SE3	x	x		
Boehmeria cylindrica	False Nettle			S5	x	x		
Laportea canadensis	Wood Nettle			S5	x	x		
Pilea pumila	Canada Clearweed			S5	x	x		
Urtica dioica ssp. *gracilis*	Slender Stinging Nettle			S5	x	x		
Verbena hastata	Blue Vervain			S5	x	x		
Viola affinis	Lecontes Violet			S4?		x		
Viola conspersa	American Bog Violet			S5		x		
Viola pubescens	Downy Yellow Violet			S5	x	x		
Viola sororia	Woolly Blue Violet			S5	x	x		
Parthenocissus vitacea	Thicket Creeper			S5	x	x		
Vitis riparia	Riverbank Grape			S5	x	x		
Aralia racemosa ssp. *racemosa*	American Spikenard			S5	x			
Bidens cernua	Nodding Beggar's Ticks			S5	x			
Bidens tripartita	European Beggar's Ticks			S5	x			
Erechtites hieracifolia	Fireweed			S5	x			
Erigeron philadelphicus var. *philadelphicus*	Philadelphia Fleabane			S5	x			
Prenanthes alba	White Rattlesnake-root			S5	x			
Cardamine diphylla	Broad-leaved Toothwort			S5	x			
Erucastrum gallicum	Common Dog Mustard			SE5	x			
Lepidium campestre	Field Pepper-grass			SE5	x			
Viburnum acerifolium	Maple-leaf Viburnum			S5	x			

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Moehringia lateriflora	Grove Sandwort			S5	x			
Calystegia sepium ssp. *angulata*	Hedge Bindweed			S5	x			
Cuscuta gronovii	Gronovius Dodder			S5	x			
Cornus amomum	Silky Dogwood			S5	x			
Carex arctata	Black Sedge			S5	x			
Carex aurea	Golden-fruited Sedge			S5	x			
Carex bromoides	Brome-like Sedge			S5	x			
Carex granularis	Meadow Sedge			S5	x			
Carex hirsutella	Hirsute Sedge			S3			x	
Carex lurida	Shallow Sedge			S5	x			
Carex projecta	Necklace Sedge			S5	x			
Carex seorsa	Weak Stellate Sedge			S2	x			
Carex tuckermanii	Tuckerman Sedge			S4	x			
Eleocharis obtusa	Blunt Spikerush			S5	x			
Scirpus hattorianus	Bulrush			S4	x			
Elaeagnus angustifolia	Russian Olive			SE3	x			
Euphorbia exigua	Little Spurge			SE1	x			
Lathyrus latifolius	Everlasting Pea			SE4	x			
Fagus sylvatica	European Beech				x			
Ribes aureum	Golden Currant			SR	x			
Aesculus hippocastanum	Horse Chestnut			SE2	x			
Juglans cinerea	Butternut	END	END	S4				x
Juncus alpinoarticulatus	Richardson Rush			S5	x			
Scutellaria galericulata	Hooded Skullcap			S5	x			
Scilla siberica	Squill			SE2	x			
Trillium grandiflorum	White Trillium			S5	x			
Uvularia grandiflora	Large-flowered Bellwort			S5	x			
Fraxinus nigra	Black Ash			S5	x			
Oenothera parviflora	Northen Evening-primrose			S5?	x			
Botrychium sp.	Grape-fern Species				x			

Scientific Name	Common Name	Status			Source			
		SARA[a]	ESA[b]	S-RANK[c]	Gregory 2005	Beacon 2012	NHIC 2016	MNRF 2016
Larix decidua	European Larch			SE2	x			
Bromus pubescens	Canada Brome			S4	x			
Glyceria septentrionalis	Floating Manna Grass			S4	x			
Lolium arundinaceum	Kentucky Fescue			SE5	x			
Muhlenbergia sp.	Satin Grass Species				x			
Poa nemoralis	Woods Bluegrass			SE3	x			
Sphenopholis intermedia	Slender Wedge Grass			S4S5	x			
Persicaria arifolia	Halberd-leaved Smartweed			S3			x	
Polygonum aviculare	Prostrate Knotweed			SE5	x			
Polygonum punctatum	Dotted Smartweed			S5	x			
Amelanchier laevis	Smooth Serviceberry			S5	x			
Crataegus schuettei	Schuette's Hawthorn			S4	x			
Crataegus succulenta	Fleshy Hawthorn			S4S5	x			
Fragaria vesca ssp. *americana*	Woodland Strawberry			S5	x			
Potentilla recta	Sulphur Cinquefoil			SE5	x			
Prunus avium	Sweet Cherry			SE4	x			
Rosa nitida	New England Rose			SU	x			
Rosa rugosa	Rugosa Rose			SE1	x			
Rubus canadensis	Smooth Blackberry			S4?	x			
Waldsteinia fragarioides	Barren Strawberry			S5	x			
Galium circaezans	Wild Licorice			S5	x			
Galium obtusum	Wild Madder			S4S5	x			
Salix exigua	Sandbar Willow			S5	x			
Salix purpurea	Basket Willow			SE4	x			
Salix serissima	Autumn Willow			S5	x			
Veronica scutellata	Marsh Speedwell			S5	x			
Ulmus rubra	Slippery Elm			S5	x			
Viola blanda	Smooth White Violet			S4S5	x			

Key:
a – SARA = Species at Risk Act: END = Endangered, THR = Threatened, SC = Special Concern.
b – ESA = Endangered Species Act: END = Endangered, THR = Threatened, SC = Special Concern.
c – S-RANK (from NHIC): S1 = Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not applicable 'because the species is not suitable target for conservation activities'; includes non-native species.

Appendix B

Nanticoke Solar Records Review
Birds Species List

Appendix B

Nanticoke Solar Records Review Birds Species List

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Common Loon	*Gavia immer*			S5	A				x		
Pied-billed Grebe	*Podilymbus podiceps*			S4					x		
Double-crested Cormorant	*Phalacrocorax auritus*			S5					x		
Great Blue Heron	*Ardea herodias*			S4		x			x	x	
Green Heron	*Butorides virescens*			S4		x			x	x	
Black-crowned Night-Heron	*Nycticorax nycticorax*			S3		x			x		
Tundra Swan	*Cygnus columbianus*			S4					x		
Mute Swan	*Cygnus olor*			SNA					x		
Snow Goose	*Chen caerulescens*			S					x		
Canada Goose	*Branta canadensis*			S5		x			x	x	
Wood Duck	*Aix* sp.*onsa*			S5		x			x		
Green-winged Teal	*Anas crecca*			S4		x				x	
American Black Duck	*Anas rubripes*			S4					x	x	
Mallard	*Anas platyrhynchos*			S5		x			x	x	
Blue-winged Teal	*Anas discors*			S4		x			x		
Northern Shoveler	*Anas clypeata*			S4		x					
Gadwall	*Anas strepera*			S4		x			x		
Canvasback	*Aythya valisineria*			S1	A				x		
Redhead	*Aythya americana*			S2	A				x		
Greater Scaup	*Aythya marila*			S4					x		
Lesser Scaup	*Aythya affinis*			S4					x		

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Common Goldeneye	*Bucephala clangula*			S5	A				x		
Bufflehead	*Bucephala albeola*			S4					x		
Hooded Merganser	*Lophodytes cucullatus*			S5		x			x	x	
Common Merganser	*Mergus merganser*			S5	A				x		
Red-breasted Merganser	*Mergus serrator*			S4	A				x		
Turkey Vulture	*Cathartes aura*			S5		x			x	x	
Osprey	*Pandion haliaetus*			S5					x		
Bald Eagle	*Haliaeetus leucocephalus*		SC	S4	A	x			x	x	
Northern Harrier	*Circus cyaneus*			S4	A	x			x		
Sharp-shinned Hawk	*Accipiter striatus*			S5	A				x		
Cooper's Hawk	*Accipiter cooperi*			S4	A	x			x		
Northern Goshawk	*Accipiter gentilis*			S4	A				x		
Red-shouldered Hawk	*Buteo lineatus*			S4	A				x		
Broad-winged Hawk	*Buteo platypterus*			S5	A				x		
Red-tailed Hawk	*Buteo jamaicensis*			S5		x			x	x	x
Rough-legged Hawk	*Buteo lagopus*			S1					x		
American Kestrel	*Falco* sp.*arverius*			S4		x			x		
Peregrine Falcon	*Falco peregrinus*	SC	SC	S3		x	x	x		x	
Ring-necked Pheasant	*Phasianus colchicus*			SE		x					
Wild Turkey	*Meleagris gallopavo*			S5		x				x	
Ruffed Grouse	*Bonasa umbellus*			S4		x			x		
Virginia Rail	*Rallus limicola*			S5		x			x		
Sora	*Porzana carolina*			S4		x			x	x	
American Coot	*Fulica americana*			S4	A	x			x		
Black-bellied Plover	*Pluvialis squatarola*			S4N					x		
Killdeer	*Charadrius vociferus*			S5		x			x	x	
Pectoral Sandpiper	*Calidris melanotos*			SHB					x		
Solitary Sandpiper	*Tringa solitaria*			S4					x		

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Spotted Sandpiper	*Actitis macularia*			S5		x			x	x	
Upland Sandpiper	*Bartramia longicauda*			S4	A	x			x		
Wilson's Snipe	*Gallinago delicata*			S5		x			x		
American Woodcock	*Scolopax minor*			S4		x			x	x	
Bonaparte's Gull	*Larus philadelphia*			S4					x		
Ring-billed Gull	*Larus delawarensis*			S5					x		
Herring Gull	*Larus argentatus*			S5					x		
Great Black-backed Gull	*Larus marinus*			S2					x		
Caspian Tern	*Sterna caspia*			S3					x		
Common Tern	*Sterna hirundo*			S4					x		
Rock Pigeon	*Columba livia*			SNA		x			x	x	
Mourning Dove	*Zenaida macroura*			S5		x			x	x	
Black-billed Cuckoo	*Coccyzus erythropthalmus*			S5		x				x	
Yellow-billed Cuckoo	*Coccyzus americanus*			S4		x			x		
Great Horned Owl	*Bubo virginianus*			S4		x			x		
Snowy Owl	*Bubo scandiaca*			SNA					x		
Eastern Screech-Owl	*Megascops asio*			S4		x			x		
Long-eared Owl	*Asio otus*			S4		x					
Northern Saw-whet Owl	*Aegolius acadicus*			S4		x					
Chimney Swift	*Chaetura pelagica*	THR	THR	S4		x		x	x		
Ruby-throated Hummingbird	*Archilochus colubris*			S5		x			x		
Belted Kingfisher	*Ceryle alcyon*			S4		x			x		
Red-headed Woodpecker	*Melanerpes erythrocephalus*	THR	SC	S4		x					
Yellow-bellied Sapsucker	*Sphyrapicus varius*			S5	A				x		
Red-bellied Woodpecker	*Melanerpes carolinus*			S4		x					
Downy Woodpecker	*Picoides pubescens*			S5		x			x	x	
Hairy Woodpecker	*Picoides villosus*			S5	A	x			x		
Northern Flicker	*Colaptes auratus*			S4		x			x	x	

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4		x			x		
Acadian Flycatcher	*Empidonax virescens*	END	END	S2S3	A				x		
Alder Flycatcher	*Empidonax alnorum*			S5		x			x		
Willow Flycatcher	*Empidonax traillii*			S5		x			x	x	
Least Flycatcher	*Empidonax minimus*			S4	A	x			x		
Eastern Phoebe	*Sayornis phoebe*			S5		x			x		
Great Crested Flycatcher	*Myiarchus crinitus*			S4		x			x		
Eastern Kingbird	*Tyrannus tyrannus*			S4		x			x	x	
Horned Lark	*Eremophila alpestris*			S5		x			x		
Purple Martin	*Progne subis*			S4		x			x		
Tree Swallow	*Tachycineta bicolor*			S4		x			x	x	
N. Rough-winged Swallow	*Stelgidopteryx serripennis*			S4		x			x	x	
Bank Swallow	*Riparia riparia*	THR	THR	S4		x			x		
Cliff Swallow	*Petrochelidon pyrrhonota*			S4		x			x	x	
Barn Swallow	*Hirundo rustica*	THR	THR	S4		x		x	x	x	
Blue Jay	*Cyanocitta cristata*			S5		x			x	x	
American Crow	*Corvus brachyrhynchos*			S5		x			x	x	
Black-capped Chickadee	*Poecile atricapillus*			S5		x			x	x	
Red-breasted Nuthatch	*Sitta canadensis*			S5	A	x			x		
White-breasted Nuthatch	*Sitta carolinensis*			S5	A	x					
Tufted Titmouse	*Baeolophus bicolor*			S4	A	x					
Brown Creeper	*Certhia americana*			S5	A				x		
House Wren	*Troglodytes aedon*			S5		x			x	x	
Winter Wren	*Troglodytes hiemalis*			S5	A				x		
Carolina Wren	*Thryothorus ludovicianus*			S4		x					
Marsh Wren	*Cistothorus palustris*			S4		x			x	x	
Golden-crowned Kinglet	*Regulus satrapa*			S5		x			x		
Ruby-crowned Kinglet	*Regulus calendula*			S4					x		

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Blue-gray Gnatcatcher	*Polioptila caerulea*			S4	A	x			x		
Eastern Bluebird	*Sialia sialis*			S5		x					
Veery	*Catharus fuscescens*			S4	A	x			x		
Swainson's Thrush	*Catharus ustulatus*			S4					x		
Hermit Thrush	*Catharus guttatus*			S5	A				x		
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4		x					
American Robin	*Turdus migratorius*			S5		x			x	x	
Northern Mockingbird	*Mimus polyglottus*			S4		x			x	x	
Gray Catbird	*Dumetella carolinensis*			S4		x			x	x	
Brown Thrasher	*Toxostoma rufum*			S4		x			x	x	
American Pipit	*Anthus rubescens*			S4					x		
Cedar Waxwing	*Bombycilla cedrorum*			S5		x			x	x	
Northern Shrike	*Lanius excubitor*			S2S3					x		
European Starling	*Sturnus vulgaris*			SE		x			x	x	
Blue-headed Vireo	*Vireo solitaries*			S5	A				x		
Warbling Vireo	*Vireo gilvus*			S5		x			x	x	
Philadelphia Viro	*Vireo philadelphicus*			S5					x		
Red-eyed Vireo	*Vireo olivaceus*			S5		x			x	x	
Blue-winged Warbler	*Vermivora cyanptera*			S4		x					
Golden-winged Warbler	*Vermivora chrysoptera*	THR	SC	S4					x		
Nashville Warbler	*Oreothlypis ruficapilla*			S5					x		
Northern Parula	*Setophaga americana*			S4	A				x		
Yellow Warbler	*Setophaga petechia*			S5		x				x	
Chestnut-sided Warbler	*Setophaga pensylvanica*			S5		x			x		
Black-throated Blue Warbler	*Setophaga caerulescens*			S5	A				x		
Yellow-rumped Warbler	*Setophaga coronata*			S5					x		
Black-throated Green Warbler	*Setophaga virens*			S5	A				x		
Blackburnian Warbler	*Setophaga fusca*			S5	A				x		

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Pine Warbler	*Setophaga pinus*			S5	A	x					
Bay-breasted Warbler	*Setophaga castanea*			S5					x		
American Redstart	*Setophaga ruticilla*			S5	A	x			x		
Ovenbird	*Seiurus aurocapillus*			S4	A	x					
Northern Waterthrush	*Parkesia noveboracensis*			S5		x			x		
Mourning Warbler	*Geothlypis philadelphia*			S4		x					
Common Yellowthroat	*Geothlyphis trichas*			S5		x			x	x	
Wilson's Warbler	*Cardellina pusilla*			S4					x		
Canada Warbler	*Cardellina canadensis*	THR	SC	S4	A				x		
Hooded Warbler	*Setophaga citrina*	THR	SC	S3					x		
Scarlet Tanager	*Piranga olivacea*			S4	A	x			x		
Northern Cardinal	*Cardinalis cardinalis*			S5		x			x	x	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			S4		x			x		
Indigo Bunting	*Passerina cyanea*			S4		x			x	x	
Eastern Towhee	*Pipilio erythrophthalmus*			S4		x			x		
American Tree Sparrow	*Spizelloides arborea*			S4					x		
Chipping Sparrow	*Spizella passerina*			S5		x			x	x	
Field Sparrow	*Spizella pusilla*			S4		x			x	x	
Vesper Sparrow	*Pooecetes gramineus*			S4		x			x	x	
Savannah Sparrow	*Passerculus sandwichensis*			S4	A	x			x	x	
Grasshopper Sparrow	*Ammodramus savannarum*			S4	A	x			x	x	
Song Sparrow	*Melospiza melodia*			S5		x			x	x	
Lincoln's Sparrow	*Melospiza lincolnii*			S5					x		
Swamp Sparrow	*Melospiza georgiana*			S5		x			x	x	
White-throated Sparrow	*Zonotrichia albicollis*			S5					x		
White-crowned Sparrow	*Zonotrichia leucophrys*			S4					x		
Dark-eyed Junco	*Junco hyemalis*			S5					x		
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4	A	x	x	x	x	x	

Common Name	Scientific Name	Status				Source					
		SARA[a]	ESA[b]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	OBBA[e]	NHIC[f]	MNRF[g]	Gregory 2005[h]	Beacon 2012[i]	Haldimad County Winter Raptor Survey[j]
Red-winged Blackbird	*Agelaius phoeniceus*			S4		x			x	x	
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4	A	x	x	x	x	x	
Rusty Blackbird	*Euphagus carolinus*	SC		S4					x		
Common Grackle	*Quiscalus quiscula*			S5		x			x	x	
Brown-headed Cowbird	*Molothrus ater*			S4		x			x	x	
Orchard Oriole	*Icterus* sp.*urius*			S4		x			x	x	
Baltimore Oriole	*Icterus galbula*			S4		x			x	x	
House Finch	*Haemorhous mexicanus*			SNA		x			x		
American Goldfinch	*Spinus tristis*			S5		x			x	x	
House Sparrow	*Passer domesticus*			SNA		x			x		

Key
a – SARA = Species at Risk Act: END = Endangered, THR = Threatened, SC = Special Concern.
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c – S-RANK (from NHIC): S1 = Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not applicable 'because the species is not suitable target for conservation acitivites'; includes non-native species.
d – Ontario Ministry of Natural Resources (OMNR). 2000. *Significant Wildlife Habitat Technical Guide* (Appendix G). 151 p plus appendices.

Note:
Many of the species on this list have only been recorded as migrants.

Appendix C

Nanticoke Solar Records Review Reptiles, Amphibians, Mammals and Insects List

Appendix C

Nanticoke Solar Records Review Reptiles, Amphibians, Mammals and Insects List

Common Name	Scientific Name	Status			Source									
		SARA[a]	ESA[b]	SRANK[c]	Ontario Reptile & Amphibi	Ontario Mammal Atlas	Ontario Butterfly Atlas	Gregory, 2005	Gregory, 2007	Gregory, 2009	Gregory, 2010	Clemens, 2011	Beacon, 2012	Beacon, 2012
Reptiles and Amphibians														
American Bulfrog	Lithobates catesbeianus	-	-	S4	x									
American Toad	Anaxyrus americanus	-	-	S5	x			x			x			
Blanding's Turtle	Emydoidea blandingii	THR	THR	S3	x									
Dekay's Brownsnake	Storeria dekayi			S5	x				x		x			
Eastern Foxsnake	Pantherophis gloydi	END	END	S2	x			x						
Eastern Gartersnake	Thamnophis sirtalis sirtalis	-	-	S5	x			x	x	x	x			
Red-spotted Newt	Notophthalmus viridescens viridescens			S5	x									
Eastern Red-backed Salamander	Plethodon cinereus	-	-	S5	x									
Eastern Ribbonsnake	Thamnophis sauritus	SC	SC	S3	x									
Four-toed Salamander	Hemidactylium scutatum	-	-	S4	x									
Gray Ratsnake	Pantherophis spiloides	END	END	S1	x									
Gray Treefrog	Hyla versicolor	-	-	S4	x			x	x	x	x	x	x	x
Green Frog	Lithobates clamitans	-	-	S5	x			x	x	x	x		x	x
Jefferson / Blue-spotted Salamander Complex	*Ambystoma hybrid pop.*	-	-	S2 - S4	x									
Midland Painted Turtle	*Chrysemys picta marginata*	-	-	S4	x			x	x	x	x		x	x
Milksnake	*Lampropeltis triangulum*	-	SC	S3	x						x			
Mudpuppy	Necturus maculosus	-	-	S4	x									
Northern Leopard Frog	Lithobates pipiens	-	-	S5	x			x	x	x	x		x	x
Northern Map Turtle	Graptemys geographica	SC	SC	S3	x									
Northern Watersnake	Nerodia sipedon sipedon	-	-	S5	x									
Queensnake	Regina septemvittata	END	END	S2	x									
Red-bellied Snake	Storeria occipitomaculata	-	-	S5	x									
Snapping Turtle	Chelydra serpentina	SC	SC	S3	x			x	x	x	x		x	x
Spring Peeper	Pseudacris crucifer	-	-	S5	x			x	x	x	x	x	x	x
Western Chorus Frog	Pseudacris triseriata	-	-	S4	x			x	x	x	x	x	x	x
Wood Frog	Lithobates sylvaticus	-	-	S5	x			x	x		x			
Mammals														
Badger	Taxidea taxus	END	ESA	S2		x								
Beaver	Castor canadensis	-	-	S5		x								

Common Name	Scientific Name	Status			Source									
		SARA[a]	ESA[b]	SRANK[c]	Ontario Reptile & Amphibi	Ontario Mammal Atlas	Ontario Butterfly Atlas	Gregory, 2005	Gregory, 2007	Gregory, 2009	Gregory, 2010	Clemens, 2011	Beacon, 2012	Beacon, 2012
Big Brown Bat	Eptesicus fuscus	-	-	S5		x								
Coyote	Canis latrans	-	-	S5		x		x					x	
Deer Mouse	Peromyscus maniculatus	-	-	S5		x								
Eastern Chipmunk	Tamias striatus	-	-	S5		x								
Eastern Cottontail	Sylvilagus floridanus	-	-	S5		x		x					x	
European Hare	Lepus europaeus	-	-	S5				x						
Tri-colored Bat	Pipistrellus subflavus	END	END	S3?		x								
Eastern Red Bat	Lasiurus borealis	-	-	S4		x								
Gray Squirrel	Sciurus carolinensis	-	-	S5		x		x						
Little Brown Myotis	Myotis lucifuga	END	END	S4		x								
Long-tailed Weasel	Mustela frenata	-	-	S4		x								
Meadow Jumping Mouse	Zpus hudsonius	-	-	S5		x								
Meadow Vole	Microtus pennsylvanicus	-	-	S5		x		x					x	
Mink	Mustela vison	-	-	S4		x		x						
Muskrat	Ondatra zibethicus	-	-	S5		x		x					x	
Northern Myotis	Myotis septentrionalis	END	END	S3		x								
Northern Short-tailed Shrew	Blarina brevicauda	-	-	S5		x								
Norway Rat	Rattus norvegicus	-	-	SNA		x								
Porcupine													x	
Raccoon	Procyon lotor	-	-	S5		x		x						
Red Fox	Vulpes vulpes	-	-	S5		x		x						
Red Squirrel	Tamiasciurus hudsonicus	-	-	S5		x								
Silver-haired Bat	Lasionycteris noctivagans	-	-	S4		x								
Southern Flying Squirrel	Glaucomys volans	SC	-	S4		x								
Striped Skunk	Mephitis mephitis	-	-	S5		x		x						
Virginia Opossum	Didelphis virginiana	-	-	S4		x		x						
White-footed Mouse	Peromyscus leucopus	-	-	S5		x								
White-tailed Deer	Odocoileus virginianus	-	-	S5		x		x				x	x	
Woodchuck	Marmota monax	-	-	S5		x		x						
Woodland Vole	Pitymys pinetorum	SC	SC	S3?		x								
Insects														
Black Swallowtail	Papilio polyxenes	-	-	S5			x							
Cabbage White	Pieris rapae	-	-	SNA			x						x	
Monarch	Danaus plexippus	-	SC	S2N,S4B			x						x	
Orange Sulphur	Colias eurytheme	-	-	S5			x							

Common Name	Scientific Name	Status			Source									
		SARA[a]	ESA[b]	SRANK[c]	Ontario Reptile & Amphibi	Ontario Mammal Atlas	Ontario Butterfly Atlas	Gregory, 2005	Gregory, 2007	Gregory, 2009	Gregory, 2010	Clemens, 2011	Beacon, 2012	Beacon, 2012
White Admiral	Limenitis arthemis arthemis	-	-	-			x							
Wild Indigo Duskywing	Erynnis baptisiae	-	-	S4			x							
Orange Bluet Damselfly	Enallagma signatum	-	-	S4									x	
Green Darner Dragonfly	Anax junius	-	-	S5									x	
Western Honey Bee	Apis mellifera	-	-	-									x	
Eastern Common Bumble Bee	Bombus impatiens	-	-	S4S5									x	
Mud Dauber	Chalybion californicum	-	-	-									x	
Black and Yellow Mud Dauber	Sceliphron caementarium	-	-	-									x	
Yellow Jacket	Vespula sp.	-	-	-									x	
Clouded Sulphur Butterfly	Colias philodice	-	-	S5									x	
Red Admiral Butterfly	Vanessa atalanta	-	-	S5									x	
Buckeye Butterfly	Junonia coenia	-	-	SNA									x	
Eastern Carpenter Bee	Xylocopa virginica	-	-	S5									x	
Soldier Beetle	Chauliognathus sp.	-	-	SNR									x	

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c – S-RANK (from NHIC): S1 = Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not applicable ‘because the species is not suitable target for conservation activities’; includes non-native species.

Appendix D

Site Investigation Field Notes

578500 000000

579000 000000

4741000 000000

4740500 000000

4740000 000000

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

Jan 23, 2014
R. Aitken, D. Westerhoff
8:30pm - 1:00pm
T: -3°C cc: 100%
Bs: 2/3 Bw: 0-1

Rainham Rd

VOD

480

480

South Coast Dr

Incidental Obs

RTHA - ..
WTDE - TKS
Coyote - TKS

0 35 70 140 Metres

N
W E
S

1/2

579000.000000
579500.000000
4741000.000000
4740500.000000
4740000.000000

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

Rainham Rd

PP

WOp

PP

SWS

South Coast Dr

0 35 70 140 Metres

N
W E
S

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

579000 000000
579500 000000
4741000 000000
4740500 000000
4740000 000000

Rainham Rd
South Coast Dr

April 27, 2015
R.A., D.W.
9:30am - 4:30pm
T: 10°C
BS: 2/3
BN: 0-1
60% 40%

Ag. RC
Ag. RC
Ag. RC
Ag. RC
Ag. RC
Ag. RC
Ag. RC
Ag. RC
Ag. RC

Incidentals
- RTH(A (F) - Coyote (Tks) - Chipmunk
- WTDC - Bald Eagle (F)

0 35 70 140 Metres
N
W E
S

VJ

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

578500 000000
579000 000000
4741000 000000
4740500 000000
4740000 000000

Rainham Rd
South Coast Dr
Fly Ash Pile
Ag. RC
PC

0 35 70 140 Metres

N
W E
S

2/3

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

578000 000000
578500 000000
4740000 000000
4739500 000000
4739000 000000
4738500 000000

Fly Ash Pile

Coal Storage Yard

Lake Erie

D
(2.0 ha)

E
(29.9 ha)

0 37.5 75 150 Metres

N
W E
S

3/5

214350

ELC Community Description and Classification

Map #: OPG Nanticoke		Polygon: 3	
Surveyor(s): R. A. / D. W.	Date: May 29, 2015	Time start:	5:40 am
		finish:	3:00 pm
UTMZ:	UTMZ: 17	UTMN:	

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☐ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☐ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☒ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☐ Valley Slope	☐ Forb	☐ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☒ Tableland	☐ Lichen	☐ Swamp
☒ Surficial Dep.		☒ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☐ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☐ Natural		☐ Crevice/Cave	☐ Mixed	☒ Meadow
☒ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☒ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☐ Treed		☐ Bluff		☐ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) *(>> Much Greater Than; > Greater Than; = About Equal To)*
1	–	O	–
2	–	O	–
3	–	C	–
4	G	Y	POAPRAT > TRIPRAT > SCLALT1

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:								
		N	<10	N	10-24	N	25-50	N	>50
BA:	Standing Snags:	N	<10	N	10-24	N	25-50	N	>50
	Deadfall / Logs:	N	<10	N	10-24	N	25-50	N	>50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☒ Pioneer ☐ Young ☐ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Mineral Cultural Meadow	Code:	CUM1
Vegetation Type:	Dry-Moist Old Field Meadow	Code:	CUM1-1
Inclusion:	–	Code:	–
Complex:	–	Code:	–

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #							
	UTM	Zone							Moisture Regime
		Easting							
		Northing							
	Slope	Position							
		Aspect							
		Percent							Drainage
		Slope Length							
Depth to...	Mottles								
	Gley								
	Water Table								Effective Texture (indicate below)
	Carbonates								
	Bedrock								
Soil Horizon Description	1	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	2	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
	Moisture Regime								
	Drainage								

Vascular Plant Species List

Project: 214350- Nanticoke
Date: June 17, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
					DACGLOM	O			
					SOLALT1	A			
					PHLEPRAT	O			
					POAPRAT	O			
					SYMNOVA	R			
					FESTUCA SP.				
					DIPFULO	O			
					ARCMINU	R			
					ASCSYR1	O			
					LONCON1	O			
					LUCVULG	R			
					TRIPRAT	A			
					MELALBA	O			
					BROINER	O			
					POTRECT	R			
					TAROFF1	R			
					MEDLUPU	O			
Shrubs/Vines					PLANAJO	R			
VITRIPA	R				SYMLANC	R			
LONTATA	R				AMBTRIF	R			
ROSA	R				CIRVULG	R			
RHUTYPH	R				POTNORV	R			
					LOTCORN	O			
					SONARVE	O			
					PLALANC	O			
					VICCRAC	O			
					ASTNOVA	O			
					CARVULP	R			
					PANACR1	R			

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 3-CUMI-1
Surveyor(s): R.A. / D.W

21435C

ELC Community Description and Classification

Map #: OPG Nanticoke	Polygon: 4		
Surveyor(s): R.A. / D.W.	Date: May 29, 2015	Time start:	9:40 am
		finish:	3:00 pm
UTMZ:	UTMZ:	UTMN:	

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☐ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☐ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☒ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☐ Valley Slope	☐ Forb	☐ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☒ Tableland	☐ Lichen	☐ Swamp
☒ Surficial Dep.		☒ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☐ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☐ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☒ Cultural		☐ Alvar		☒ Prairie
Cover		☐ Rockland		☐ Thicket
☒ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☐ Treed		☐ Bluff		☐ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	–	0	–
2	–	0	–
3	4	3	ANDGER1>SORNUT4
4	6	4	POAPRAT>TRIPRAT

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	N	<10	N	10-24	N	25-50	N	>50
	Standing Snags:	N	<10	N	10-24	N	25-50	N	>50
BA:	Deadfall / Logs:	N	<10	N	10-24	N	25-50	N	>50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: [X] Pioneer [ ] Young [ ] Mid-Age [ ] Mature [ ] Old Growth

Ecosite:	Planted Prairie	Code:	–
Vegetation Type:	–	Code:	–
Inclusion:	–	Code:	–
Complex:	–	Code:	–

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

						Summary
Site Metrics	Pit/Auger #					
	UTM	Zone				Moisture Regime
		Easting				
		Northing				
	Slope	Position				
		Aspect				Drainage
		Percent				
		Slope Length				
Depth to...	Mottles					Effective Texture (indicate below)
	Gley					
	Water Table					
	Carbonates					
	Bedrock					
Soil Horizon Description	1	Depth from zero	% CF	% CF	% CF	% CF
		Texture				
	2	Depth from zero	% CF	% CF	% CF	% CF
		Texture				
	3	Depth from zero	% CF	% CF	% CF	% CF
		Texture				
	4	Depth from zero	% CF	% CF	% CF	% CF
		Texture				
		% Surface Stone/Rock				
	Moisture Regime					
	Drainage					

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: May 19, 2015, June 17, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
					SOLALTI	A			
					DIFFUS	O			
					TRIPRAT	A			
					TAROFFI	R			
					COCKLEBURR	R			
					SORNUTA	O			
					ANDGERA	A			
					LESCAPI	O			
					FRAVIRG	O			
					POAPRAT	A			
					CORLANC	O			
					Jewelweed	O			
					Prairie Dock	O			
					PENDIGI	O			
					LOTCORN	O			
					MEDLUPU	R			
					MELALBA	O			
Shrubs/Vines					MELOFFI	O			
					PENHIRS	R			
					See 2012 Plant List				

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 4 - Planted Prairie
Surveyor(s): R.A. / D.W

Vascular Plant Species List

Project: 21435O - Nanticoke
Date: June 17, 2015

BEACON ENVIRONMENTAL

Incidental Wildlife Observations/Comments/General Notes:
- BOB Q
- CAGO

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 4 - Planted Prairie
Surveyor(s): R.A. / D.W

214350

ELC Community Description and Classification

Map #: OPG - Nantiocke	Polygon: 5	
Surveyor(s): R.A.	Date: June 19, 2015	Time start: 5:50pm finish: 2:00pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒Terrestrial ☐Wetland ☐Aquatic	☐Organic ☒Mineral Soil ☐Parent Min. ☐Acidic Bedrk ☐Basic Bedrk ☐Carb. Bedrk	☐Lacustrine ☐Riverine ☐Bottomland ☐Terrace ☐Valley Slope ☒Tableland ☒Roll. Upland ☐Cliff ☐Talus ☐Crevice/Cave ☐Alvar ☐Rockland ☐Beach / Bar ☐Sand Dune ☐Bluff	☐Plankton ☐Submerged ☐Floating-LVD. ☐Graminoid ☐Forb ☐Lichen ☐Bryophyte ☒Deciduous ☐Coniferous ☐Mixed	☐Lake ☐Pond ☐River ☐Stream ☐Marsh ☐Swamp ☐Fen ☐Bog ☐Barren ☐Meadow ☐Prairie ☒Thicket ☐Savannah ☐Woodland ☐Forest ☐Plantation
Site ☐Open Water ☐Shallow Water ☒Surficial Dep. ☐Bedrock				
History ☐Natural ☒Cultural				
Cover ☐Open ☒Shrub ☐Treed				

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	–	0	–
2	2	2	FRAAMER > POPDELT
3	3	4	CRAT. SP. >> CORRACE
4	6	2	PRUPRAT = SOLALTI = BRONER

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	A <10	A 10-24	R 25-50	N >50
	Standing Snags:	R <10	R 10-24	R 25-50	N >50
BA:	Deadfall / Logs:	R <10	R 10-24	N 25-50	N >50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☒ Young ☐ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Mineral Cultural Thicket	Code:	CUT1
Vegetation Type:	Hawthorn Mineral Cultural Thicket	Code:	CUT1
Inclusion:	–	Code:	–
Complex:	–	Code:	–

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

							Summary
Site Metrics		Pit/Auger #					
	UTM	Zone					Moisture Regime
		Easting					
		Northing					
	Slope	Position					
		Aspect					Drainage
		Percent					
		Slope Length					
Depth to...		Mottles					Effective Texture (indicate below)
		Gley					
		Water Table					
		Carbonates					
		Bedrock					

Soil Horizon Description										
	1	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	2	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	3	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	4	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
		% Surface Stone/Rock								
	Moisture Regime									
	Drainage									

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: June 17, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
MALPUMI		O			SOLALTI				O
CRAT SP.		A			POAPRAT				O
FRAAMER	O	O			BROINER				O
TILAMER	R	O			POPDELT				R
RHACATH		C	O		SYMLANC				R
ULMAMER	R	R			TAROFFI				R
ACESACC	R	R			ALIPETI				O
CARCVA	R	R			FRAVIRG				R
POPDELT	R	R			POAPRAT				R
					CIRVULG				R
					CHLINTY				R
					SONARVE				R
					TRIPRAT				
Shrubs/Vines									
VITRIPA		O	O						
PARINSE		O	O						
CORRACE			O						
ECHLOBA			R	R					
RUBIDAE			R						
LONTATI			R						

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: S - CUT-A / Thicket Hedge
Surveyor(s): R.A. / D.W.

214350

ELC Community Description and Classification

Map #: OPG Nantcoke	Polygon: 6		
Surveyor(s): R. A.	Date: June 17, 2015	Time start: 5:50 am	finish: 2:00 pm
UTMZ:	UTMZ:	UTMN:	

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒Terrestrial	☐Organic	☐Lacustrine	☐Plankton	☐Lake
☐Wetland	☒Mineral Soil	☐Riverine	☐Submerged	☐Pond
☐Aquatic	☐Parent Min.	☐Bottomland	☐Floating-LVD.	☐River
Site	☐Acidic Bedrk	☐Terrace	☒Graminoid	☐Stream
☐Open Water	☐Basic Bedrk	☐Valley Slope	☐Forb	☐Marsh
☐Shallow Water	☐Carb. Bedrk	☒Tableland	☐Lichen	☐Swamp
☒Surficial Dep.		☒Roll. Upland	☐Bryophyte	☐Fen
☐Bedrock		☐Cliff	☐Deciduous	☐Bog
History		☐Talus	☐Coniferous	☐Barren
☐Natural		☐Crevice/Cave	☐Mixed	☐Meadow
☒Cultural		☐Alvar		☐Prairie
Cover		☐Rockland		☐Thicket
☒Open		☐Beach / Bar		☐Savannah
☐Shrub		☐Sand Dune		☐Woodland
☒Treed		☐Bluff		☐Forest
				☐Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	4	POPDELT >> ACCFRAE
2	2	3	POPDELT >> ACCFRAE
3	3	3	CRATSP. >> CORRACE
4	6	3	SALALT1 = POPBAT

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	R	R	R	N
BA:	Deadfall / Logs:	R	R	R	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☒ Young ☒ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:		Code:	
Vegetation Type:	Cottonwood Deciduous Hedgerow	Code:	DH.
Inclusion:		Code:	
Complex:		Code:	

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #							
	UTM	Zone							Moisture Regime
		Easting							
		Northing							
	Slope	Position							
		Aspect							Drainage
		Percent							
		Slope Length							
Depth to...		Mottles							
		Gley							Effective Texture (indicate below)
		Water Table							
		Carbonates							
		Bedrock							
Soil Horizon Description	1	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	2	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
		Moisture Regime							
		Drainage							

Vascular Plant Species List

Project: 21435C - OPG Nanticoke
Date: May 19, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
CAROVAT	R	R			TAROFFI				O
FRAPENN	O	O			SOLALTI				A
ACESACC	R	R			GERMACU				O
ACEFRGE	O	O			SYMLANC				O
POPDELT	D	D			FRAVIRG				C
CRAT SP.			O		SYMNOVA				O
					PHAARUN				R
					knapweed sp				O
					POAPRAT				O
					DIPFWLO				R
					DAUCARR				O
					BROINER				O
					CHLINTH				R
					ASCSYRI				R
					ACHMILL				R
					CIRVULG				R
					SONARVE				O
Shrubs/Vines					CORCORN				R
CORRACE			A		MELALBA				R
VITRIPA			O		TRIPRAT				
LONTATI			O						
Thicket Creeper			O						
RUBIDAE			O						
RIBAMER			O						
ECHLOBA			R	R					

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 6 - Deciduous Hedgerow
Surveyor(s): I.B.A. / D.W.

214350

ELC Community Description and Classification

Map #: OPG Manitoke	Polygon: 7	
Surveyor(s): D.W.	Date: June 23, 2015	Time start: 9:45 am / finish: 9:30 am
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☐ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☐ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☐ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☐ Valley Slope	☐ Forb	☐ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☒ Tableland	☐ Lichen	☐ Swamp
☒ Surficial Dep.		☐ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☒ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☐ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☒ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☐ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☒ Woodland
☒ Treed		☐ Bluff		☐ Forest
				☒ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	4	ACESACC > FRAPENN = POPDELT
2	-	0	-
3	3/4	4	LONTATI > ROSMULT
4	4/5	4	SOLALTI > SYMNOVA > CARSPIC > Grasses

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
		O	A	O	N
	Standing Snags:	N	N	N	N
BA:	Deadfall / Logs:	N	N	N	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age:	☐ Pioneer	☒ Young	☒ Mid-Age	☐ Mature	☐ Old Growth

Ecosite:	Mineral Cultural Woodland	Code:	CUW1
Vegetation Type:	-	Code:	-
Inclusion:	-	Code:	-
Complex:	-	Code:	-

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #							
	UTM	Zone							Moisture Regime
		Easting							
		Northing							
	Slope	Position							
		Aspect							Drainage
		Percent							
		Slope Length							
Depth to...		Mottles							
		Gley							Effective Texture (indicate below)
		Water Table							
		Carbonates							
		Bedrock							
Soil Horizon Description	1	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	2	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
		Moisture Regime							
		Drainage							

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: May 19, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
ACESACI	A				SOLALTI				A
FRAPENN	A				CARSPIC				O
POPDELT	A				ROAPRAT				O
THUOCC		R			GLEHEDE				O
PINSTRO	R				FRAVIRG				O
ROBPSEU	O				ASTNOVA				O
PICABIE	O				GALMOLU				O
					DAUCARO				R
					LOLIUM/ELYMUS				O
					ERIANNU				R
					ALLPETI				O
					AGRGIGA				O
					BROINN				O
Shrubs/Vines									
RHUTYPH		R							
CORFOEM		O	O						
VIBOPUL			O						
LIGVULG			R						
ROSEMULT			O						
RUBOCCI			O						
CONTATA		A	O						

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 7-CUWI
Surveyor(s): D.W/R.A.

214350

ELC Community Description and Classification

Map #: OPG Nanticoke	Polygon: 8	
Surveyor(s): R. A.	Date: June 17, 2015	Time start: 5:50 pm / finish: 2:00 pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒Terrestrial	☐Organic	☐Lacustrine	☐Plankton	☐Lake
☐Wetland	☒Mineral Soil	☐Riverine	☐Submerged	☐Pond
☐Aquatic	☐Parent Min.	☐Bottomland	☐Floating-LVD.	☐River
Site	☐Acidic Bedrk	☐Terrace	☐Graminoid	☐Stream
☐Open Water	☐Basic Bedrk	☐Valley Slope	☐Forb	☐Marsh
☐Shallow Water	☐Carb. Bedrk	☒Tableland	☐Lichen	☐Swamp
☒Surficial Dep.		☐Roll. Upland	☐Bryophyte	☐Fen
☐Bedrock		☐Cliff	☒Deciduous	☐Bog
History		☐Talus	☐Coniferous	☐Barren
☒Natural		☐Crevice/Cave	☐Mixed	☐Meadow
☐Cultural		☐Alvar		☐Prairie
Cover		☐Rockland		☐Thicket
☐Open		☐Beach / Bar		☐Savannah
☐Shrub		☐Sand Dune		☐Woodland
☒Treed		☐Bluff		☒Forest
				☐Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	4	FRAAMER> FAGGRAN > QUERUBR = CAROVAT
2	2	3	FRAAMER > FAGGRAN > CAROVAT > ACESACC
3	3	3	FAGGRAN >> OSTVIRG = CAROVAT
4	7	2	FAGGRAN > Rosebery > GERMACU

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	O	A	A	O
BA:	Deadfall / Logs:	O	O	O	R
		O	O	O	R

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age:	Pioneer	Young	Mid-Age	Mature	Old Growth
			X		

Ecosite:	Dry-Fresh Deciduous Forest	Code:	FOD4
Vegetation Type:	Dry-Fresh White Ash Deciduous Forest	Code:	FOD4-2
Inclusion:		Code:	
Complex:	Dry-Fresh Beech Deciduous Forest	Code:	FOD4-1

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

							Summary
Site Metrics		Pit/Auger #					
	UTM	Zone					Moisture Regime
		Easting					
		Northing					
	Slope	Position					
		Aspect					Drainage
		Percent					
		Slope Length					
Depth to...		Mottles					
		Gley					Effective Texture (indicate below)
		Water Table					
		Carbonates					
		Bedrock					

Soil Horizon Description										
	1	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	2	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	3	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
	4	Depth from zero		% CF		% CF		% CF		% CF
		Texture								
		% Surface Stone/Rock								
		Moisture Regime								
		Drainage								

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: May 12, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy (Ground)	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
CARCVAT	D	C	A	C	GERMACA	O			
FRAAMER	O	O	R	O	EUPCBCV	R			
OSTVIRG		O	R		VIEPAPI	R			
Blue Beech		R	R		CARBOIC	O			
QUERUBR	O	O	R	R	CARBLAND	O			
TILAMER	O	R	R	R	ERYAMER	O			
ACESACC	R	R		R	CLAVIRG	R			
FAGGRAN	A	A		A	ARITRIP	R			
TSUCANA	R				ALAPETI	O			
QUEMACR	O				CARGRAC	O			
					CIRLUTI				
					Trillium	O			
					QUESENS	O			
					DRYCART	O			
					FRAVIRG	O			
					PREALBA	R			
					CARSPRE	R			
Shrubs/Vines					GLYSTRI	O			
RUBIDAC				R	SYNCORD	O			
PRUSER			O		AMBTRIF	R			
ROSA RULT.			O		GERROB	O			
Barberry			A	O	OXAEURO	O			
RIBAMER				R	IMPCAPE	R			
RIBCYNO				R	GEUALB	R			
RHACATH				R	PLAMAJO	R			
VIBACER				R	TAROFFI	R			
LONTATA			R		ARCMINU	R			
					WhiteLettuce	R			
					POPDELT	O			

Polygon: B - FOD4-1 / FOD4-2
Surveyor(s): R.A. / D.W.

D = Dominant, A= Abundant, O = Occasional, R = Rare

Vascular Plant Species List

Project: 21435O - Nantucket
Date: June 17, 2015

BEACON ENVIRONMENTAL

Incidental Wildlife Observations/Comments/General Notes:
-WAVI
-RLWBL
-TREES
-SASP
-BARS F
-BAOR
-WAVI
-SOSP
-AMGO
-AMCR
-YEWA
-WITU
-WIFL
-FISP
-YBSS
-RBGR
-GCFC
-WOTH
-HOWR
-EAVO
-BRTH
-GRCA
-SPSA
-BHCO
-BLJA
-RBWO
-NOFL

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 8 - FOD4-1/FOD4-2
Surveyor(s): R. Aitken

214350 - OPG Nanticoke

ELC Community Description and Classification

Map #:		Polygon: 9	
Surveyor(s): R A.	Date: June 17, 2015	Time start:	9:30 am
		finish:	2:00 pm
UTMZ:	UTMZ:	UTMN:	

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒Terrestrial	☐Organic	☐Lacustrine	☐Plankton	☐Lake
☐Wetland	☒Mineral Soil	☐Riverine	☐Submerged	☐Pond
☐Aquatic	☐Parent Min.	☐Bottomland	☐Floating-LVD.	☐River
Site	☐Acidic Bedrk	☐Terrace	☐Graminoid	☐Stream
☐Open Water	☐Basic Bedrk	☐Valley Slope	☐Forb	☐Marsh
☐Shallow Water	☐Carb. Bedrk	☒Tableland	☐Lichen	☐Swamp
☒Surficial Dep.		☐Roll. Upland	☐Bryophyte	☐Fen
☐Bedrock		☐Cliff	☒Deciduous	☐Bog
History		☐Talus	☐Coniferous	☐Barren
☒Natural		☐Crevice/Cave	☐Mixed	☐Meadow
☒Cultural		☐Alvar		☐Prairie
Cover		☐Rockland		☐Thicket
☐Open		☐Beach / Bar		☐Savannah
☒Shrub		☐Sand Dune		☒Woodland
☒Treed		☐Bluff		☒Forest
				☐Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) *(>> Much Greater Than; > Greater Than; = About Equal To)*
1	–	O	–
2	2	4	FRAAMER
3	3	4	CRAT SP.
4	7	2	ALIPETI = ROSMULT

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	R	R	R	N
BA:	Deadfall / Logs:	R	R	R	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☒ Young ☐ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Dry-Fresh Deciduous Forest	**Code:**	FOD4
Vegetation Type:	Dry-Fresh White Ash Deciduous Forest	**Code:**	FOD4-2
Inclusion:	–	**Code:**	–
Complex:	–	**Code:**	–

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #							
	UTM	Zone							Moisture Regime
		Easting							
		Northing							
	Slope	Position							
		Aspect							Drainage
		Percent							
		Slope Length							
Depth to...		Mottles							
		Gley							Effective Texture (indicate below)
		Water Table							
		Carbonates							
		Bedrock							
Soil Horizon Description	1	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	2	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
		Moisture Regime							
		Drainage							

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: June 17, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
FRAAMER		D			TAROFFI				R
CRAT. SP.			D		GEUALAP				O
					ALIPETI				O
					JNP				R
					PODPELT				O
					CARRADI				R
					SOLALTI				R
Shrubs/Vines									
VITRIPA		O	O	O					
PARINSE				A					
RUBIDAE				O					
ROSMULT				O					
RHACATH			O	O					

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 8 - FOD4-2
Surveyor(s): R.A. / D.W.

214350

ELC Community Description and Classification

Map #: OPG Nanticoke	Polygon: 10	
Surveyor(s): R. A.	Date: June 17 2015	Time start: 8:30 am / finish: 2:00 pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☐ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☒ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☒ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☒ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☒ Valley Slope	☐ Forb	☒ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☐ Tableland	☐ Lichen	☐ Swamp
☒ Surficial Dep.		☐ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☐ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☒ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☐ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☒ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☐ Treed		☐ Bluff		☐ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	3	1	FRAPENN
2	-	0	-
3	4	1	CORRACE = CORSERI
4	5	4	CAREX SP. > AGROSTIS SP. > SYMLANC

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:		<10	10-24	25-50	>50
	Standing Snags:	R	<10	N	N	N	N	>50
BA:	Deadfall / Logs:	R	<10	N	N	N	N	>50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age:	☐ Pioneer	☒ Young	☐ Mid-Age	☐ Mature	☐ Old Growth

Ecosite:	Mineral Meadow Marsh	Code:	MAM2
Vegetation Type:	Narrow-leaved Sedge Mineral Meadow Marsh	Code:	MAM2-5
Inclusion:	-	Code:	-
Complex:	Forb Mineral Meadow Marsh	Code:	MAM2-10

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #	1						
	UTM	Zone	17T						Moisture Regime
		Easting	0579189						
		Northing	4740625						
	Slope	Position	Bottomland						
		Aspect	Flat						Drainage
		Percent	N/A						
		Slope Length	N/A						
Depth to...	Mottles		35cm						Effective Texture (indicate below)
	Gley		35cm						
	Water Table		N/A						
	Carbonates		N/A						
	Bedrock		N/A						
Soil Horizon Description	1	Depth from zero	35	% CF 0		% CF		% CF	% CF
		Texture	S.CL						
	2	Depth from zero	35+	% CF 0		% CF		% CF	% CF
		Texture	CL						
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
	Moisture Regime		Moist (5)						
	Drainage		I/P						

Vascular Plant Species List

Project: 214350 - OPG Nanticoke
Date: 23 June 15

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
FRAPENN	R		R	R	CARVULP				
SALXRUBE	R				EPIHIRS				
POPDELT	R				CARSTIP				
					ASTLAE				
					VERHAST				
					MENARVE				
					GEUALL				
					LEEORYZ				
					CICMACU				
					AGRGIGA				
					TYPLATI				
					DIPFULL				
					SOLALTI				
					MENARVE				
					GUNCWS				
					SCIATRU				
					GEUCANA				
Shrubs/Vines					CARCRIN				
CORSTOL			R		MORJUBA				
CRAT		R			GLYSTRI				
CORFOEM			R		PHAARUN				
SALEXIG			R		ELEERYT				
CORRACE			R		JUNEFFU				
					ASCINCA				
					EQUARUF				
					GLYSTRI				
					ASTNOVA				
					LYSCILI				
					ELEREPE				
					BARVULG				
					RHURAMD				
					ALOPRAT				
					TRIPRAT				

Polygon: 10 - MAM2-5/MAM2-6
Surveyor(s): DW/RA

D = Dominant, A= Abundant, O = Occasional, R = Rare

214350

ELC Community Description and Classification

Map #: OPG Nanticoke	Polygon: 11	
Surveyor(s): DW	Date: June 23, 2021	Time start: 4:45pm finish: 10:30pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☐Terrestrial ☒Wetland ☐Aquatic	☐Organic ☒Mineral Soil ☐Parent Min. ☐Acidic Bedrk ☐Basic Bedrk ☐Carb. Bedrk	☐Lacustrine ☐Riverine ☒Bottomland ☐Terrace ☐Valley Slope ☐Tableland ☐Roll. Upland ☐Cliff ☐Talus ☐Crevice/Cave ☐Alvar ☐Rockland ☐Beach / Bar ☐Sand Dune ☐Bluff	☐Plankton ☐Submerged ☐Floating-LVD. ☒Graminoid ☐Forb ☐Lichen ☐Bryophyte ☐Deciduous ☐Coniferous ☐Mixed	☐Lake ☐Pond ☐River ☐Stream ☒Marsh ☐Swamp ☐Fen ☐Bog ☐Barren ☒Meadow ☐Prairie ☐Thicket ☐Savannah ☐Woodland ☐Forest ☐Plantation

Site: ☐Open Water ☐Shallow Water ☒Surficial Dep. ☐Bedrock

History: ☒Natural ☐Cultural

Cover: ☒Open ☐Shrub ☐Treed

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	3	2	FRAPENN
2	–	0	–
3	4	1	CARRACE
4	4	4	EPILHIRS > AGROSTIS > CARBEBBI

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m

CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	N	N	N	N
BA:	Deadfall / Logs:	N	N	N	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☒ Young ☐ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Mineral Meadow Marsh	Code:	MAM2
Vegetation Type:	Forb Mineral Meadow Marsh	Code:	MAM2-10
Inclusion:	–	Code:	–
Complex:	–	Code:	–

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

										Summary
Site Metrics		Pit/Auger #	1							
	UTM	Zone	17T							Moisture Regime
		Easting	0579075							
		Northing	4740010							
	Slope	Position	Lowland							
		Aspect	Flat							Drainage
		Percent	N/A							
		Slope Length	N/A							
Depth to...		Mottles	20cm							Effective Texture (indicate below)
		Gley	N/A							
		Water Table	N/A							
		Carbonates	N/A							
		Bedrock	N/A							

Soil Horizon Description											
	1	Depth from zero	20+	% CF 0		% CF		% CF		% CF	
		Texture	S. C l								
	2	Depth from zero		% CF		% CF		% CF		% CF	
		Texture									
	3	Depth from zero		% CF		% CF		% CF		% CF	
		Texture									
	4	Depth from zero		% CF		% CF		% CF		% CF	
		Texture									
		% Surface Stone/Rock									
	Moisture Regime		Very Moist (6)								
	Drainage		P/I								

Vascular Plant Species List

Project: 21435O-OPG Nanticoke
Date: Jun 23 2025

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
KRAPENN	R				EPIHIRS				A
					ASTLANC				A
					PHRAUST				O
					TYPLATI				O
					SCIATRO				O
					SONARVE				O
					LYTSALI				O
					SOLALTI				O
					IMPCAPE				O
					CARBEBB				O
					CARVULP				O
					AGRSTOL				A
					AGROGA				A
					LEEORYZ				O
Shrubs/Vines									

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 11-MAM2-10
Surveyor(s): D.W./B.A.

214350

ELC Community Description and Classification

Map #: OPG Nantyrocks	Polygon: 12	
Surveyor(s): R A.	Date: June 17, 2015	Time start: 5:50 am / finish: 2:00 pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☐ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☒ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☒ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☒ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☐ Valley Slope	☐ Forb	☒ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☐ Tableland	☐ Lichen	☐ Swamp
☒ Surficial Dep.		☐ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☐ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☒ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☒ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☒ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☐ Treed		☐ Bluff		☐ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	–	O	–
2	–	O	–
3	–	O	–
4	4	4	TYPLAT1

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	N <10	N 10-24	N 25-50	N >50
	Standing Snags:	N <10	N 10-24	N 25-50	N >50
BA:	Deadfall / Logs:	N <10	N 10-24	N 25-50	N >50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age:	☐ Pioneer	☒ Young	☐ Mid-Age	☐ Mature	☐ Old Growth

Ecosite:	Mineral Shallow Marsh	Code:	MAS2
Vegetation Type:	Cattail Mineral Shallow Marsh	Code:	MAS2-1
Inclusion:		Code:	
Complex:		Code:	

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

			Pit/Auger #	1			Summary
Site Metrics	UTM		Zone	17T			Moisture Regime
			Easting				
			Northing				
	Slope		Position	Bottomland			
			Aspect	Flat			Drainage
			Percent	N/A			
			Slope Length	N/A			
Depth to...			Mottles	–			
			Gley	–			Effective Texture (indicate below)
			Water Table	At Surface			
			Carbonates	=			
			Bedrock	=			
Soil Horizon Description	1		Depth from zero	5	% CF O	% CF	% CF % CF
			Texture	On			
	2		Depth from zero	5+	% CF O	% CF	% CF % CF
			Texture	Cl			
	3		Depth from zero		% CF	% CF	% CF % CF
			Texture				
	4		Depth from zero		% CF	% CF	% CF % CF
			Texture				
			% Surface Stone/Rock				
			Moisture Regime	Very Moist (6)			
			Drainage	P/T			

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: _____

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
					TYPLAT,				
					LEMMINO				
Shrubs/Vines									

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 12 - MAS2-1
Surveyor(s): D.W. / B.A

214350

ELC Community Description and Classification

Map #: OPG Nantiroke	Polygon: 13		
Surveyor(s): R. A.	Date: May 29, 2018	Time start: 5:40	finish: 3:00
UTMZ:	UTMZ:	UTMN:	

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☒ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☒ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☒ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☐ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☒ Valley Slope	☐ Forb	☐ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☐ Tableland	☐ Lichen	☒ Swamp
☒ Surficial Dep.		☐ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☒ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☒ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☐ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☐ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☒ Treed		☐ Bluff		☒ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	4	FRAPENN >> QUEMACR
2	2	3	FRAPENN > CAROVAT > TILAMER
3	3	3	FRAPENN > TILAMER
4	7	4	RUBPUBC = RIBAMCR - ONOSENS > IMPCAPE

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	O	O	O	N
BA:	Deadfall / Logs:	O	O	O	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☐ Young ☒ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Ash Mineral Deciduous Swamp	Code:	SWD2
Vegetation Type:	Green Ash Mineral Deciduous Swamp	Code:	SWD2-2
Inclusion:	—	Code:	—
Complex:	—	Code:	—

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

									Summary
Site Metrics		Pit/Auger #	1						
	UTM	Zone	17T						Moisture Regime
		Easting	0579486						
		Northing	4740750						
	Slope	Position	lowland						
		Aspect	Flat						Drainage
		Percent	N/A						
		Slope Length	N/A						
Depth to...	Mottles		19cm						
	Gley		19cm						Effective Texture (indicate below)
	Water Table		N/A						
	Carbonates		N/A						
	Bedrock		N/A						
Soil Horizon Description	1	Depth from zero	19	% CF O		% CF		% CF	% CF
		Texture	SiCl						
	2	Depth from zero	19+	% CF O		% CF		% CF	% CF
		Texture	Clay						
	3	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
	4	Depth from zero		% CF		% CF		% CF	% CF
		Texture							
		% Surface Stone/Rock							
	Moisture Regime		Moist (5)						
	Drainage		I/P						

Vascular Plant Species List

Project: 21435O-OPG Nantroke
Date: 23 Jun 15

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
FRAPENN	D				EPIHIRS				O
POPDELT	R				ASTLANC				O
					SOLALTI				O
					IMPCAPE				C
					SCIATRI				R
					LEEORYZ				O
					CARVULP				R
					POAPALU				O
					HERMAXI				R
Shrubs/Vines									
CORFOEM									
ROSMULT									
RUBOCCI									
RHACATH									

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 13 - SWD22
Surveyor(s): D.W / R.A

Vascular Plant Species List

Project: 21435O - OPG Nanticoke
Date: _____

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
FRAPENN	D			O	GEUALAP				O
CARCUAT		O	O		FRAVESE				R
Blue Beech		O			GLYSTRI				O
FAGGRAN		R			SOLALTI				C
ULMAMER		R			IMPCARE				O
QUEMACR	R	R			JNP				R
					ONOSENS				O
					DRYCART				R
					LYSCILI				R
					MATSTRU				O
					RUBIDAC				R
					CARGRAC				R
					Turtlehead				R
Shrubs/Vines									
ROSMULT				R					
Bonebreck				R					
RUBPUBE				A					
RHACATH				R					
RIBAMER				O					
RARINSE									

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 1B-SWD2, 2
Surveyor(s): R.A. / D.W.

214350

ELC Community Description and Classification

Map #: OPG Nantricoke	Polygon: 14	
Surveyor(s): R.A.	Date: June 17 2015	Time start: 5:30 pm / finish: 9:00 pm
UTMZ:	UTMZ:	UTMN:

Polygon Description

System	Substrate	Topographic Feature	Plant Form	Community
☐ Terrestrial	☐ Organic	☐ Lacustrine	☐ Plankton	☐ Lake
☒ Wetland	☒ Mineral Soil	☐ Riverine	☐ Submerged	☐ Pond
☐ Aquatic	☐ Parent Min.	☒ Bottomland	☐ Floating-LVD.	☐ River
Site	☐ Acidic Bedrk	☐ Terrace	☐ Graminoid	☐ Stream
☐ Open Water	☐ Basic Bedrk	☐ Valley Slope	☐ Forb	☐ Marsh
☐ Shallow Water	☐ Carb. Bedrk	☐ Tableland	☐ Lichen	☒ Swamp
☒ Surficial Dep.		☐ Roll. Upland	☐ Bryophyte	☐ Fen
☐ Bedrock		☐ Cliff	☒ Deciduous	☐ Bog
History		☐ Talus	☐ Coniferous	☐ Barren
☒ Natural		☐ Crevice/Cave	☐ Mixed	☐ Meadow
☐ Cultural		☐ Alvar		☐ Prairie
Cover		☐ Rockland		☐ Thicket
☐ Open		☐ Beach / Bar		☐ Savannah
☐ Shrub		☐ Sand Dune		☐ Woodland
☒ Treed		☐ Bluff		☐ Forest
				☐ Plantation

Stand Description

Layer	HT	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	4	ACERXFREE>FRAPENN>>POPDEL
2	-	0	-
3	4	4	FRAPENN>CORRACE>LONTAT
4	5	4	Grasses

HT Codes: 7 <0.2m 6 >0.2-0.5m 5 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m
CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	<10	10-24	25-50	>50
	Standing Snags:	R	N	N	N
BA:	Deadfall / Logs:	R	R	N	N

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age: ☐ Pioneer ☐ Young ☒ Mid-Age ☐ Mature ☐ Old Growth

Ecosite:	Maple Mineral Deciduous Swamp	Code:	SWD3
Vegetation Type:	Silver Maple Mineral Deciduous Swamp	Code:	SWD3-2
Inclusion:	-	Code:	-
Complex:	-	Code:	-

Community Profile Diagram/Comments

Notes:

Tree Tally by Species

Prism Factor: 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
Total						100
Basal Area (BA)						
Dead						

Soils Ontario and ELC Soils Description

						Summary
Site Metrics	Pit/Auger #		1			
	UTM	Zone	17T			Moisture Regime
		Easting	0579226			
		Northing	4739989			
	Slope	Position	Lowland			
		Aspect	Flat			Drainage
		Percent	N/A			
		Slope Length	N/A			
Depth to...	Mottles		20cm			
	Gley		N/A			Effective Texture (indicate below)
	Water Table		N/A			
	Carbonates		N/A			
	Bedrock		N/A			

Soil Horizon Description									
	1	Depth from zero	20+	% CF 0	% CF	% CF	% CF	% CF	
		Texture	S.C.L						
	2	Depth from zero		% CF	% CF	% CF	% CF	% CF	
		Texture							
	3	Depth from zero		% CF	% CF	% CF	% CF	% CF	
		Texture							
	4	Depth from zero		% CF	% CF	% CF	% CF	% CF	
		Texture							
		% Surface Stone/Rock							
	Moisture Regime		Very Moist (6)						
	Drainage		P/I						

Vascular Plant Species List

Project: 214350 - OPG Nanticoke
Date: May 12, 2015

BEACON ENVIRONMENTAL

Species	Abundance/Layer				Species	Abundance/Layer			
	Canopy	Sub-canopy	Understory	Groundlayer		Canopy	Sub-canopy	Understory	Groundlayer
Trees					**Herbaceous Vegetation**				
ACEFREE	D				CARUULP				O
POPDELT	O				LYTSALI				O
FRAPENN	A				FRANIG				R
					GEUALE				R
					AGROSTIS				O
					CARBEBB				O
					ASTPUNI				O
					PHAARUN				O
					ASTLANC				O
					IMPCAPE				O
					GRASS				D
Shrubs/Vines									
ROSPALU			R						
CRATSP		R							
LONTATA			R						
CORFOEM			O						

D = Dominant, A= Abundant, O = Occasional, R = Rare

Polygon: 14-SWD3-2
Surveyor(s): D. W. / R. A.

579000 000000

579500 000000

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

May 28, 2015
5:40am - 10:32am
T: 13°C BS: 1/2
BN: 1/2 CC: 40%

Other / Flyover
Deer RBGU
GBHE American Toad
CAGO BAEA
AMCR
TUTU
MODO

4741000 000000

Rainham Rd

4740500 000000

4740000 000000

South Coast Dr

① 7:10am - 7:20
② 7:23am - 7:33am
③ 9:02am - 9:12am

0 35 70 140 Metres

N
W E
S

579000 000000

579500 000000

1/3

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

578500 000000
579000 000000
4741000 000000
4740500 000000
4740000 000000

Rainham Rd
South Coast Dr

0 35 70 140 Metres

N
W E
S

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

578000 000000
578500 000000
4740000 000000
4739500 000000
4739000 000000
4738500 000000

May 28, 2015
9:29am - 9:55am

Flyover (Other BAEA (2/3rd year) BARS)

MADO WIFL RWBL BHCO NOCA RWBL CAKE ANRA RWBL

D
(2.0 ha)

CAGO

ANRA

KILL

E
(29.9 ha)

KILL

PSA

0 37.5 75 150 Metres

N
W E
S

3/3

579000 579500

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

June 17, 2015
R. Arthur
S: 9am - 9:55am
Tk SC BS: 1/2
OC: 80% BN: 0/1

Flyovers / Other
- RBGU
- Deer
- Coyote
- Eastern Cottontail
- Racer
- GACO
- Viceroy

4741000

Rainham Rd

4740500

South Coast Dr

4740000

1 - 7:45am - 7:55am
2 - 7:59 - 8:09 am
3 - 9:38 - 9:48 am

0 35 70 140 Metres

N W E S

579000 579500

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

8:30 - 9:29 am
June 17, 2015
R. Aitken
T: 20°C BS: 2/3
BN: 0/1 CC: 30%

Others / Flyovers
- BARS
- GBHE
- TUVU
- BOBO

578500
579000
4741000
4740500
4740000

Robinham Rd
South Coast Dr

0 35 70 140 Metres

N
W E
S

578000 578500

4740000 4740000

Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH

June 17, 2015
10:30am - 11:15am
R. Aitken

1-CUMI-1 w CUT Incl.

Flyovers/Other
- BARS

RWBB GRCA RWBB WIFL RWBB SOSP RWBB INBW YEWA YEWA RWBB

D
(2.0 ha)

E
(29.9 ha)

4739500 4739500

4739000 4739000

4738500 4738500

578000 578500

0 37.5 75 150 Metres

N
W E
S

578000 579000 580000

4741000

Project #: 214350
Project Name: Nanticoke
Project Manager: BH

June 2, 2015
R. Aitken, J. Davey
8:00pm - 10:50pm
T: 17°C CC: 0%
BS: 1 BIV: 0-1

#4
#1
#3
#2
#5
#6
#7

Nanticoke 2
(39.9 ha)

4740000

0 75 150 300 Metres

N
W E
S

578000 579000 580000


Project #: 214350
Project Name: OPG Nanticoke
Project Manager: LW/BH
578000
578500
4740000
4739500
4739000
4738500
D
(2.0 ha)
E
(29.9 ha)
0 37.5 75 150 Metres
N
W
E
S

Amphibian Data Form

BEACON ENVIRONMENTAL

Visit Information

Project Name: Nanticoke
Project #: 214350
Observer Name: DW, JD
Visit #: 1
Date: Apr 15 2016
Cloud Cover (%): 0
Temperature (°C): 11
Beaufort Wind Scale (0-6): 2
Precipitation (check one): ☐ None/Dry ☐Damp/Haze/Fog ☐ Drizzle ☐Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted.

Code 2: Some calls simultaneous, number of individuals can be reliably estimated.

Code 3: Full chorus, call continuous and overlapping, number of individuals cannot be reliably estimated.

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

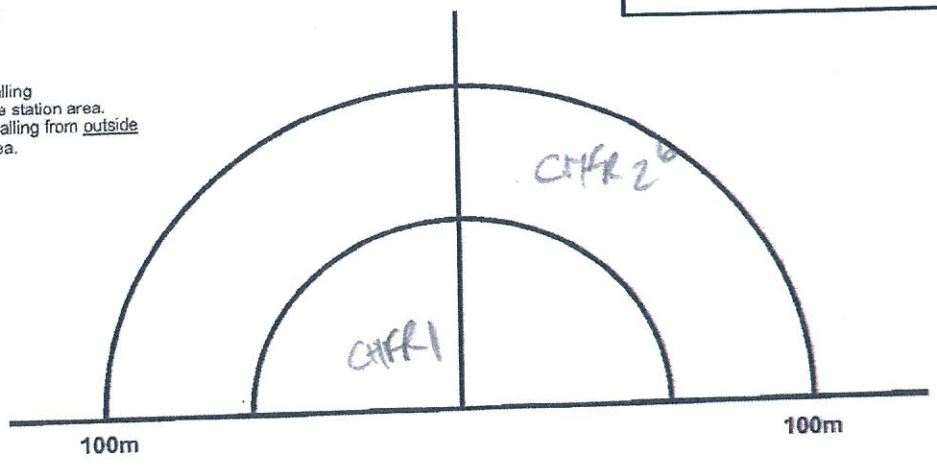
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 1

Station Start Time (24 hr): 20:30

Background Noise Code (1-4): 1

GPS Coordinates: _____

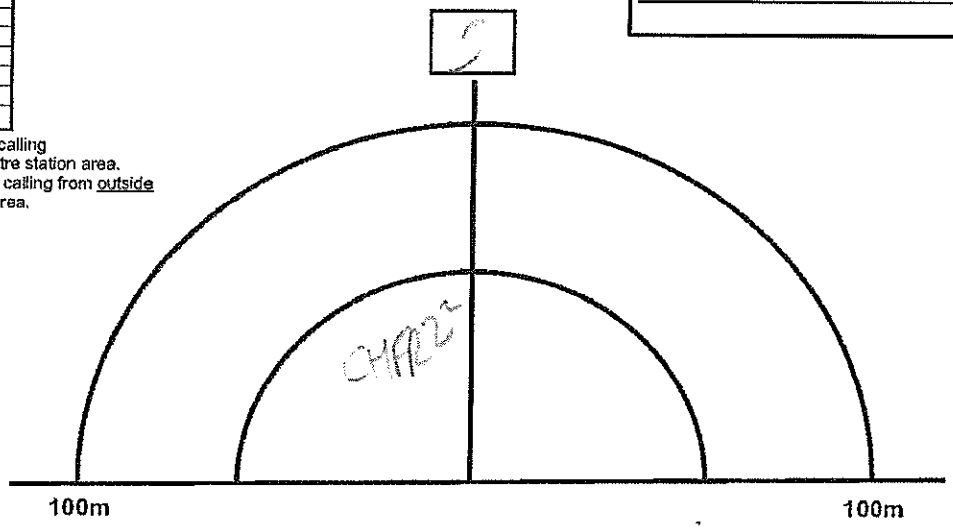


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 4

Station Start Time (24 hr): 21:10
Background Noise Code (1-4):
GPS Coordinates:

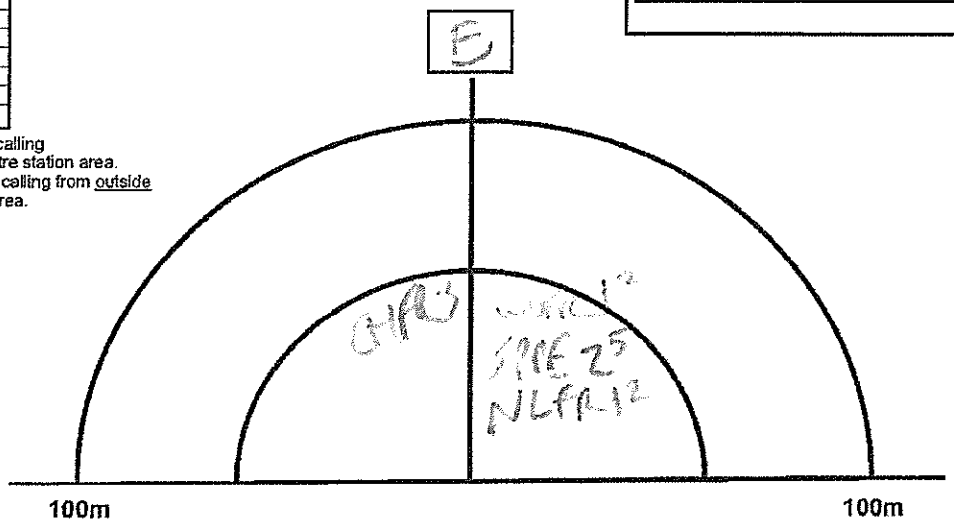


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 6

Station Start Time (24 hr): 21:26
Background Noise Code (1-4):
GPS Coordinates:

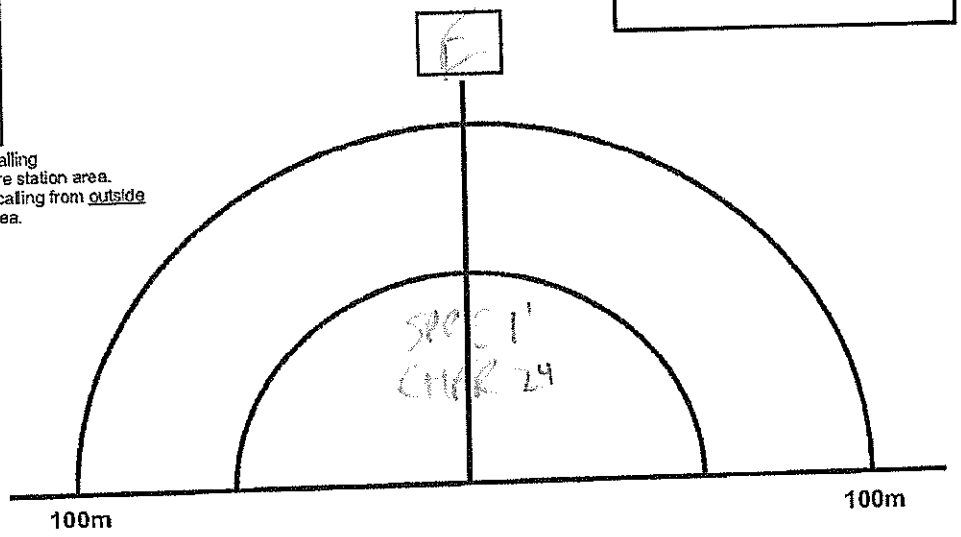


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 7

Station Start Time (24 hr):	22:24
Background Noise Code (1-4):	1
GPS Coordinates:	

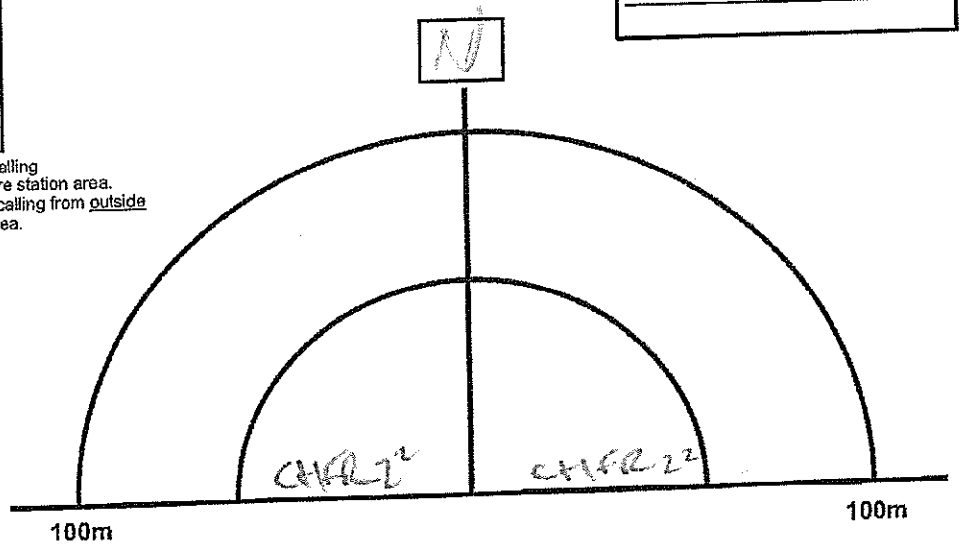


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 2

Station Start Time (24 hr):	11:53
Background Noise Code (1-4):	1
GPS Coordinates:	

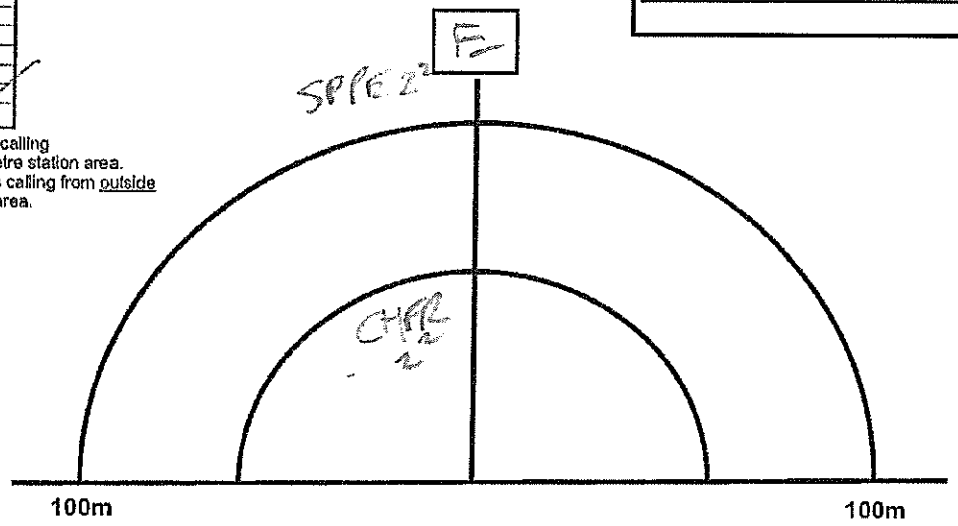


Species	In*	Out**
AMTO		
BCFR		
BULL	✓	✓
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		✓
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 2

Station Start Time (24 hr):	20:36
Background Noise Code (1-4):	1
GPS Coordinates:	

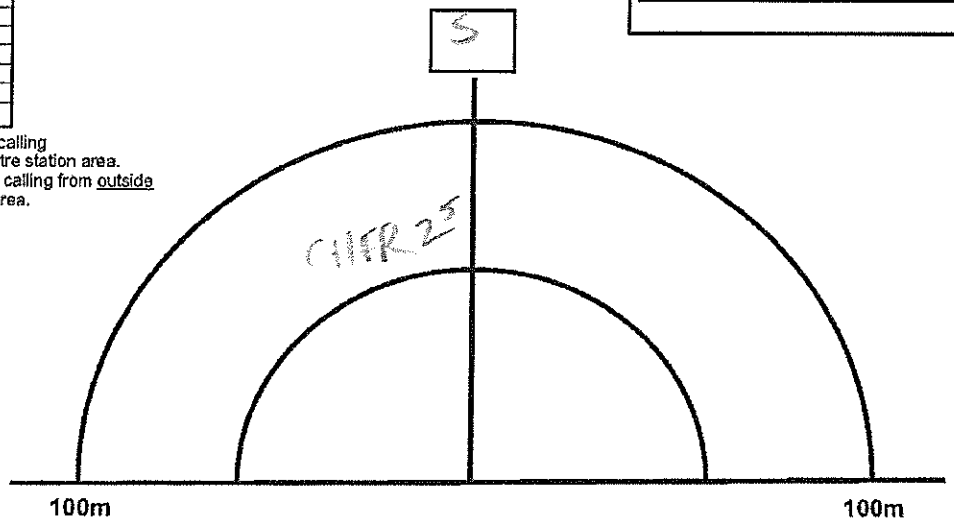


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		✓
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 3

Station Start Time (24 hr):	20:54
Background Noise Code (1-4):	1
GPS Coordinates:	

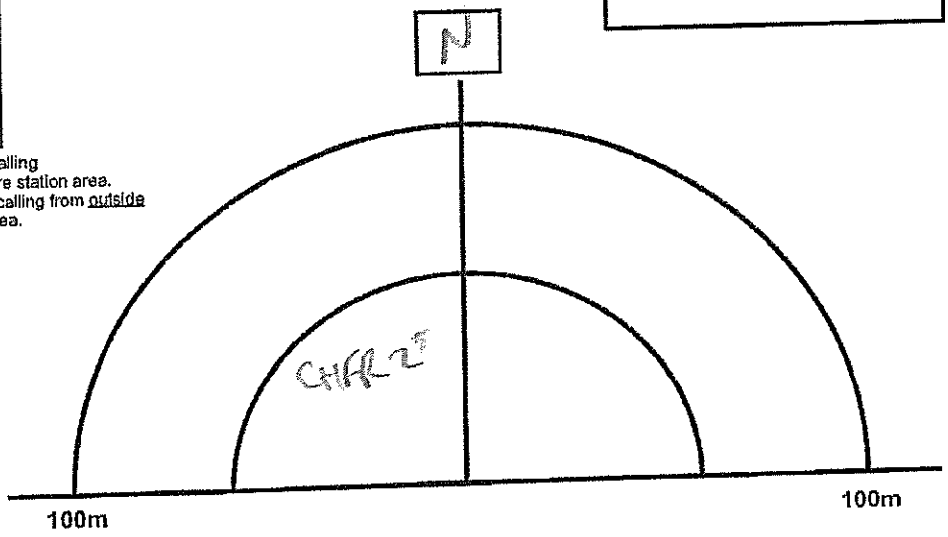


Species	In*	Out**
AMTO		
BCFR		
BULL	✓	
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 5

Station Start Time (24 hr):	22 38
Background Noise Code (1-4):	1
GPS Coordinates:	



Amphibian Species Codes

Species	Code
American Toad	AMTO
Northern (Blanchard's) Cricket Frog	BCFR
Bullfrog	BULL
Chorus Frog	CHFR
Cope's (Diploid) Gray Treefrog	CGTR
Fowler's Toad	FOTO
Gray (Tetraploid) Treefrog	GRTR
Green Frog	GRFR
Mink Frog	MIFR
Northern Leopard Frog	NLFR
Pickerel Frog	PIFR
Spring Peeper	SPPE
Wood Frog	WOFR

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

24 Hour Time

12 Hour	24 Hour	12 Hour	24 Hour
7:00 PM	1900	10:00 PM	2200
8:00 PM	2000	11:00 PM	2300
9:00 PM	2100	12:00 PM	2400

Beaufort Wind Scale

Number	Wind Speed		Indicators
	Km/h	Mph	
0	0-2	0-1	**Calm**, smoke rises vertically
1	3-5	2-3	**Light air movement**, smoke drifts
2	6-11	4-7	**Slight breeze**, wind felt on face
3	12-19	8-12	**Gentle breeze**, leaves and small twigs in constant motion
4*	20-30	13-18	**Moderate breeze**, small branches are moving, raises dust and loose paper

* Winds over Beaufort 3 are unacceptable for amphibian surveys.

Amphibian Data Form

BEACON ENVIRONMENTAL

Visit Information

Project Name: OPG Nanticoke | Project #: 214350

Observer Name: RA & JD | Visit #: 1

Date: June 2, 2015 | Cloud Cover (%): 0

Temperature (°C): 17 | Beaufort Wind Scale (0-6): 1

Precipitation (check one): ☒ None/Dry ☐ Damp/Haze/Fog ☐ Drizzle ☐ Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted.

Code 2: Some calls simultaneous, number of individuals can be reliably estimated.

Code 3: Full chorus, call continuous and overlapping, number of individuals cannot be reliably estimated.

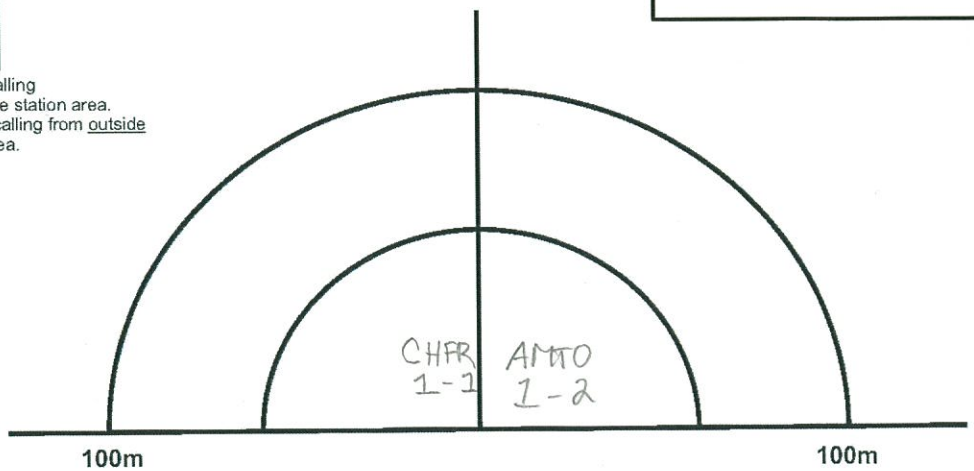
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station ~~S~~ 1

Station Start Time (24 hr):	21:20
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0579583 4740782

SW



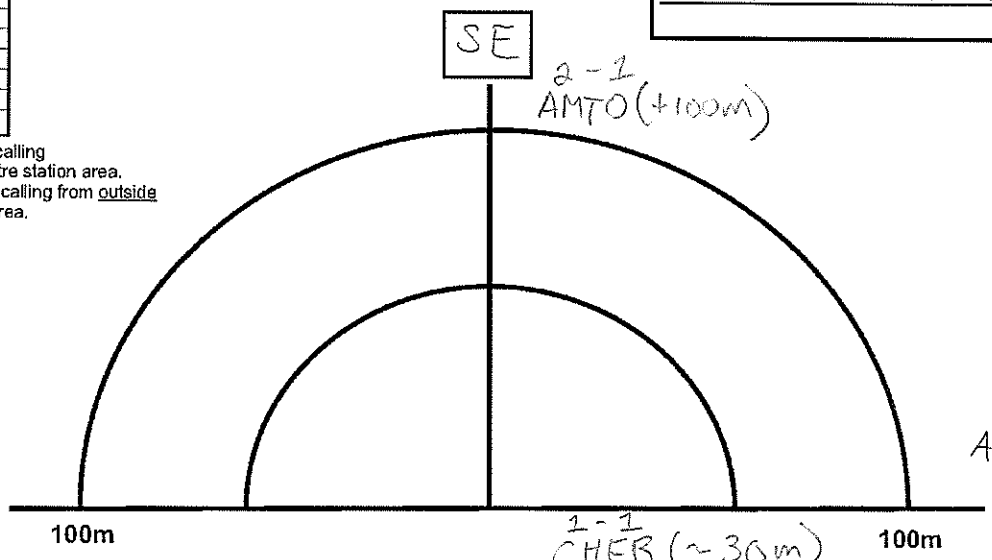
BAT OBSERVED.

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 2

Station Start Time (24 hr):	21:29
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0579691 4740647

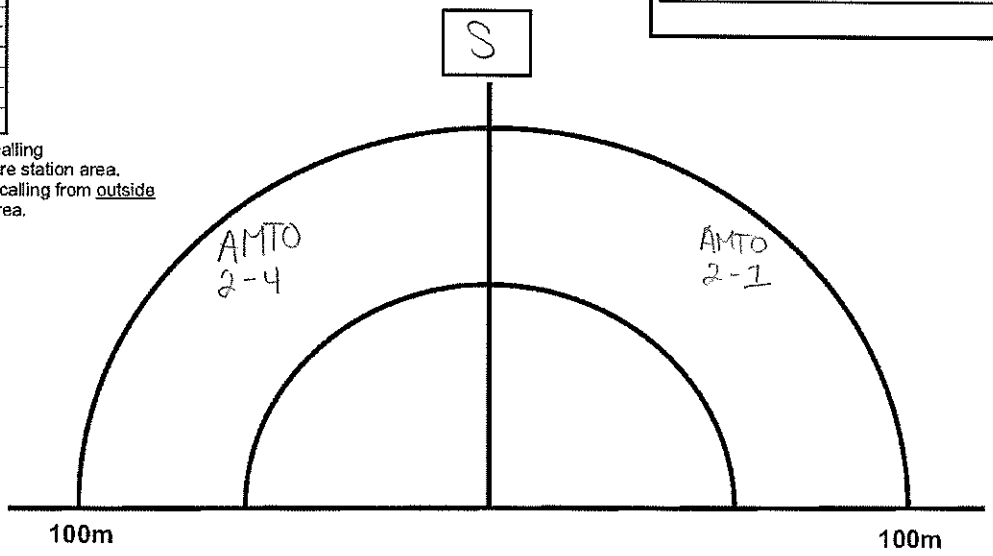


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 3

Station Start Time (24 hr):	21:45
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0579184 4740741



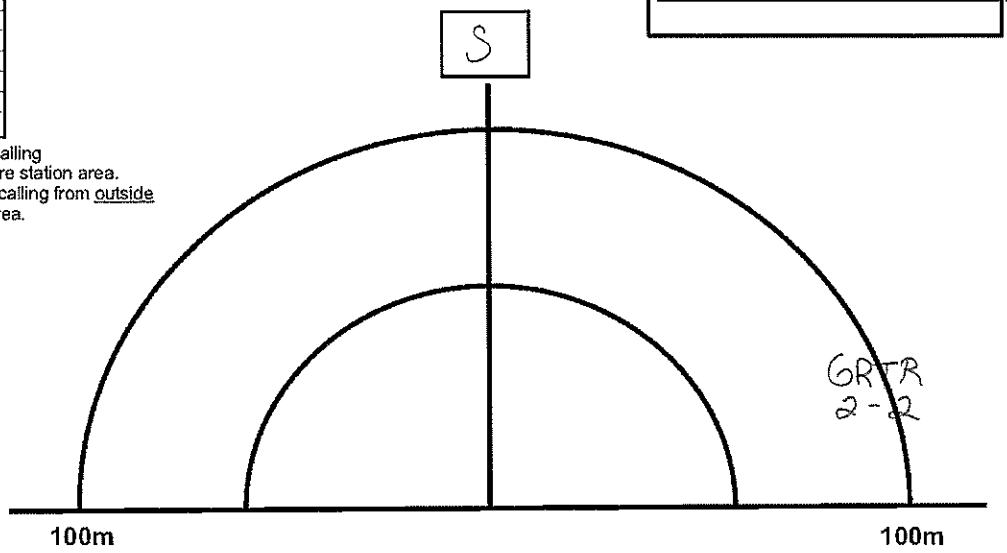
BY ROAD
CHFR HEARD
1-1 (OTHER SIDE OF ROAD)

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 4

Station Start Time (24 hr):	21:58
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0572855 4740228

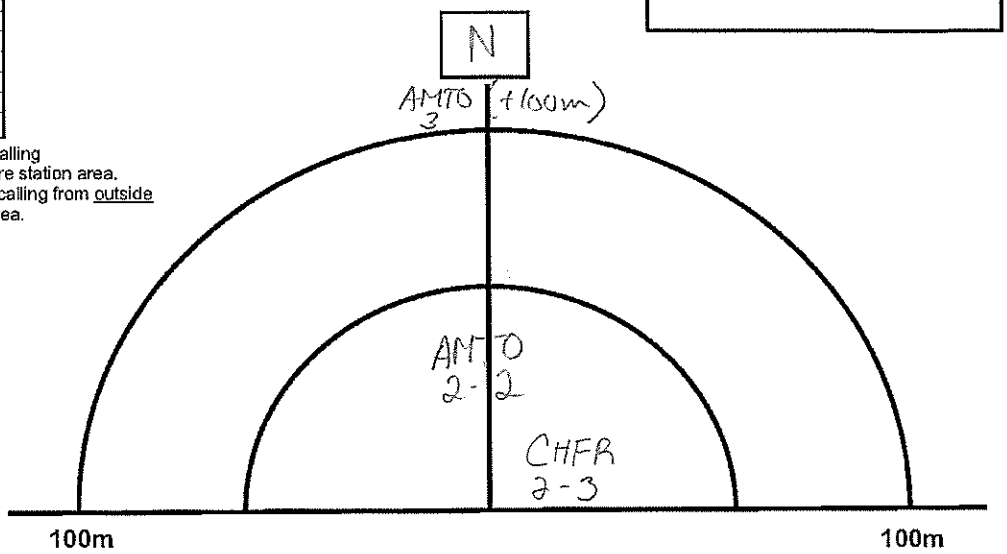


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 5

Station Start Time (24 hr):	22:09
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0579524 4739976

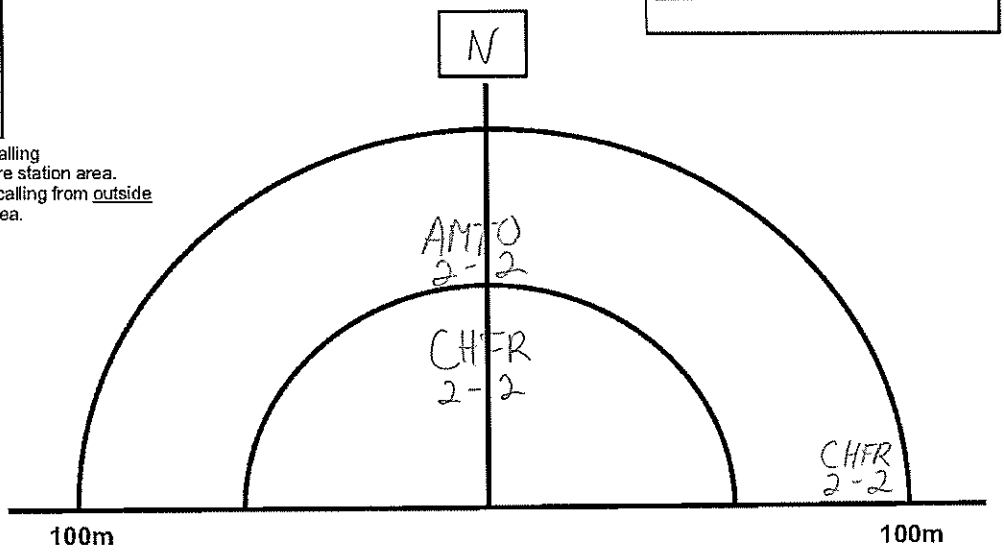


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 6

Station Start Time (24 hr):	22:14
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0579243 4749967

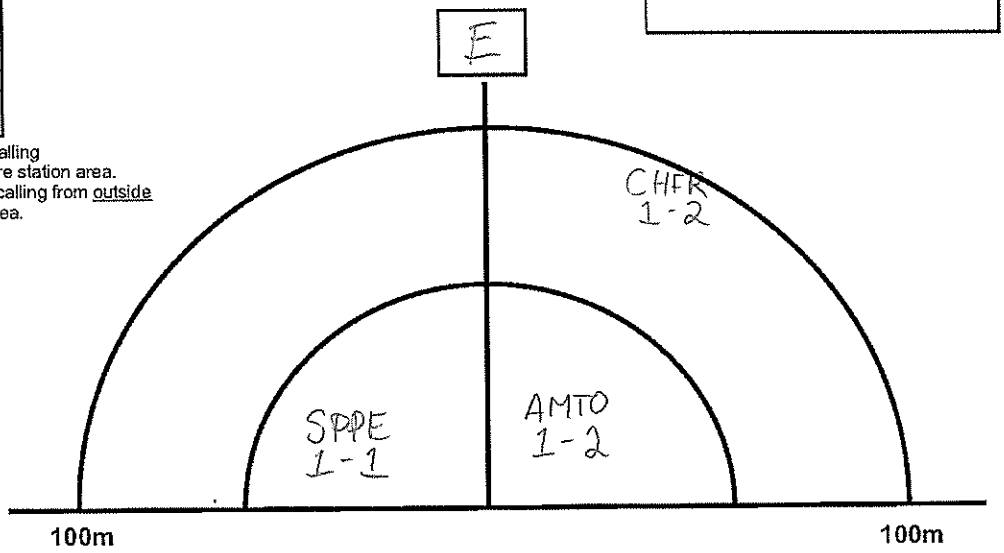


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 7

Station Start Time (24 hr):	22:20
Background Noise Code (1-4):	1
GPS Coordinates:	17T 0578588 4740030

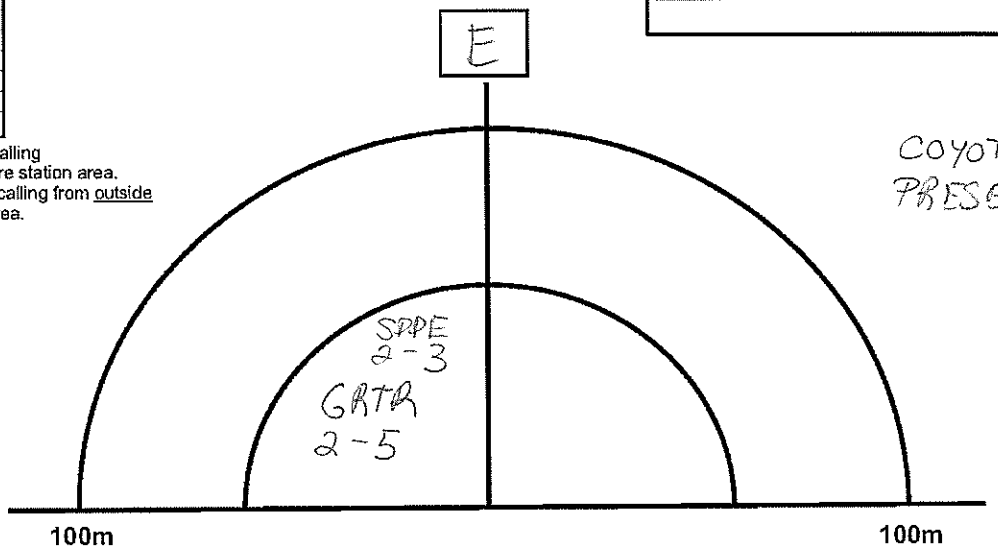


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 8

Station Start Time (24 hr): 22:26
Background Noise Code (1-4): 1
GPS Coordinates: 17T 0578450 4740511



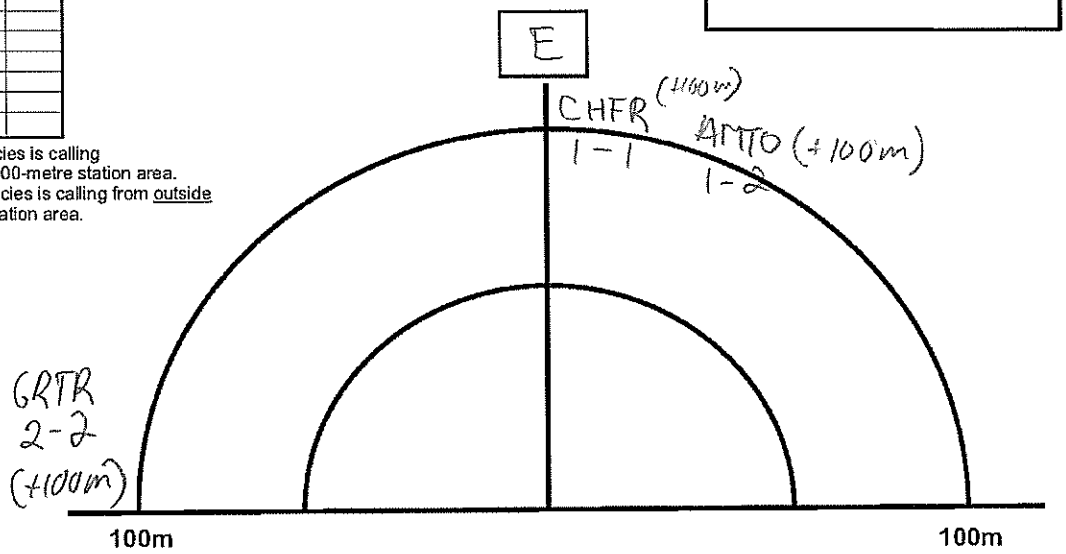
COYOTES PRESENT

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 9

Station Start Time (24 hr): 22:39
Background Noise Code (1-4): 2
GPS Coordinates: 17T 0577877 4739468



Amphibian Data Form

BEACON ENVIRONMENTAL

Visit Information

Project Name: OPG Nanticoke | Project #: 214350

Observer Name: DW + JD | Visit #: 2

Date: June 23, 2015 | Cloud Cover (%): 0 %

Temperature (°C): 17.°C | Beaufort Wind Scale (0-6): 0

Precipitation (check one): ☑ None/Dry ☐ Damp/Haze/Fog ☐ Drizzle ☐ Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted.

Code 2: Some calls simultaneous, number of individuals can be reliably estimated.

Code 3: Full chorus, call continuous and overlapping, number of individuals cannot be reliably estimated.

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

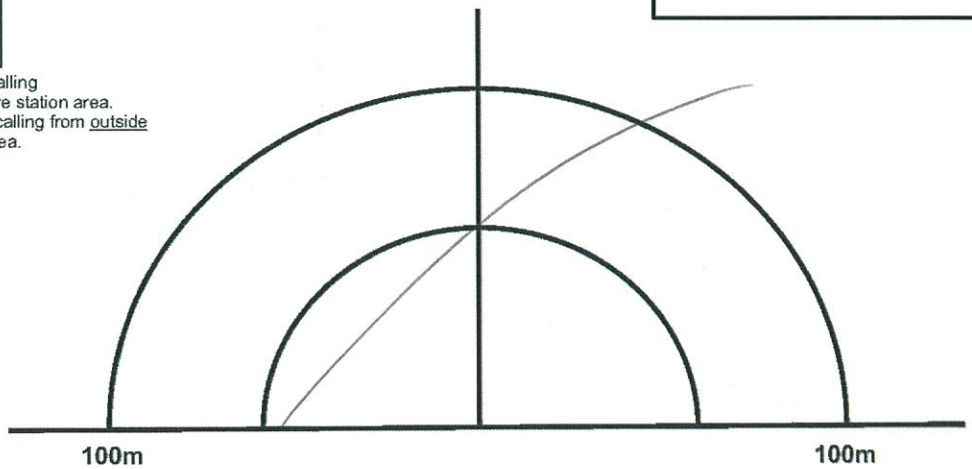
Station 1

SW

Station Start Time (24 hr): 21:45

Background Noise Code (1-4): 2

GPS Coordinates: 17T 0579583 4740782

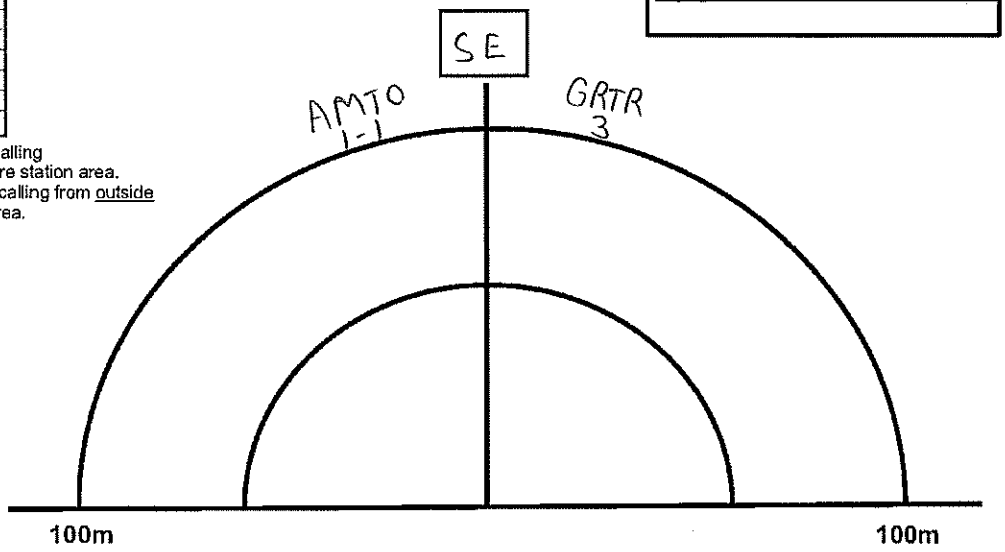


Species	In*	Out**
AMTO		✓
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		✓
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 2

Station Start Time (24 hr):	22:01
Background Noise Code (1-4):	2
GPS Coordinates:	17T 0579691 4740647

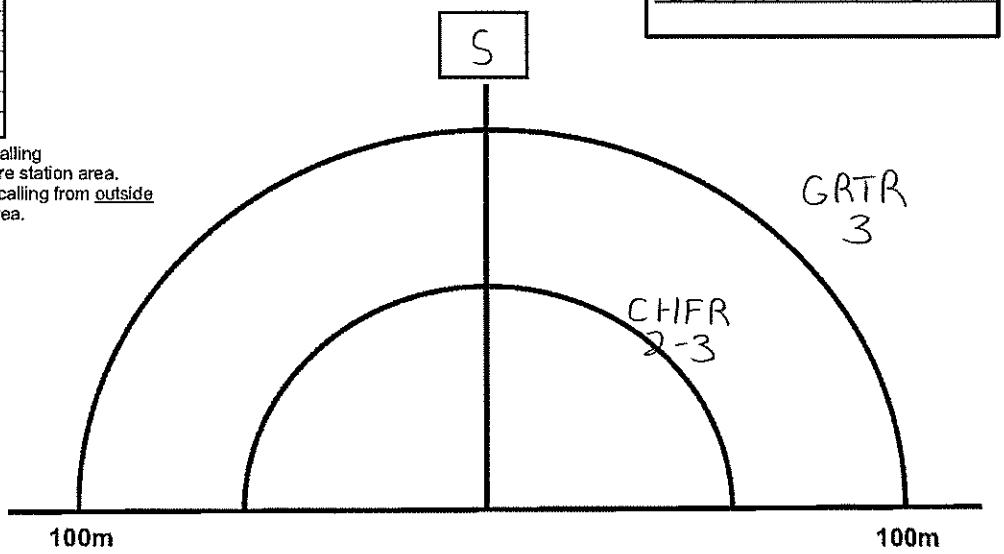


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		✓
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 3

Station Start Time (24 hr):	22:20
Background Noise Code (1-4):	2
GPS Coordinates:	17T 0579184 4740741

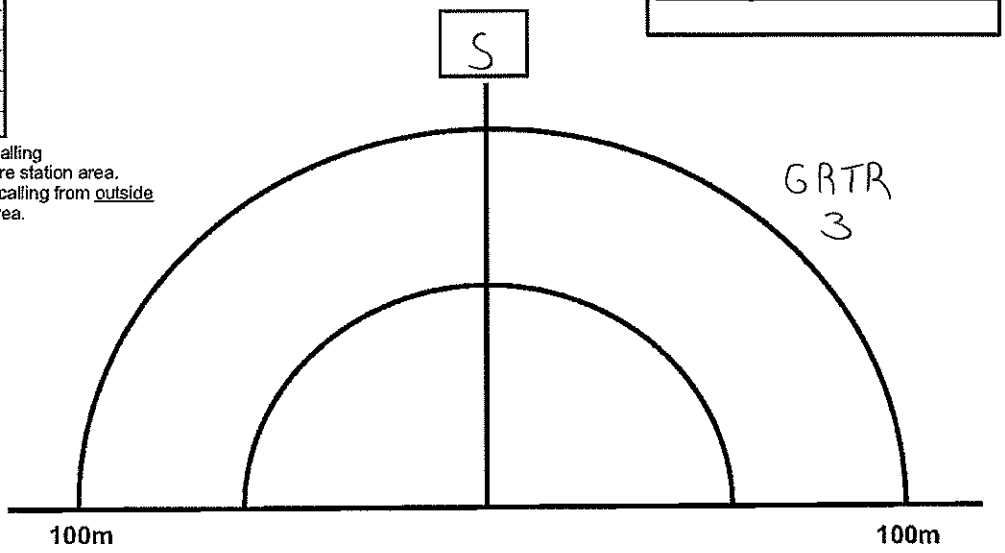


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		✓
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 4

Station Start Time (24 hr): 20:33
Background Noise Code (1-4): 2
GPS Coordinates: 17T 0578255 4740929

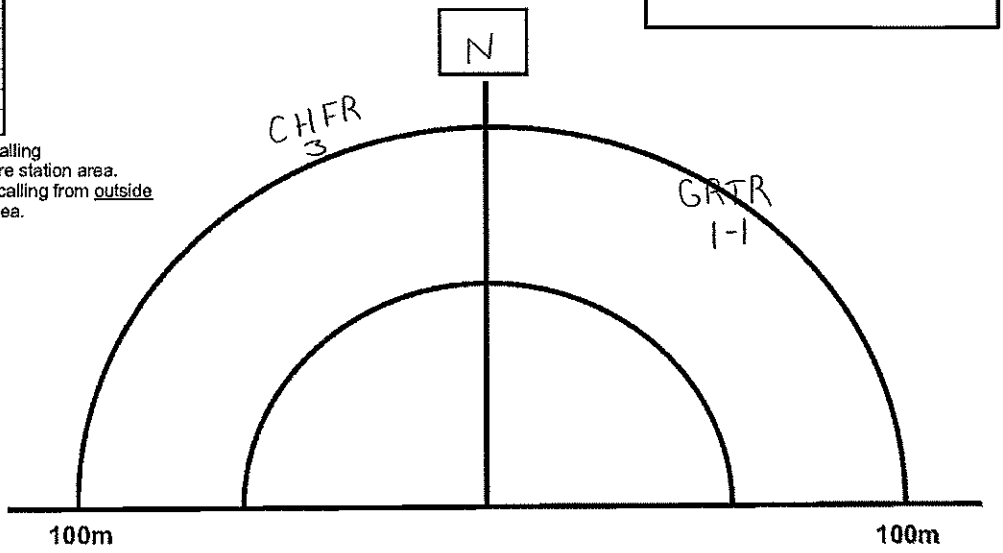


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		✓
CGTR		
FOTO		
GRTR	✓	
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 5

Station Start Time (24 hr): 23:03
Background Noise Code (1-4): 2
GPS Coordinates: 17T 0579524 4739976

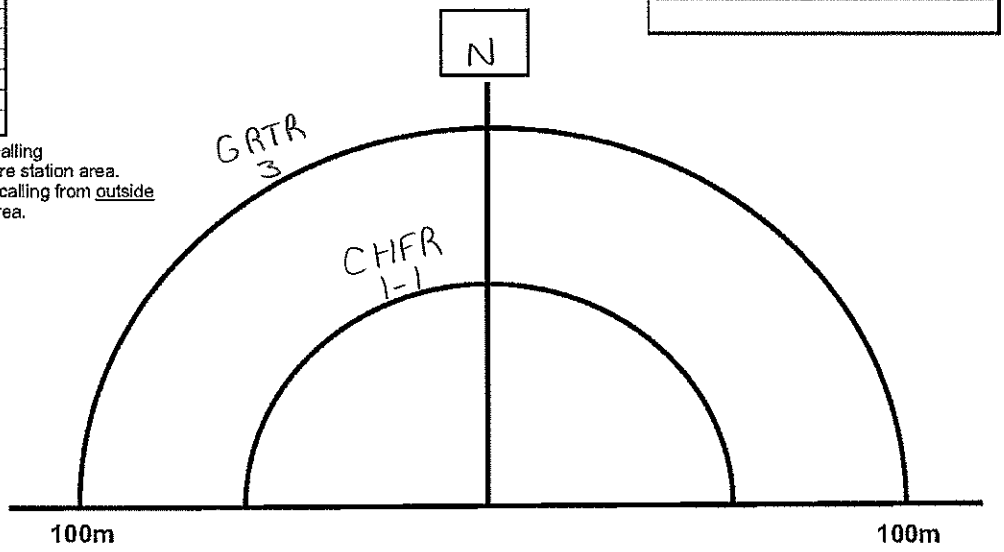


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		✓
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 6

Station Start Time (24 hr):	22:56
Background Noise Code (1-4):	2
GPS Coordinates:	17T 0572243 4749967

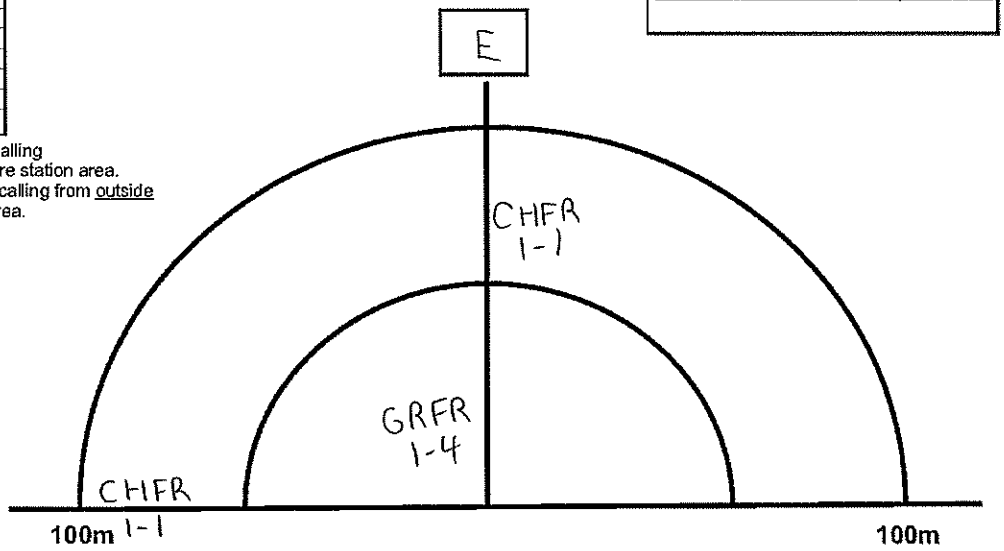


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR	✓	
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 7

Station Start Time (24 hr):	22:45
Background Noise Code (1-4):	2
GPS Coordinates:	17T 0572588 4740030

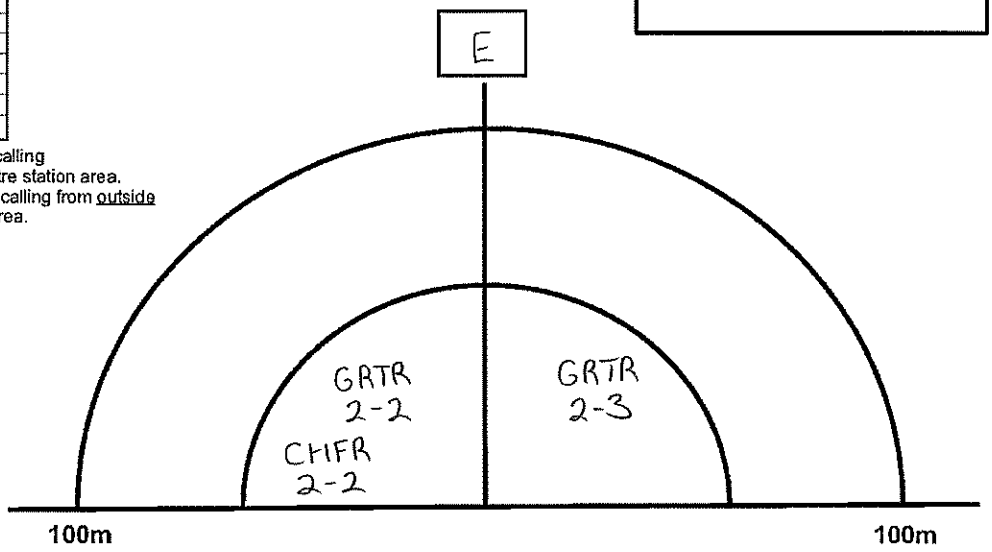


Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station 8

Station Start Time (24 hr):	22:39
Background Noise Code (1-4):	2
GPS Coordinates:	17T 0578450 4740511



Amphibian Species Codes

Species	Code
American Toad	AMTO
Northern (Blanchard's) Cricket Frog	BCFR
Bullfrog	BULL
Chorus Frog	CHFR
Cope's (Diploid) Gray Treefrog	CGTR
Fowler's Toad	FOTO
Gray (Tetraploid) Treefrog	GRTR
Green Frog	GRFR
Mink Frog	MIFR
Northern Leopard Frog	NLFR
Pickerel Frog	PIFR
Spring Peeper	SPPE
Wood Frog	WOFR

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

24 Hour Time

12 Hour	*24 Hour*	*12 Hour*	*24 Hour*
7:00 PM	1900	10:00 PM	2200
8:00 PM	2000	11:00 PM	2300
9:00 PM	2100	12:00 PM	2400

Beaufort Wind Scale

Number	Wind Speed		Indicators
	Km/h	Mph	
0	0-2	0-1	**Calm**, smoke rises vertically
1	3-5	2-3	**Light air movement**, smoke drifts
2	6-11	4-7	**Slight breeze**, wind felt on face
3	12-19	8-12	**Gentle breeze**, leaves and small twigs in constant motion
4*	20-30	13-18	**Moderate breeze**, small branches are moving, raises dust and loose paper

* Winds over Beaufort 3 are unacceptable for amphibian surveys.

Appendix E

Nanticoke Solar Site Investigation Plant List

Appendix E

Site Investigation Plant List

Scientific Name	English Name	Poly 3 CUM1-1	Poly 4 PP	Poly 5 CUT1	Poly 6 DH	Poly 7 CUW1	Poly 8 FOD4-2 / FOD4-1	Poly 9 FOD4-2	Poly 10 MAM2-5/ MAM2-10	Poly 11 MAM2-10	Poly 12 MAS2-1	Poly 13 SWD2-2	Poly 14 SWD3-2	Srank	SARA	ESA
Dryopteris carthusiana	Spinulose Shield Fern						O					R		S5		
Matteuccia struthiopteris	Ostrich Fern											O		S5		
Onoclea sensibilis	Sensitive Fern						O					O		S5		
Picea abies	Norway Spruce					O								SE3		
Pinus strobus	Eastern White Pine					R								S5		
Thuja occidentalis	Eastern White Cedar					R	R							S5		
Typha latifolia	Broad-leaf Cattail								x	O	D			S5		
Agrostis sp.	Bentgrass sp.												o			
Agrostis gigantean	Black Bentgrass					O			x	A				SE5		
Agrostis stolonifera	Spreading Bentgrass									A				S5		
Alopecurus pratensis	Meadow Foxtail								x					SE5		
Andropogon gerardii	Big Bluestem		A											S4		
Bromus inermis ssp. inermis	Smooth Brome	O		O	O	O								SE5		
Dactylis glomerata	Orchard Grass	O												SE5		
Glyceria striata var. striata	Fowl Manna-grass						O		x			O		S4S5		
Leersia oryzoides	Rice Cutgrass								x	O		O		S5		
Phalaris arundinacea	Reed Canary Grass				R				x				O	S5		
Phleum pretense	Meadow Timothy	O												SE5		
Phragmites australis	Common Reed									O				S5		
Poa palustris	Fowl Bluegrass											O		S5		
Poa pratensis ssp. pratensis	Kentucky Bluegrass	D	A	O	O	O								S5		
Sorghastrum nutans	Yellow Indian-grass		O											S4		
Carex bebbii	Bebb's Sedge									O			o	S5		
Carex blanda	Woodland Sedge						O							S5		
Carex crinita	Fringed Sedge								x					S5		
Carex gracilescens	Slender Sedge											O		S3		
Carex gracillima	Graceful Sedge						O							S5		
Carex radiata	Stellate Sedge							R						S5		
Carex rosea	Rosy Sedge						O							S5		
Carex spicata	A Sedge					O								SE5		
Carex sprengelii	Longbeak Sedge						R							S5		
Carex stipata	Stalk-grain Sedge								x					S5		
Carex vulpinoidea	Fox Sedge	R							x	O		R	O	S5		
Eleocharis erythropoda	Bald Spikerush								x					S5		
Scirpus atrovirens	Dark-green Bulrush								x	O				S5		
Arisaema triphyllum	Jack-in-the-pulpit							R				R		S5		
Lemna minor	Lesser Duckweed										A			S5		
Juncus sp	Rush sp								x							
Erythronium americanum	Yellow Trout-lily						O							S5		
Trillium luteum	Yellow Trillium						O							SEH		

Scientific Name	English Name	Poly 3 CUM1-1	Poly 4 PP	Poly 5 CUT1	Poly 6 DH	Poly 7 CUW1	Poly 8 FOD4-2 / FOD4-1	Poly 9 FOD4-2	Poly 10 MAM2-5/ MAM2-10	Poly 11 MAM2-10	Poly 12 MAS2-1	Poly 13 SWD2-2	Poly 14 SWD3-2	Srank	SARA	ESA
Populus deltoides ssp. deltoides	Cottonwood			R	D	A			R			R	O	SU		
Populus tremuloides	Trembling Aspen			R										S5		
Salix discolor	Pussy Willow				R									S5		
Salix exigua	Sandbar Willow								R					S5		
Salix x rubens	Hybrid Crack Willlow								R					SE4		
Carya ovata	Shag-bark Hickory			R	R		D					O		S5		
Carpinus caroliniana	American Hornbeam						R					O		S5		
Ostrya virginiana	Eastern Hop-hornbeam						O							S5		
Fagus grandifolia	American Beech						A					R		S5		
Quercus macrocarpa	Bur Oak						O					R		S5		
Quercus rubra	Northern Red Oak						R							S5		
Ulmus americana	American Elm			R								r		S5		
Claytonia virginica	Narrow-leaved Spring Beauty						R							S5		
Ranunculus acris	Tall Butter-cup	R												SE5		
Berberis thunbergii	Japanese Barberry						R							SE5		
Podophyllum peltatum	May Apple			R			O	O						S5		
Alliaria petiolata	Garlic Mustard			O		O	O	O						SE5		
Barbarea vulgaris	Yellow Rocket								x					SE5		
Ribes americanum	Wild Black Currant						R					O		S5		
Ribes cynosbati	Prickly Gooseberry						R							S5		
Crataegus sp.	Hawthorn			A	O			D	R				R			
Fragaria vesca	Woodland Strawberry											R		S5		
Fragaria virginiana	Virginia Strawberry		O	R	O	O	O						R	S5		
Geum aleppicum	Yellow Avens						R	O	x			O	R	S5		
Geum canadense	White Avens								x					S5		
Malus pumila	Common Apple			O										SE5		
Potentilla norvegica	Norwegian Cinquefoil	R												S5		
Potentilla recta	Sulphur Cinquefoil	R												SE5		
Prunus serotina	Wild Black Cherry						O							S5		
Rosa multiflora	Rambler Rose	R			R	O	O	O				R		SE4		
Rosa palustris	Swamp Rose												R	S5		
Rubus idaeus ssp. idaeus	Common Red Raspberry			R	O		R	O				R		SE1		
Rubus occidentalis	Black Raspberry					o						R		S5		
Rubus pubescens	Catherinettes Berry											A		S5		
Lespedeza capitata	Round-head Bush-clover		O											S4		
Lotus corniculatus	Birds-foot Trefoil	O	O		R									SE5		
Medicago laciniata	Cut-leaf Medic		R											SEH		
Medicago lupulina	Black Medic	O												SE5		
Melilotus alba	White Sweet Clover	O	O		R									SE5		
Melilotus officinalis	Yellow Sweetclover		O											SE5		
Robinia pseudo-acacia	Black Locust					o								SE5		
Trifolium pratense	Red Clover	A	A	R					x					SE5		
Vicia cracca	Tufted Vetch	O												SE5		
Oxalis stricta	Upright Yellow Wood-sorrel						R							S5		
Geranium maculatum	Wild Crane's-bill				O		O							S5		
Geranium robertianum	Herb-robert						O							SE5		
Rhus radicans ssp. rydbergii	Poison Ivy								x					S5		
Rhus typhina	Staghorn Sumac	R		R		R								S5		

Scientific Name	English Name	Poly 3 CUM1-1	Poly 4 PP	Poly 5 CUT1	Poly 6 DH	Poly 7 CUW1	Poly 8 FOD4-2 / FOD4-1	Poly 9 FOD4-2	Poly 10 MAM2-5/ MAM2-10	Poly 11 MAM2-10	Poly 12 MAS2-1	Poly 13 SWD2-2	Poly 14 SWD3-2	Srank	SARA	ESA
Euonymus obovata	Running Strawberry-bush						R							S5		
Acer negundo	Box Elder				R									S5		
Acer saccharinum	Silver Maple					A								S5		
Acer saccharum ssp. saccharum	Sugar Maple			R	R		R							S5		
Acer x freemanii	Hybrid Maple												D	S?		
Impatiens capensis	Spotted Jewel-weed						R			O		O	O	S5		
Rhamnus cathartica	Buckthorn			O	O		R	O				R		SE5		
Parthenocissus quinquefolia	Virginia Creeper			O	O			A				O		S4?		
Vitis riparia	Riverbank Grape	R		O	O			O						S5		
Tilia americana	American Basswood			O			R							S5		
Lythrum salicaria	Purple Loosestrife									O			O	SE5		
Epilobium hirsutum	Great-hairy Willow-herb								x	A				SE5		
Cicuta maculata	Spotted Water-hemlock								x					S5		
Daucus carota	Wild Carrot				O	R								SE5		
Heracleum mantegazzianum	Giant Hogweed											R		SE2		
Cornus foemina	Stiff Dogwood					O			R			R	O	S5		
Cornus stolonifera	Red-osier Dogwood								R					S5		
Cornus racemosa	Gray Dogwood			O	A				R					S5		
Lysimachia ciliata	Fringed Loosestrife											r		S5		
Fraxinus americana	White Ash			O			O	D						S5		
Fraxinus pennsylvanica	Green Ash				O	A			R	R		D	A	S5		
Ligustrum vulgare	European Privet					R								SE5		
Asclepias syriaca	Milkweed	O			R									S5		
Verbena hastata	Blue Vervain								x					S5		
Mentha arvensis	Corn Mint								x					S5		
Chelone glabra	White Turtlehead											R		S5		
Penstemon digitalis	Foxglove Beardtongue		O											S4S5		
Penstemon hirsutus	Hairy Beardtongue		R											S4		
Plantago lanceolata	English Plantain	O												SE5		
Plantago major	Nipple-seed Plantain	R					R							SE5		
Galium mollugo	Great Hedge Bedstraw					O								SE5		
Lonicera tatarica	Tartarian Honeysuckle	R		R	O	a	R						R	SE5		
Viburnum acerifolium	Maple-leaf Viburnum						R							S5		
Viburnum opulus	Guelder-rose Viburnum					O								SE4		
Dipsacus fullonum	Fuller's Teasel	O	O		R				x					SE5		
Echinocystis lobata	Wild Mock-cucumber			R	R									S5		
Achillea millefolium ssp. millefolium	Common Yarrow				R									SE		
Ambrosia trifida	Great Ragweed	R					R							S5		
Arctium minus ssp. minus	Common Burdock	R												SE5		
Chrysanthemum leucanthemum	Oxeye Daisy	R												SE5		
Cichorium intybus	Chicory			R	R									SE5		
Cirsium vulgare	Bull Thistle	R		R	R									SE5		
Coreopsis lanceolata	Lance-leaved Coreopsis		O											S4?		
Erigeron annuus	White-top Fleabane					R								S5		
Prenanthes alba	White Rattlesnake-root						R							S5		
Silphium terebinthinaceum	Prairie Dock		O											S1		
Solidago altissima	Tall Goldenrod	A	A	O	A	A		R	x	O		O		S5		

Scientific Name	English Name	Poly 3 CUM1-1	Poly 4 PP	Poly 5 CUT1	Poly 6 DH	Poly 7 CUW1	Poly 8 FOD4-2 / FOD4-1	Poly 9 FOD4-2	Poly 10 MAM2-5/ MAM2-10	Poly 11 MAM2-10	Poly 12 MAS2-1	Poly 13 SWD2-2	Poly 14 SWD3-2	Srank	SARA	ESA
Sonchus arvensis ssp. arvensis	Sowthistle	O		R	R					O				SE5		
Symphyotrichum cordifolium	Heart-leaf Aster						O							S5		
Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster	R		R	O				X	A		O	O	S5		
Symphyotrichum novae-angliae	New England Aster	R			O	O								S5		
Symphyotrichum puniceum	Swamp Aster												O	S5		
Taraxacum officinale	Brown-seed Dandelion	R	R	R	O			R						SE5		
Vernonia missurica	Missouri Ironweed		O											S3?		
Xanthium strumarium	Rough Cockle-bur		R											S5		

Key

a – SARA = Species at Risk Act: END = Endangered, THR = Threatened, SC = Special Concern.

b – ESA = Endangered Species Act: END = Endangered, THR = Threatened, SC = Special Concern.

c – S-RANK (from NHIC): S1 = Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not applicable ‘because the species is not suitable target for conservation acitivites’; includes non-native species.

Appendix F

Nanticoke Solar Site Investigation
Breeding Bird List

Appendix F

Site Investigation Breeding Bird List

Common Name	Scientific Name	Status				Survey Dates[e]	
		National Species at Risk COSEWIC[a]	Species at Risk in Ontario Listing[a]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	May 29, 2015	June 17, 2015
Great Blue Heron	*Ardea herodias*			S4			F
Canada Goose	*Branta canadensis*			S5		6	F
Red-breasted Merganser	*Mergus serrator*			S4	A	1	
Turkey Vulture	*Cathartes aura*			S5			F
Bald Eagle	*Haliaeetus leucocephalus*		SC	S4	A		F
Wild Turkey	*Meleagris gallopavo*			S5		9	1
Killdeer	*Charadrius vociferus*			S5		4	8
Spotted Sandpiper	*Actitis macularia*			S5		4	3
American Woodcock	*Scolopax minor*			S4			3
Ring-billed Gull	*Larus delawarensis*			S5			F
Mourning Dove	*Zenaida macroura*			S5		3	4
Red-bellied Woodpecker	*Melanerpes carolinus*			S4		3	1
Downy Woodpecker	*Picoides pubescens*			S5			3
Northern Flicker	*Colaptes auratus*			S4		1	4
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4		3	2
Willow Flycatcher	*Empidonax traillii*			S5		11	8
Least Flycatcher	*Empidonax minimus*			S4	A	1	1
Great Crested Flycatcher	*Myiarchus crinitus*			S4		2	1

Common Name	Scientific Name	Status				Survey Dates[e]	
		National Species at Risk COSEWIC[a]	Species at Risk in Ontario Listing[a]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	May 29, 2015	June 17, 2015
Eastern Kingbird	*Tyrannus tyrannus*			S4		2	
Horned Lark	*Eremophila alpestris*			S5		2	
Tree Swallow	*Tachycineta bicolor*			S4		16	13
Barn Swallow	*Hirundo rustica*	THR	THR	S4			F
Blue Jay	*Cyanocitta cristata*			S5		5	3
American Crow	*Corvus brachyrhynchos*			S5			1
Black-capped Chickadee	*Poecile atricapillus*			S5		4	2
White-breasted Nuthatch	*Sitta carolinensis*			S5	A	1	1
House Wren	*Troglodytes aedon*			S5		10	11
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4		3	2
American Robin	*Turdus migratorius*			S5		11	17
Gray Catbird	*Dumetella carolinensis*			S4		12	13
Brown Thrasher	*Toxostoma rufum*			S4		6	2
Cedar Waxwing	*Bombycilla cedrorum*			S5		2	7
European Starling	*Sturnus vulgaris*			SE		2	4
Warbling Vireo	*Vireo gilvus*			S5		4	7
Red-eyed Vireo	*Vireo olivaceus*			S5		4	2
Yellow Warbler	*Setophaga petechia*			S5		43	37
Chestnut-sided Warbler	*Setophaga pensylvanica*			S5		2	2
Yellow-rumped Warbler	*Setophaga coronata*			S5		1	
Blackpoll Warbler	*Setophaga striata*			S4		1	
Common Yellowthroat	*Geothlyphis trichas*			S5		6	2
Northern Cardinal	*Cardinalis cardinalis*			S5		4	3
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			S4		6	4

Common Name	Scientific Name	Status				Survey Dates[e]	
		National Species at Risk COSEWIC[a]	Species at Risk in Ontario Listing[a]	Provincial breeding season SRANK[c]	Area-sensitive (OMNR)[d]	May 29, 2015	June 17, 2015
Indigo Bunting	*Passerina cyanea*			S4		1	2
Chipping Sparrow	*Spizella passerina*			S5		2	1
Field Sparrow	*Spizella pusilla*			S4		4	4
Vesper Sparrow	*Pooecetes gramineus*			S4			4
Savannah Sparrow	*Passerculus sandwichensis*			S4	A	12	11
Song Sparrow	*Melospiza melodia*			S5		40	43
Swamp Sparrow	*Melospiza georgiana*			S5			3
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4	A	4	1
Red-winged Blackbird	*Agelaius phoeniceus*			S4		54	54
Common Grackle	*Quiscalus quiscula*			S5		3	5
Brown-headed Cowbird	*Molothrus ater*			S4		13	17
Baltimore Oriole	*Icterus galbula*			S4		4	3
American Goldfinch	*Spinus tristis*			S5		14	9

Key

a – SARA = Species at Risk Act: END = Endangered, THR = Threatened, SC = Special Concern.

b – ESA = Endangered Species Act: END = Endangered, THR = Threatened, SC = Special Concern.

c – S-RANK (from NHIC): S1 = Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not applicable 'because the species is not suitable target for conservation acitivites'; includes non-native species.

d – Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide (Appendix G). 151 p plus appendices.

e - # - number of species observed within study area during breeding bird surveys, F – identifies species that was documented flying over the study area but did not display any evidence of breeding.

Appendix G

Nanticoke Solar Site Investigation
Incidental Wildlife Observations

Appendix G

Site Investigation Incidental Wildlife Observations

Common Name	Scientific Name	SRank	SARA	ESA
White-tailed Deer	Odocoileus virginianus	S5		
Coyote	Canis latrans	S5		
Eastern Chipmunk	Tamias striatus	S5		
American Toad	Anaxyrus americanus	S5		
Eastern Cottontail	Sylvilagus floridanus	S5		
Viceroy Butterfly	Limenitis archippus	S5		
Western Chorus Frog	Pseudacris triseriata	S5		
Northern Leopard Frog	Lithobates pipiens	S5		
Spring Peeper	Pseudacris crucifer	S5		
Gray Treefrog	Hyla versicolor	S5		

Appendix H

Project Team Curriculum Vitae

Brian E. Henshaw
Senior Ecologist - Principal

Profile

2005–Present	Principal, Senior Ecologist, Beacon Environmental Limited
1999–2005	Senior Ecologist, Gartner Lee Limited
1989–1999	Consulting Ecologist
1989–1994	Co-publisher and editor of *Birders Journal*, a Canadian semi-technical ornithological journal
1988–1988	Proprietor of natural history retail business
1978–1987	Managing Director of two businesses in England
1976–1978	Completed Ordinary and Advanced Level courses (County Grammar School, England)

Expertise

Mr. Henshaw is an accomplished project manager. Over 25 years, he has accrued a broad range of experience related to the monitoring, inventory, analysis and evaluation of natural systems, with special expertise in wildlife and in wetlands. Project types which he has managed include: functional habitat analyses, Natural Heritage System development, Environmental Assessments (natural environment component), Environmental Impact Studies, and development and execution of various monitoring protocols. He has also undertaken strategic analyses of natural heritage issues, undertaken ecological risk assessments, integrated information from multi-disciplinary consulting teams, negotiated with agencies, and managed other project components. In addition, he has expertise in addressing nuisance wildlife issues, wildlife air traffic hazard and risk assessments, nuisance wildlife management (gulls, geese and others), trail planning, restoration activities, qualitative and quantitative bird studies, and inventories of mammals, herpetofauna, insects and vegetation.

Projects managed frequently include the identification of locally, provincially and nationally significant species, identification of habitats and ecological/development constraints and opportunities, buffer, attribute and landscape connectivity assessments, and recommendations for mitigative measures. Research undertaken by Mr. Henshaw has included the use of breeding habitat by waterfowl, the use of small mammals as bio-indicators, urban effects on forest birds, interactions between roads and wildlife, and landscape restoration targets.

Mr. Henshaw was a lead instructor for the Ontario Ministry of Natural Resources' Ontario Wetland Evaluation System course for 12 years and also assisted in the instruction of the Ecological Land Classification course. He has undertaken various peer review projects and has provided expert testimony on several occasions to the Ontario Municipal Board and at Expropriation Hearings on behalf of clients.

Selected Project Experience

Mr. Henshaw has managed or participated in over 300 projects in a wide range of assignments including:

Renewable Energy

- *REA Applications for Solar, 2014 – 2016:*
  Managing the natural environment portions and multiple reporting requirements for three major REA applications for industrial-level solar power sites in southern Ontario.
- *Peer Review of REA Projects, 2012 – present:*
  Providing peer review on behalf of First Nations relative to several *Renewable Energy Act* projects in Ontario.
- *Species at Risk Surveys for a REA project in Durham Region, 2011:*
  Undertook surveys and analysis for a proposed wind farm.
- *Environmental Assessment for REA project in Prince Edward County, 2004:*
  Collaborated on the EA process for a multi-unit wind farm and associated wildlife related issues.

- *Strategic Advice, Pickering Wind Turbine, Ontario Power Generation Inc., 2000:*
  Provided advice to Ontario Power Generation Inc. on bird issues and monitoring protocols related to a proposed wind turbine installation in Pickering, Ontario.

Species at Risk Investigations and Permits

- *Various projects, 2008 - present*
  Prepared, managed and/or undertaken field surveys for species subject to provincial or federal Species at Risk legislation. Prepared Information Gathering and Avoidance forms, prepared overall benefit permit applications, negotiated with MNR and Conservation Authorities, Worked with legal experts to resolve ESA issues. Provided connections to NGOs to arrange for overall benefit projects. Species directly addressed have included: Redside Dace, Butternut, Bobolink, Eastern Meadowlark, Chimney Swift, Blanding`s Turtle.

Environmental Impact Studies

- *Various projects, 1995 – present:*
  Managed and led projects (including in Toronto, King City, Oakville, Wasaga, Aurora, Brooklin, Ajax, Uxbridge, Vaughan, Brampton, Klienburg, Pickering, Oshawa, Meaford, Tottenham, Orillia, Bowmanville, Kendall, Innisfil, Niagara) investigating a wide range of potential impacts on attributes and functions, analysed and integrated multidisciplinary data, determined development limits and appropriate mitigation.

Natural Heritage System Planning

- Managed or assisted in a number of projects associated with the development or identification of Natural Heritage System components within the Town of Brooklin, the Town of East Gwillimbury, the Lake Simcoe Basin, the Regional Municipality of Hamilton-Wentworth and Farwell Creek sub watershed.

Research

- Managed or assisted in 19 research projects working with a variety of agencies evaluating a wide variety of topics including watershed development, environmental buffers, Conservation Authority regulations, Birds, Climate Change, Habitat Thresholds, Road Effects on Wildlife and Prescribed Burns.

Selected Courses

- CEAA Screenings (three days, Ottawa 2004)
- Project Management Training (two one day sessions, 2004)
- Introduction to the CEAA (three half days, spring 2002)
- Temperate Wetlands Restoration Course (six days, September, 2000)
- OMNR Introductory Soils Course (three days, July 2000)
- OMNR ELC course for instructors (1999)
- Ecosystems and Predictive Engineering Geology Terrain Models (semester course September - December 1997; refresher course December 2000)
- OMNR Environmental Impact Study Training Session (two days, July 1995)
- Ontario Ministry of Natural Resources Wetland Evaluation Course (five days, summer 1994)

Other Assignments

- Course Director (Faculty), Environmental Planning Graduate Semester Course, York University, 2015
- Primary instructor for the Ontario Ministry of Natural Resources' Wetland Evaluation System full courses and refresher courses, 1998 – 2010
- Assistant instructor for the Ontario Ministry of Natural Resources' Ecological Land Classification courses, 2000 – 2001

Robert Aitken, B.Sc. (Hons.)
Ecologist

Profile

2014 – Present	Ecologist, Beacon Environmental
2012 - 2014	Ecologist, AECOM
2010 - 2012	Ecologist, Aboud & Associates
2008 - 2010	Environmental Scientist, Conestoga Rovers & Associates
Summer 2007	Conservation Intern, Nature Conservancy of Canada
Summer 2006	Field Technician, Watershed Science Centre – Trent University
Summer 2005	Greening Co-op Student, York Region Forestry Department
Summer 2004	Environmental Technician, Conservation Halton

Education

2008	Honours B.Sc. Environmental Resource Science & Biology, Trent University
2006	Environmental Technologist Diploma, Sir Sandford Fleming College
2004	Natural Resources Law Enforcement Certificate, Sir Sandford Fleming College
2003	Ecosystem Management Technician Diploma, Sir Sandford Fleming College

Expertise

Mr. Aitken is a Terrestrial Ecologist with over seven years of experience in the environmental field. He has participated in a variety of environmental studies in both terrestrial and aquatic ecosystems including environmental impact studies, environmental assessments, sub-watershed studies, natural heritage studies for renewable energy applications, and tree inventory and management plans. His areas of expertise include: breeding bird surveys, terrestrial species at risk surveys, habitat assessments, wildlife tracking, botanical inventories, ecological land classification (ELC), wetland delineation and evaluation, and tree assessments. He has also provided support for electrofishing surveys, aquatic invertebrate surveys, hydraulic stream flow monitoring, and water quality monitoring. Mr. Aitken regularly compiles background research, conducts data analyses, contributes to report writing and provides GIS mapping for ecological studies of various scales throughout Ontario.

Selected Experience

Transportation Infrastructure

Participated in a number of provincial and municipal transportation projects for existing and proposed roadways and rail facilities. Key tasks included breeding bird surveys, nest clearance surveys, species at risk surveys, botanical inventories, ELC surveys, wetland delineation using OWES and fish rescues. Select projects include:

- *Glen Lawson Road/ 3rd Line Class Environmental Assessment, Acton, 2015*
- *Green Lane Sanitary Sewer, Newmarket, 2014*
- *Albert Street Bridge Replacement, Strathroy, 2013 - 2014*
- *Highway 401 Bridge Repair/Enhancement, Milton, 2013 - 2014*
- *Peterborough Parkway, Peterborough, 2013*
- *Highway 17 Environmental Assessment, Bonfield, 2013*
- *East Gwillimbury Transit Corridor, East Gwillimbury, 2013*
- *Bracebridge Transit Corridor, Bracebridge, 2012*
- *Rare species surveys for 407 extension, Durham, 2011*
- *Windsor Essex Parkway – Species at Risk surveys & Botanical Inventories, Windsor, 2011*

Renewable Energy Infrastructure

Participated in several aspects of the natural heritage assessments and species at risk studies for renewable energy infrastructure projects. Key tasks included breeding bird surveys, winter raptor surveys, waterfowl surveys, species at risk surveys, botanical inventories, amphibian and reptile surveys, ELC surveys and wetland delineation and evaluation using OWES. Select projects include:

- *Bluewater/Goshen/Jericho Wind Energy Centre, Grand Bend, NextEra Energy Canada, 2012-2014*
- *Summerhaven Wind Energy Centre, Nanticoke, NextEra Energy Canada, 2013-2014*
- *Biogas Facility Natural Heritage Assessment, Elora, ENS Poultry, 2011*

Aggregates and Mining

Participated in multiple studies for proposed mining and aggregate projects and for proposed expansions of existing aggregate operations. Key tasks included breeding bird surveys, species at risk surveys, botanical inventories, ELC surveys, wildlife surveys, amphibian and reptile surveys and wetland delineation and evaluation using OWES. Select projects include:

- *Tri-County Pit, Orangeville, 2014*
- *Borden Lake Environmental Baseline Survey, Chapleau, 2013 - 2014*
- *Butler Pit Expansion Environmental Monitoring, Cambridge, 2013*
- *Mill Creek Pit Expansion ELC & Breeding Bird Survey, Aberfoyle, 2012*

Residential and Municipal Development

Participated in a variety of studies for a variety of residential and municipal developments. Key tasks included conducting breeding bird surveys nest surveys, amphibian and reptile surveys, botanical inventories, tree inventories and management plans and ELC surveys. Select projects include:

- *Big Bay Point, Innisfill, 2014*
- *Block 27, Vaughan, 2014*
- *Riverbend Subdivision Housing Development, London, 2013*
- *Kitchener Waste Water Treatment Plant, Kitchener, 2013*
- *Kiwanis Trail Extension, London, 2013*
- *Summit Park Breeding Bird, Snake and Snake Hibernacula Surveys, Hamilton, 2011*
- *Mill Pond Park Botanical Inventory, ELC Assessment & Breeding Bird Surveys, Richmond Hill, 2011*
- *Lackner Boulevard Tree Management Plan, Kitchener, 2011*
- *Jefferson Forest Edge Management & Tree Preservation Plan, Richmond Hill, 2011*
- *Block 12 Large Restore Buffer Vegetation Monitoring, Vaughan, 2010 – 2011*

Certifications and Training

2015 Butternut Health Assessment
2014 MNR/ON Reptile and Amphibian Field Survey Training Course
2013 Dragonflies and Damselflies Identification Workshop, University of Guelph Arboretum
2013 Warbler Identification Workshop, University of Guelph Arboretum
2013 Animal Tracking Workshop, University of Guelph Arboretum
2013 Owl Identification Workshop, University of Guelph Arboretum
2011 Natural Heritage Information Centre Data Sensitivity Training
2011 Class 2 Backpack Electro Fishing Certification
2011 Ontario Stream Assessment Protocol Certification
2011 MTO/DFO/MNR Protocol for Protecting Fish Habitat Workshop
2010 MNR Ecological Land Classification for Southern Ontario Certification
2010 Asters/Goldenrod Identification Workshop
2009 MNR Ontario Wetland Evaluation System Certification
2009 OSAP Level 1 Fish Identification Certification

Daniel S. Westerhof, B.Sc., MES
Terrestrial Ecologist

Profile

2010 – Present	Terrestrial Ecologist, Beacon Environmental
2009	Assistant Field Botanist, Toronto and Region Conservation Authority
2009	Tree Research and Monitoring Specialist, ReForest London
2008	Stream Inventory Technician, Lake Simcoe Region Conservation Authority
2007 – 2008	Stewardship Co-ordinator, Friends of the Rappahannock
2007	Assistant Field Botanist, Toronto and Region Conservation Authority
2005	Ecological Restoration Technician, City of Toronto

Education

2007	Master's in Environmental Studies, York University, Toronto, ON
2001	B.Sc. Biology, Calvin College, Grand Rapids, MI

Expertise

Dan is a field ecologist, botanist, and project manager with 12 years of professional experience in the environmental field, working in Ontario and the United States. His core areas of expertise include: botanical surveys, vegetation community classification, ecological monitoring, arborist assessments and tree preservation plans, and ecological restoration. Dan has strong plant identification skills, particularly concerning Ontario flora, and is certified and well-versed in the Ecological Land Classification (ELC) system and Ontario Wetland Evaluation System (OWES). Dan has contributed to numerous small and large scale ecological inventories and assessments in Ontario during his time with Beacon and while previously working as a field botanist for the Toronto Region Conservation Authority. Dan is also an ISA Certified Arborist and has completed the ISA Tree Risk Assessment Qualification (TRAQ). He regularly conducts tree inventories and prepares tree preservation plans for public and private sector clients. Dan has also contributed to numerous ecological restoration and invasive species management initiatives in Ontario and the United States.

Selected Experience

Environmental Impact Studies and Environmental Assessments

Participate in numerous Environmental Impact Studies (EIS), Environmental Assessments, and Natural Heritage Evaluations, studies for land development and infrastructure projects. Key tasks include conducting ELC surveys and vegetation inventories, wetland delineation and assessment, amphibian and reptile surveys, policy analysis, and impact assessment. Select project include:

- *Victoria Feedermain, Town of Caledon, 2013-2014*
- *CP Rail Crossing at New Coronation Road EA, Town of Whitby, 2013-2014*
- *New Post Creek Hydroelectric EA, Abitibi Canyon, OPG, 2011-2013*
- *10th Line West and Thomas Street EIS, City of Mississauga, 2011-2013*
- *Block 48-1 and 48-2 EIR, City of Brampton, 2012-2014*
- *Four X Lands EIR, City of Brampton, 2011-2015*
- *Aurora 2C Road Crossings EIS, Town of Aurora, 2013-2014*
- *North Leslie MESP, Town of Richmond Hill, 2010-2014*
- *Southwest Georgetown Secondary Plan Study, Georgetown, 2013-2014*
- *Merton Tertiary Plan EIS, Town of Oakville, 2012-2013*
- *Evergreen EIS (Dundas and Tremaine), City of Burlington, 2012-2015*

Arboriculture

Regularly conducts tree inventories and prepares tree preservation plans and arborist reports for public and private sector clients. Select projects include:

- *Mayfield Road Widening EA Tree Inventory, Town of Caledon and City of Brampton, 2014*
- *Applewood Creek EA Tree Inventory and Preservation Plan, City of Mississauga, 2011-2012*
- *Pinnacle Uptown Tree Inventory, City of Mississauga, 2012*
- *1342 Queen Street Tree Inventory and Preservation Plan, City of Brampton, 2015*
- *1403 Queen Street Tree Inventory, 2015*
- *Eglington Crosstown LRT, Tree Inventory, City of Toronto, 2011*
- *Brampton Block 48-1 and 48-2 Tableland Vegetation Assessment, City of Brampton, 2012*
- *Four X Lands Tree Inventory and Preservation Plan, City of Brampton, 2012*
- *Oxford St and Bathurst St Tree Inventory and Preservation Plan, Town of Richmond Hill, 2012*
- *Lots 107, 108, and 109 Fairport Road Tree Inventory and Preservation Plan, City of Pickering, 2012*

Ecological Inventory and Monitoring

- *Wetland Restoration Monitoring at Keswick Sewage Treatment Plant, 2015-Present*
- *Riparian Restoration Monitoring of Davis Creek, Hamilton, 2014-2015*
- *Riparian Restoration Monitoring of Cooksville Creek, Mississauga, 2014-Present*
- *Prairie Restoration Monitoring, Hidden Valley Park, 2014-Present*
- *City of London EIS Performance Monitoring, 2012-2013*
- *City of Toronto Environmentally Significant Areas Study, 2010-2011*
- *Nanticoke Generating Station Biological Surveys and Monitoring, OPG, 2012 & 2013*
- *Little Abitibi Provincial Park Ecological Integrity Study, 2010*
- *Biological Monitoring for Nestle Waters Canada, Aberfoyle, ON, 2010-2011, 2014-Present*

Ecological Restoration and Enhancement Plans

Regularly prepare restoration and enhancement plans for woodlands, wetlands, ravines, buffers, and other natural heritage features. Provide oversight during implementation of restoration plans and follow-up monitoring. Plans include site clean-up, invasive species management, buffer plantings, reforestation, native plant salvage, and edge management. Select projects include:

- *Cooksville Creek Restoration and Enhancement Plan and Monitoring, City of Mississauga, 2013-2014*
- *Woodland Restoration and Enhancement Plan, 1455 Joshua's Creek Dr.,Town of Oakville, 2014*
- *Woodland Enhancement Plan and Monitoring, Thomas St. & 10th Line W., Mississauga, 2011-2013*
- *Milton Heights Wetland Enhancement Plan, Town of Milton, 2013*
- *Ravine Stewardship Plan, 120 Old Colony Road, City of Toronto, 2014-2015*
- *Ravine Stewardship Plan, Park Lawn Rd and The Queensway, City of Toronto, 2011-2012*
- *Ravine Restoration and Enhancement Plan, Trafalger Rd & Steeles Ave, Halton Hills, 2011-2012*
- *Ravine Stewardship Plan, Albion Rd and Islington Ave, City of Toronto, 2011*

Certifications and Training

2014 Butternut Health Assessment
2013 ISA Tree Risk Assessment Qualification
2013 Standard First Aid and Level C CPR
2012 Ontario Wetland Evaluation System (OWES)
2011 ISA Certified Arborist
2010 Ecological Land Classification (ELC)

Lindsey Waterworth, B.Sc.
Aquatic Ecologist

Profile

2008 - Present Ecologist, Beacon Environmental
2007 - 2008 Research Assistant, Aquatic Ecology Laboratory, Trent University
2005 & 2006 Research Assistant, Department of Fisheries and Oceans, GLLFAS, Sault Ste. Marie

Academic Qualifications

2008 B.Sc. (Honours), Biology - Trent University, Peterborough, Ontario
2006 Fish and Wildlife Technologist Diploma - Sir Sandford Fleming College, Lindsay, Ontario
2005 Fish and Wildlife Technician Diploma - Sir Sandford Fleming College, Lindsay, Ontario

Expertise

Ms. Waterworth is an Aquatic Ecologist with Beacon Environmental with over ten years' experience in environmental consulting and ecological research. Her consulting and research background allows her to develop applicable approaches to project execution. She has a strong background in collecting field data as well as completing data analysis. Lindsey has played a key role in a number of Environmental Impact Studies and Environmental Assessments in support of land development, power generation projects and linear infrastructure. As well, she has undertaken biological monitoring studies for Species at Risk for aquatic species, birds and bats, with responsibility for project management, study design, field work, data analysis and reporting.

She has extensive experience in fish population evaluations, aquatic habitat assessments, benthic macro-invertebrate sampling, water quality monitoring and is skilled in a variety of assessment and monitoring techniques for both small and large aquatic systems. Lindsey can identify both common and rare aquatic species and is knowledgeable in their life processes and habitat requirements. She is familiar with provincial and federal environmental regulatory procedures and is capable of identifying opportunities and constraints consistent with applicable policies and legislations as they apply to aquatic systems and surrounding natural environments. Lindsey has used this knowledge to assist in the successful negotiation of *Conservation Authorities Act* permits, *Fisheries Act* Authorizations and *Endangered Species Act* permits.

Selected Experience

Environmental Assessments

- *Replacement of Six Bridges Highway 11 and 583, Hearst, Ministry of Transportation*
  Responsible for the assessment of fish habitat, the development of mitigation measures and fish habitat compensation plans as well as construction mitigation measures.

- *Darlington Nuclear Generating Station Refurbishment Federal EA*
  Undertook terrestrial field investigations to document existing natural conditions at the Darlington Nuclear Site and co-ordinated and completed aquatic and terrestrial sampling as part of an Ecological Risk Assessment.

- *New Nuclear – Darlington Environmental Assessment Federal EA*
  Investigated and reported existing natural conditions at the Darlington Nuclear Site. Identified effects of development on the aquatic and terrestrial environment and developed mitigative option to reduce impacts

- *Steeles Avenue/ Finch Avenue Class EA, Region of Peel*
  Assisted in completing the natural environment component of a Class EA. Collected and summarized relevant secondary source natural environment information as well as reported on existing aquatic conditions.

Environmental Monitoring

- *Darlington Nuclear Generating Station Annual Biodiversity Monitoring Program*
  Completed monitoring for species at risk birds and acoustic monitoring for bats. Carried out bat acoustic data analysis to identify species.

- *Stone Castle Redside Dace Monitoring, City of Brampton*
  Developed and carried out a monitoring program in conjunction with the Ministry of Natural Resource to assess potential impacts to Redside Dace habitat as a result of dewatering.

- *Bank Swallow Monitoring Program, Ontario Power Generation*
  Developed and implemented the Bank Swallow Monitoring Program, Responsible for data collection, analysis and preparation of technical reports for the program.

- *Clarkway Tributary Monitoring Program, City of Brampton*
  Developed and implemented a terrestrial and aquatic monitoring program consistent with Natural Channel Design Monitoring Program Protocols.

Environmental Impact and Natural Heritage Studies

Participated as a member of multidisciplinary project teams conducting Environmental Impact and Natural Heritage Studies in support of development applications.

- *Lucas Point Industrial Lands, Town of Cobourg*
- *Water Street, City of Peterborough*
- *Columbus Subwatershed Study, City of Oshawa*
- *Berczy Glen Subwatershed Study, City of Markham*
- *Duffins Village, Town of Ajax*
- *Seaton Neighbourhood, City of Pickering*

Certifications and Skills Development

- Acoustic Bat Monitoring Workshop - 2015
- DFO Species at Risk Workshop – 2015
- Certified Inspector of Erosion and Sediment Control Training – 2015
- MNR Bat and Bat Habitat Training – 2012
- Class I Electrofishing – 2011
- MTO/DFO/MNR Fisheries Specialist Certification Course – 2011
- Mussel Identification Workshop - 2009
- Ontario Stream Assessment Protocol – 2008
- Class II Backpack Electrofishing – 2005 (re-certification – 2008)

Joel Davey, B.BRM, CISEC
Environmental Inspector

Profile

2014 to 2015	Environmental Inspector, Beacon Environmental
2012 to 2014	Environmental Inspector, Groundwater Environmental Management Services
2012	Environmental Technician, Cole Engineering
2011 to 2012	Environmental Technician, Toronto and Region Conservation Authority (TRCA)
2010	Environmental Field Technician, Vaughan Agricultural Research Services (VARS)
2009	Junior Environmental Warden, Canadian Wildlife Services, Environment Canada

Education

2006-2010	Bachelor Bio-Resource Management (B.BRM), University of Guelph, Guelph, ON

Expertise

Joel is an Environmental Inspector with experience in construction monitoring and providing support on a wide range of projects. Joel holds accreditation with the Certification of Inspector of Erosion and Sediment Control (CISEC) program, Ontario Stream Assessment Protocol (OSAP), and is also certified in Class 2 Backpack Electrofishing. Joel possesses identification skills of Ontario fish species, and holds certification in identifying Ontario's aquatic Species At Risk (SAR). He regularly provides on-the-ground supervision for small, medium and large-scale developments in southern Ontario before, during and following construction. He has provided supervision and inspection services for a wide range of project types including watermain/feedermain installations, road widenings, subdivision developments, wetland/habitat remediation, and watercourse realignments.

Selected Project Experience

Environmental Inspector, Peel Region Feedermain Installation – Hanlan Contract 2: 2014 - Present

Lead Environmental Inspector overseeing the installation of approximately 2.7km of a 2400mm diameter feedermain from Golden Orchard Drive to Eastgate Parkway, along Dixie Road in Mississauga, ON. As an Environmental Inspector with Beacon Environmental, Joel is responsible for undertaking regular environmental assessments for the ongoing construction area and adjacent natural features, completing project PTTW requirements, Erosion and Sediment Control (ESC) report submissions, and acting as liaison with government and regional staff.

Environmental Inspector, City of Brampton Block Plan Development – Sub-Area 1 & 3, Credit Valley Secondary Plan Area, Bluegrass Developments Ltd.: 2014 - Present

Lead Environmental Inspector throughout the construction stages of a block plan development in Brampton, ON. The development site is bisected by a reach of Huttonville Creek, within the Credit River Valley watershed, a reach identified as habitat for the endangered Redside Dace by the Ministry of Natural Resources and Forestry (MNRF). Project responsibilities included the monitoring of ESC conditions, PTTW requirements, ESA monitoring submissions, and implementation of MNRF-approved monitoring plans to reduce various ecological impacts to the adjacent valley corridor and Redside Dace habitat.

Environmental Inspector, City of Vaughan Block Plan Development – Block 61 West, Nashville Developments Inc. (Nashville Heights Subdivision): 2014 – Present

Lead Environmental Inspector for a multi-phase development in Kleinburg, ON. Undertaking regular inspections and attending meetings to discuss mitigation strategies for development within proximity to tributaries of the West Humber River watershed. Joel was involved in the planning process for watercourse realignment strategies to accommodate site development and promote restoration to a reach of an adjacent tributary. Staff from the City and TRCA regularly contact Joel for project updates, timing of works, site improvements, and information regarding natural features.

Key Personnel, Town of East Gwillimbury: Holland River Boulevard and West Street Sewage Pumping Station Upgrades - Watercourse Monitoring for the East Holland River, Holland Landing Pumping Station: 2012 – 2014

Key Personnel member for the monitoring of potential impacts to the East Holland River during upgrade works related to the Holland Landing Pumping Station. Joel conducted long-term environmental monitoring for water quality, impacts to riparian vegetation, potential impacts to wildlife, and impacts to downstream habitat areas.

Key Personnel, Town of East Gwillimbury: West Holland Landing Holland Green Subdivision Development – Construction and watercourse monitoring during construction staging: 2012-2014

Key Personnel member responsible for monitoring overall watercourse health during construction staging. Joel oversaw the installation of mitigation measures to prevent sedimentation within tributaries of the East and West Holland Rivers that intersected the site at various locations. Joel worked with conservation, regional and development staff to reduce potential impacts to the watercourse, especially during periods of widespread vegetation removal.

Relevant Training

- Ontario Species At Risk (SAR) Workshop certification, 2015
- Introductory 3-day Ontario fish species identification course, 2015
- Ontario Stream Assessment Protocol (OSAP) Certification, 2014
- Certified Inspector of Sediment and Erosion Control (CISEC), 2014
- Class 2 backpack Electrofishing Certification, 2013

Appendix I

Nanticoke Solar Property Access

Access to Adjacent Lands

Appendix I

Nanticoke Solar

Legend

- Project Location Plus 50 m Setback
- Project Location
- Lot Fabric (LIO, 2016)
- Area of Alternative Site

LIO: 2015; Beacon Environmental: 2015.

UTM Zone 17 N, NAD 83

First Base Solutions
Web Mapping Service 2010

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BEACON ENVIRONMENTAL

Project 214350
December, 2016

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